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Report No: 53050-MD

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF SDR6.80 MILLION
(US$10.00 MILLION EQUIVALENT)

TO THE

REPUBLIC OF MOLDOVA

FOR A

DISASTER AND CLIMATE RISK MANAGEMENT PROJECT

JULY 6, 2010

CURRENCY EQUIVALENTS

(Exchange Rate Effective, July 6, 2010)

Currency Unit	=	Leu
Leu 12.9940	=	US$ 1
US$ 1	=	Euro 0.81520

FISCAL YEAR
January - December

ABBREVIATIONS AND ACRONYMS

APL	Adaptable Program Loan
CAS	Country Assistance Strategy
CRIF	Catastrophe Risk Insurance Facility
DES	Department of Exceptional Situations
DRM	Disaster Risk Management
DCRMP	Disaster and Climate Risk Management Project
EC	European Commission
ECC	Emergency Command Center
EU	European Union
EUMETNET	Network of European Meteorological Services
FM	Financial Management
FMI	Finnish Meteorological Institute
GDP	Gross Domestic Product
GFDRR	Global Facility for Disaster Reduction and Recovery
GIS	Geographic Information System
IT	Information Technologies
MDG	Millennium Development Goals
MAFI	Ministry of Agriculture and Food Industry
MoE	Ministry of Environment
MoF	Ministry of Finance
MoIA	Ministry of Internal Affairs
SEE	South Eastern Europe
SEE DRMAP	South Eastern Europe Disaster Risk Mitigation and Adaptation Program for South Eastern Europe
SEEC	South Eastern Europe and Caucasus
SHS	State Hydrometeorological Service
SOE	Statement of Expenses
UNDP	United Nations Development Programme
UN ISDR	UN International Strategy for Disaster Reduction
WMO	World Meteorological Organization

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PROJECT APPRAISAL DOCUMENT

EUROPE AND CENTRAL ASIA

ECSSD

Date: July 6, 2010	Team Leader: Salman Anees
Country Director: Martin Raiser	Sectors: Central government administration (100%)
Sector Manager/Director: Wael Zakout	Themes: Natural disaster management (100%)
Project ID: P115634	Environmental category: Partial Assessment
Lending Instrument: Specific Investment Loan	Joint IFC:
	Joint Level:

Project Financing Data

[ ] Loan [X] Credit [ ] Grant [ ] Guarantee [ ] Other:

For Loans/Credits/Others:
Total Bank financing (US$m.): 10.00
Proposed terms:

Financing Plan (US$m)

Source	Local	Foreign	Total
BORROWER/RECIPIENT	0.00	0.00	0.00
International Development Association (IDA)	3.51	6.49	10.00
Total:	3.51	6.49	10.00

Borrower:
Republic of Moldova
Moldova

Responsible Agency:
Ministry of Environment
Street Cosmonautilor 9, of 614A etaj 6
Moldova
MD-2005
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Moldova

Estimated disbursements (Bank FY/US$m)									
FY	2011	2012	2013	2014	2015				
Annual	0.50	3.25	3.75	2.00	0.50				
Cumulative	0.50	3.75	7.50	9.50	10.00				

Project implementation period: Start September 30, 2010 End: September 30, 2014
Expected effectiveness date: September 30, 2010
Expected closing date: September 30, 2014

Does the project depart from the CAS in content or other significant respects? ***Ref. PAD I.C.***	[ ]Yes [X] No
Does the project require any exceptions from Bank policies? ***Ref. PAD IV.G.***	[ ]Yes [X] No
Have these been approved by Bank management?	[ ]Yes [ ] No
Is approval for any policy exception sought from the Board?	[ ]Yes [X] No
Does the project include any critical risks rated "substantial" or "high"? ***Ref. PAD III.E.***	[ ]Yes [X] No
Does the project meet the Regional criteria for readiness for implementation? ***Ref. PAD IV.G.***	[X]Yes [ ] No

Project development objective ***Ref. PAD II.C., Technical Annex 3***

The Project development objective (PDO) is to strengthen the State Hydrometeorological Service's ability to forecast severe weather and improve Moldova's capacity to prepare for and respond to natural disasters.

Project description *[one-sentence summary of each component]* ***Ref. PAD II.D., Technical Annex 4***

Component A. Strengthen the SHS's Severe Weather Forecasting Capacity. The Component aims to strengthen the State Hydrometeorological Service's ability to forecast severe weather and provide decision-makers and other users with more effective, diverse, and timely forecasts and warnings.

Component B. Improve Disaster Preparedness and Emergency Response. The Component aims to strengthen Government capacity to manage emergencies and coordinate disaster response among levels of government agencies units by establishing and operating the Emergency Command Center (ECC), and associated capacity-building activities.

Component C. Initiate Activities for Adaptation to Climate Risks in Agriculture. The Component aims to improve the practical application of agro-meteorological information in the agriculture sector in order to increase its resilience towards adverse weather effects.

Component D. Project Management. The Component will provide fiduciary support to implement Components A, B, and C.

Which safeguard policies are triggered, if any? ***Ref. PAD IV.F., Technical Annex 10***

The project triggers OP 4.01 (Environmental Assessment) and was determined to be World Bank environmental assessment category "B".

Significant, non-standard conditions, **if any**, for:
***Ref. PAD III.F*.**
Board presentation:
None.

Loan/credit effectiveness:
- Joint adoption by MoE, MoIA, and MAFI of the Project Operational Manual in a manner satisfactory to IDA.

Covenants applicable to project implementation:
- Treasury will open foreign currency project designated account in an acceptable commercial bank;

- The Borrower will maintain a financial management system acceptable to IDA;

- The Borrower will prepare quarterly project management-oriented Interim Financial Reports (IFRs) incorporating financial information, procurement monitoring, and physical progress information, and submit them to IDA within 45 days after each calendar quarter-end;

- Project financial statements, withdrawal applications, and designated account will be audited by independent auditors acceptable to IDA and on terms of reference acceptable to IDA. The annual audited financial statements and audit reports will be provided to IDA within six months of the end of each fiscal year;

- The Recipient will monitor and evaluate the progress of the project and prepare semi-annual Project Reports to be transmitted to IDA not later than one month after the end of the period covered by such report;

- The Recipient shall prepare a report on the execution of the project not later than March 31, 2015 or any later date as agreed with IDA.

I. STRATEGIC CONTEXT AND RATIONALE

A. Country and sector issues

1. Moldova is landlocked between Romania to the west and Ukraine to the north, east and south; the country has a surface area of 33,840 km^2, and is home to over four million people. Moldova's rich soils and mild climate are ideal for farming and the country has the potential to be a major supplier of agricultural products to Eastern Europe. However, this ideal climate is changing; extreme climatic events such as early frost onset, flash floods, hailstorms, droughts, and other extreme weather are becoming more frequent. In 2009, estimated per capita Gross Domestic Product (GDP) was US$1,514, making it the poorest country in Europe, and eligible for International Development Association (IDA) assistance.[1] Clearly, reducing Moldova's vulnerability to extreme weather events and natural hazards, and mitigating subsequent losses due to disasters are a priority for Moldova's economic development. The proposed Project would contribute to these goals.[2]

2. Moldova's economy is in recession and the global financial crisis has undermined every main source of earlier economic growth: remittances, private consumption, exports, and private investment. The country suffered weakened domestic and external demand, fiscal imbalance, limited financial intermediation, and rising poverty. During 2009, Moldova experienced two Parliamentary elections, April 5 and July 29, which distracted Government from economic priorities just as the worst effects of the global financial crisis manifested. The first Parliamentary elections were contested in demonstrations that spilled over into civil unrest. The second election produced a new coalition of four liberal democratic parties, which became the Alliance for European Integration in August 2009, but twice failed to elect a President. Therefore, general elections are again likely in the latter half of 2010.

3. Against this turbulent political backdrop, Moldova's fragile economy remains highly vulnerable to other shocks such as natural disasters, particularly in agriculture and related sectors. Moldova is exposed to many types of hazards, including floods, droughts, and earthquakes, which can lead natural disasters and add to economic vulnerability. Climate variability is likely to increase the frequency and intensity of natural disasters as evidenced by, most recently, the catastrophic disasters associated with the 2007 drought and devastating 2008 floods. The 2007 drought caused estimated losses of about US$1.0 billion; the 2008 floods cost the country about US$120 million. But even earlier, during 1984-06, Moldova's average annual economic losses due to natural disasters were about US$61 million, or 2.13 percent of national GDP;[3] data from the International Disaster Database (EM-DAT) during those years show that floods comprised 50 percent of natural disasters.[4] Now, windstorms and droughts cause frequent disasters, and frost, hail, windstorms, and landslides damage property and livelihoods. Country-

[1] Population figure includes Transnistria; per capita GDP is in current market prices (source: International Monetary Fund, World Economic Database).
[2] Disasters are often described as a result of the combination of: the exposure to a hazard (e.g., a flood); the conditions of vulnerability that are present (e.g. land use); and insufficient capacity or measures to reduce or cope with the potential negative consequences.
[3] *Mitigating the Adverse Financial Effects of Natural Hazards on the Economies of South Eastern Europe: A Study of Disaster Risk Financing Options* (South Eastern Europe Disaster Risk Mitigation and Adaptation Programme).
[4] Available only from 1984 onward.

level statistics show that nine severe droughts occurred during 1990-07. The 2000 drought crippled Moldovan agriculture in the spring and summer and affected about 2.6 million people. According to the UNDP, the proportion of overall agricultural losses in affected areas was between 70 and 90 percent. Historic records reveal earthquake damage; for example, in 1940, Chisinau experienced a magnitude 7.3 earthquake (Richter scale) while the 1986 Vrancea earthquake caused estimated losses equivalent to US$500 million.[5]

4. ***Institutional arrangements for disaster risk management***.[6] In Moldova, multiple government levels are responsible for disaster risk management (DRM). In 2001, Moldova created the Republican Commission for Emergency Situations as the main entity responsible for managing major emergencies. The Head of the Commission is the Prime Minister; the deputy head is the Director of the State Department of Exceptional Situations (DES), which is responsible for disaster prevention, response, relief and recovery. The Commission meets semi-annually and includes representatives from all line ministries and executive branches. District and local emergency commissions have a similar structure and include heads of local governments and relevant public services. During emergencies, members are notified immediately and meet to evaluate the level of threat to people, the economy, and infrastructure and agree on responses. The emergency commissions and DES create five-year preparedness and response plans, and hold regular meetings to discuss, update, and ratify these plans. District and local-level emergency planning is updated annually; as are sector plans, for example, for flood protection. DES-coordinated emergency response exercises are carried out every five years, on average.

5. Moldovan government agencies communicate by telephone, fax, and mobile phone, and limited use of radio communications. The DES staff has access to dedicated radio communication channels but most of the technology is outdated. Each organization has its own internal radio frequency, and inter-agency communication among medical units, police and fire brigades can be established over a standard frequency, activated during emergencies. In practice, mobile phones dominate communication among disaster response units. Emergency communication and disaster management information systems are deficient; DES has no emergency management center or modern information technology to facilitate coordination during disaster emergencies.

6. In addition to the DES, the State Hydrometeorological Service (SHS) under the Ministry of Environment provides critical support in disaster preparedness by providing Government, agencies, and the public with accurate and timely daily to five-day forecasts to prepare for severe weather emergencies. Floods, flash floods, severe weather, hail, and high winds are the biggest threats to human life. The existing SHS data network is inadequate to provide short-term (0-12 hours) or longer-term forecasts, and SHS lacks capacity to provide localized forecasts using weather radar. Although some radar data are available within the country, for example, from the

[5] Using the prevailing exchange rate: US$1=0.8 ruble). Source: Institute of Geology and Seismology of the Academy of Sciences of Moldova and a joint damage assessment by the International Red Cross and the Department of Exceptional Situations (DES).

[6] Disaster Risk Management is the systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster (Source: United Nations International Strategy for Disaster Reduction).

airport in Chisinau, data are neither reliably available nor digitized, which limits applications. Romanian radar data are available intermittently but are not useful to quantify rainfall estimates. Furthermore, under existing conditions, the SHS is unable to fulfill its international commitments for supplying hydrometeorological data to strengthen regional and global cooperation for improving hydrometeorological modeling and services to promote human safety and economic development.

7. ***Adopting regional approaches.*** Natural disasters do not respect national borders, and Moldova's small size makes regional cooperation crucial for future disaster preparedness and mitigation. Therefore, it is essential to identify regional strategies to reduce disaster risk across Moldova and its neighbors over the coming years. Government has pursued regional cooperation through activities of the Disaster Preparedness and Prevention Initiative and NATO (North Atlantic Treaty Organization). In this context, the South Eastern Europe Disaster Risk Mitigation and Adaptation Program (SEE DRMAP), a joint initiative comprising analytical and advisory activities of the World Bank and the United Nations International Strategy for Disaster Reduction (UNISDR)[7] identified areas that are important for reducing disaster risk in the region over the coming years. Some of these areas are the focus of country-level activities such as the proposed Disaster and Climate Risk Management Project (DCRMP).

8. Specifically, for Moldova, SEE DRMAP has identified hazard monitoring, early warning, disaster management, and climate change adaptation as issues requiring special attention. Other analytical work and stakeholder consultations have validated these priorities, including analytical work by the World Bank and the United Nations Development Programme (UNDP). In addition to strengthening national capacity to manage natural disaster risk, Moldova can pursue regional strategies such as linking its radar data and hydrometeorological data network to those of neighbouring countries and the World Meteorological Organization (WMO). The proposed Project supports this initiative. Moldova can also participate in financial risk pooling and market-based risk transfer mechanisms. A Catastrophe Risk Insurance Facility for South Eastern Europe and the Caucasus (SEEC CRIF) could address this need and has been established under the SEE DRMAP. While the Government has decided against participation in the SEEC CRIF at this time, it may choose to do so in the future.

B. Rationale for Bank involvement

9. During 1984-06, the World Bank financed 528 projects, an estimated US$26 billion in lending, to respond to natural disasters.[8] Historically, the Bank has provided post-disaster reconstruction assistance, but recently the focus has shifted to support disaster preparedness and mitigation, and catastrophe risk financing. In addition, the World Bank, in partnership with other organizations, has developed critical policy tools and knowledge products, including instruments to assess post-disaster damage, disaster area needs, hazards and vulnerability, and risk-transfer instruments.

[7] *South Eastern Europe Disaster Risk Mitigation and Adaptation Program*; World Bank, UN ISDR; March 2008
[8] *Hazards of Nature, Risks to Development – An IEG Evaluation of World Bank Assistance for Natural Disasters*; Independent Evaluation Group (IEG), World Bank, 2006

10. In the Europe and Central Asia (ECA) Region, there is increasing recognition that countries are interested in proactive measures to prepare for disaster and manage risks, including the impacts of climate change. The Bank has supported projects in disaster risk reduction in Turkey, Romania, Poland, and Albania, among others. In 2009, a major World Bank report, "Adapting to Climate Change in Eastern Europe and Central Asia," presents links between climate change and disaster management, and a useful framework to develop climate change adaptation action plans.[9] These are examples of many similar World Bank activities to develop a body of knowledge and practice that is useful to natural-hazard vulnerable countries such as Moldova.

11. The Government of Moldova is receiving technical assistance for disaster risk management and climate change adaptation from other development partners, and is eager to complement this technical assistance with the combined knowledge and finance that the Bank is uniquely placed to offer, to reduce vulnerability to natural hazards and introduce climate risk management.

C. Higher level objectives to which the project contributes

12. The proposed Project will contribute to poverty alleviation through disaster risk management to protect the most vulnerable segment of society. Disaster impacts on poor people are disproportionately severe; poorer people tend to live in disaster-prone areas and recurrent disasters erode their already minimal assets and livelihoods. Section IV of the Millennium Development Goals (MDG) declared intention "to intensify our collective efforts to reduce the effects of natural and man-made disasters."

13. The Country Partnership Strategy (CPS; Report No. 46822-MD, approved by the Board on January 29, 2009) for FY09-12, highlights the importance of disaster risk management in the context of economic vulnerability, particularly the impact of weather-related natural hazards on agriculture. Climate variability has already reduced Moldovan livelihoods, leading Government to request World Bank support to: (i) deliver reliable and timely weather services; (ii) strengthen disaster management capacity; and (iii) develop initiatives to help farmers adapt to adverse weather and climatic conditions. The proposed Project will support these three areas.

II. PROJECT DESCRIPTION

A. Lending instrument

14. The proposed lending instrument for the Moldova DCRMP is a Specific Investment Loan (SIL) of US$10.00 million through IDA Credit with 20 years to maturity, including 10 years grace period. Project implementation is anticipated to be about four years.

B. Program objective and Phases

15. Not applicable.

[9] World Bank, 2009

C. Project development objective and key indicators

16. The Project development objective (PDO) is to strengthen the State Hydrometeorological Service's ability to forecast severe weather and improve Moldova's capacity to prepare for and respond to natural disasters. The PDO will be achieved through strengthened capacities to: (i) monitor weather and issue early warnings of weather-related hazards by providing timely and accurate hydrometeorological forecasts and services; (ii) manage and coordinate responses to natural and man-made disasters; and (iii) help individuals, particularly farmers, be aware of, and adapt to natural hazards and climate variability.

17. Key outcome indicators for achievement of Project objectives will be the following:

- Issuing more accurate and specific forecasts of weather conditions
- Expanded lead-time for weather warnings to users, particularly DES
- Strengthened capacity to coordinate emergency responses

D. Project components

18. The Moldova DCRMP proposes four components: (A) strengthen the SHS's severe weather forecasting capacity; (B) improve disaster preparedness and emergency response; (C) initiate activities for adaptation to climate risks in agriculture; and (D) support project management. A summary of project-supported components is provided below while more detailed description of project design is included in Annex 4.

Component A: Strengthen the SHS's Severe Weather Forecasting Capacity

19. This Component aims to strengthen the State Hydrometeorological Service's ability to forecast severe weather and provide decision makers and other users with more effective, diverse, and timely forecasts and warnings.

20. ***Sub-Component A.1 – Develop Early Warning/Nowcasting Capabilities***. Economic losses from severe weather, flash floods and floods can be significantly reduced by establishing a "nowcasting" system.[10] This sub-component will strengthen data, communications, and modeling technology to provide timely, accurate, and geographically precise weather hazard warnings. The sub-component will support automation of the hydrometeorological observation network to accelerate accurate data delivery to users for more effective decision-making. This sub-component will upgrade meteorological instruments and hydrologic gauges to automated sensing systems to provide users with data and will also increase computer quantity and software quality to create more useful data and effective forecast products for users. Strengthening Moldova's hydrometeorological data has potential for benefiting neighboring countries. Sharing of hydrometeorological data and information with countries in the region has potential for improving forecasting capabilities for Moldova's SHS as well as its partners.

21. ***Sub-Component A.2 – Dual Polarization Doppler Radar Technology for Localized Forecasts***. A Dual polarization Doppler radar is now the most effective meteorological tool to

[10] The forecasting of the weather within the next six hours is often referred to as nowcasting (Source: Glossary of Meteorology).

predict floods, high winds, hail, and other severe weather, and issue warnings. This sub-component will improve meteorological modeling systems by providing a mesoscale model and Integrated Meteorological Workstation, and eventually a hydrologic modeling system for predicting flash–floods. These will provide best practices in delivering effective warnings to the Department of Exceptional Situations (DES), Ministry of Agriculture and Food Industry (MAFI) and other users of SHS services.

22. ***Sub-Component A.3 – Development of Plans for Seasonal/Climate Forecasts***. Building a real-time hydrometeorological data system is a first step to improving medium- to long-term forecasting. Improving and automating agro-meteorological data collection and distribution will improve drought forecasting. The next phase in strengthening hydrometeorological forecasting for drought involves expanding forecasting capability to monthly and seasonal scales. SHS is developing a monthly climate forecasting program, and starting to build a national drought forecasting center, which is part of the World Meteorological Organization Eastern Europe Regional drought forecasting program. Building the data system leads to more effective input to Global and Regional Decadal climate forecasting models to improve accuracy of model simulations to use for adaptation. This sub-component will support the SHS to develop plans for such a data system and, if resources permit, to provide investments for equipment.

23. ***Capacity Building***. To ensure that the proposed Project investments are implemented effectively and that the SHS upgrades its technical capacity, the Global Facility for Disaster Reduction and Recovery (GFDRR) has agreed to provide a US$100,000 technical assistance grant in support of the proposed Project. This grant is expected to finance additional staff training in using new equipment and provide opportunities for SHS staff to benefit from international experience in weather and climate service delivery. Some portion of the grant may be used to strengthen DES capacity to coordinate disaster response.

Component B: Improve Disaster Preparedness and Emergency Response

24. This Component aims to strengthen Government capacity to manage emergencies and coordinate disaster response among levels of government agencies by establishing and operating an Emergency Command Center (ECC), and associated capacity-building activities.

25. The ECC would facilitate joint disaster response with agency representatives and could assemble decision makers. It would operate continuously, equipped with a decision-support system to enhance the flow of crucial DES data, such as hydrometeorological forecasts and SHS alerts; this would allow DES to issue timely warnings, and undertake prevention and response measures, including evacuating affected populations.

26. ***Sub-Component B.1 - Feasibility Study and Design***. The Project will support feasibility and design studies as a basis to establish the ECC. The two studies will include: (a) ECC architectural design within the DES headquarters that ensures seismic resilience of structural and non-structural features, and efficient space planning; and (b) information management system design to link DES headquarters with DES local offices and sectoral institutions such as SHS, Ministries of Environment and Agriculture, Institute of Geology and Geophysics, and others. The design would include voice and data transfer capacity and two-way information processing, support daily DES operations, and integrate existing legacy systems. This design will be

informed by existing coordination mechanisms in the country as well as by seeking input from other agencies that participate in disaster preparedness and response.

27. ***Sub-Component B.2 - Establish Emergency Command Center***. When feasibility and design studies are complete, the Project will support establishment of the ECC by financing the following: (i) facility renovation and refurbishment works; (ii) ECC furniture and equipment; (iii) information technology (IT) hardware; (iv) emergency information management software; and (v) communication equipment.

28. ***Sub-Component B.3 – Capacity Building and Evaluation***. DES employees will staff the ECC on an as-needed basis, along with staff from other agencies, particularly during emergencies. The Project will support capacity building for DES and other agencies by providing training in emergency management information system, particularly operating the IT decision-support system, for an estimated 100 staff from 15 agencies and all regional and local DES units. To ensure sustainability and facilitate knowledge transfer, capacity building will be designed as "train the trainers" so participants can transfer knowledge to their colleagues.

Component C: Initiate Activities for Adaptation to Climate Risks in Agriculture

29. The objective of the component is to enhance the practical application of agro-meteorological information in the agriculture sector in order to increase its resilience towards adverse weather effects. This objective will be achieved through support to the following activities.

30. ***Sub-Component C.1 – Development of a Just-in-Time (JIT) Communication Platform***. This sub-component will support the development of the technical architecture (software and hardware) of a mobile JIT communication platform that could serve as a tool to rapidly disseminate critical, localized weather information to a large number of farmers and rural communities. Sub-component C.1 would support the design and testing of the communication platform, including free dissemination of the service to a farmer focus group. The design will focus on the information flows of severe weather alerts originating from the SHS to farmers via a content provider associated with the Ministry of Agriculture and Food Industry (MAFI), and in collaboration with mobile communication companies. Following the design and testing phases the platform could be fully rolled-out by MAFI in collaboration with the SHS and mobile phone companies. Furthermore, the platform could be expanded to evolve into an early warning system that would combine current and forecasted agro-meteorological data to simulate scenarios for crop development, and provide farmers with advice on necessary mitigation/enhancement agronomical measures. Last but not least, the platform can be modulated to include dissemination of other critical information to farmers, such as market and extension information. In this context, synergies with the e-Governance project currently under preparation will also be explored. This sub-component is linked to SHS improvements under Component A.

31. ***Sub-Component C.2 – Adverse Weather Adaptation Advisory Services***. Sub-component C.2 would provide technical advisory services, including grant investment support to farmers, farmer groups and rural communities for piloting and testing activities aimed at increasing awareness about coping and adaptation techniques necessary to make agriculture more resilient to adverse weather. It will build on the country's existing experience in implementing

demonstration plots for adaptation to drought through extension services and aim to expand the existing knowledge base and awareness in the farming community about adaptation techniques to a wider spectrum of risks, such as: (i) frost; (ii) excess snow and water cover of winter crops; (iii) hail storms; (iv) drought; (v) inundation of crops from torrential downpours and rising river waters. Investments supported will include on-farm irrigation, water harvesting basins, anti-hail net systems, protective forest belts, conservation land cultivation, as well as other activities with adaptation potential. Selection of beneficiaries for Sub-component C.2 would be done through a competitive scheme with clear technical, social and financial eligibility criteria.

Component D: Project Management

32. This component will provide fiduciary support for the implementation of the three components. In essence, fiduciary services will be centralized for the proposed Project. The POPs Project Management Team (PMT) housed in the Ministry of Environment will be the Project's fiduciary entity. In particular, the support will enhance the financial management and procurement functions as well as, if necessary, the technical aspects of project implementation, including monitoring and evaluation.

E. Lessons learned and reflected in the project design

33. *Focus on ex-ante disaster risk reduction measures*. The international community recognizes the importance of reducing and mitigating hazard risks in the Millennium Declaration and the UN ISDR Hyogo Framework for Action 2005-2015. Mitigation benefits are difficult to measure because costs associated with disaster impacts are financial, humanitarian, social, and environmental, and many benefits are realized only in the longer-term. Nevertheless, there is a broad consensus that ex-ante disaster risk reduction is more cost-effective than post-disaster actions and recovery. Experts estimate that mitigation investment benefits are 2-7 times higher than the costs, although estimates and analyses vary.

34. *Importance of regional cooperation and coordination.* Natural hazards cross borders and sectors, so managing disaster risks, emergency preparedness, and mitigation requires institutional coordination and collaboration among neighboring countries. Collaboration is necessary and beneficial in weather forecasting and early warning systems, in pooling national risk hazards through insurance mechanisms, and in disaster preparedness and response. South Eastern European countries would be unlikely to cope with a major catastrophe without support and coordination among neighboring states. Successful regional cooperation rests entirely on building national capacity to respond to disasters, thereby gaining sufficient capacity to support other countries during disasters. Therefore, Project components are designed to reduce Moldova's risk *and* contribute to international and regional cooperation.

35. *Integration of weather forecasting systems*. The World Bank has supported projects to enhance weather forecasting in countries such as Poland, Turkey, and Russia, building a body of knowledge and experience. Ensuring sufficient system integration to achieve full functionality is key to successful weather forecasting; hence, Project activities to strengthen weather forecasting capacity will be clustered in a few contracts to ensure inter-operability of SHS systems.

F. Alternatives considered and reasons for rejection

36. The proposed DCRMP was conceived to respond primarily to the agricultural sector. Direct interventions such as developing irrigation systems were considered, but that would require resources far in excess of the relatively limited resources available through the DCRMP. Instead, more development impact could be achieved through indirect support by strengthening SHS, which could provide support to the agricultural sector and the broader economy. Furthermore, other development partners are providing major direct contributions to the agricultural sector, for example, the Millennium Challenge Corporation (MCC). Therefore, Government decided that piloting climate adaptation activities in the agricultural sector may yield results that could be scaled up later on. Finally, Government was concerned about lack of coordination during disasters and decided to support the creation of an Emergency Command Center. The proposed DCRMP maximizes the value and development impact of limited resources.

III. IMPLEMENTATION

A. Partnership arrangements

37. The proposed Project has drawn on analytical work carried out under the SEE DRMAP, a cooperative effort among the World Bank, UNISDR and other international organizations, such as the World Meteorological Organization (WMO) and the EU, with support from the Global Facility for Disaster Reduction and Recovery (GFDRR). Since IDA resources are limited, and Government has requested it, the World Bank will provide assistance to obtain additional financial resources, possibly in the area of Climate Change Adaptation and Sustainable Land Management.

38. The proposed Project will provide the Government with technical tools, investments, and knowledge to improve its capacity to coordinate the response to disasters and emergencies through the creation of the ECC, improved access to information, voice and data transmission capabilities and training. These project-supported activities were developed as part of a broader program of support to capacity building in Moldova for disaster risk management. The investment priorities were developed on the basis of consultations over the last few years with various stakeholders. Key studies were prepared as a result of collaboration between the Finnish Meteorological Institute, UNISDR, WMO, and the World Bank. Some of these studies focused on improving the countries hydromet services while others focused more on direct investments in the agriculture sector. Some other work was done on developing risk reduction frameworks that could be applied to the entire country.

39. Complementary support is also planned by the European Commission (EC) and the UNDP; they are developing possible technical assistance programs. The EC, through its Eastern Partnership initiative, may help to strengthen disaster management capacities through support to: review of civil protection capacities; review of legislative framework, risk assessment, and enhanced cooperation with the EU Civil Protection Mechanism. The program is expected to support studies, training, and exercises in emergency management and the DES could be a main

beneficiary.[11] The UNDP has proposed assisting Government through a €1.8 million Disaster and Climate Risk Reduction Project to provide technical assistance and training to strengthen disaster risk assessment capacity and develop country disaster and climate change risk management strategy. The potential project could help Moldova prioritize actions for a national disaster risk reduction and climate risk management strategies and policies.

B. Institutional and implementation arrangements

40. An inter-ministerial steering committee, chaired by the Minister of State, will coordinate Project implementation. The steering committee will include representatives from the Ministries of Finance, Agriculture and Food Industry, Environment, and Internal Affairs. The Ministry of Environment (through SHS) will implement Component A, the Ministry of Internal Affairs (through DES) will implement Component B, and the Ministry of Agriculture and Food Industry will implement Component C. An existing Project Management Team (PMT) in the Ministry of Environment will manage fiduciary arrangements for all Components. In particular, PMT support will enhance the financial management and procurement functions and any technical aspects of Project management, including monitoring and evaluation. To ensure efficient implementation of the proposed Project, each implementing entity will be asked to nominate a focal point. This focal point will be the primary counterpart for the World Bank's task team and for the fiduciary PMT. To ensure a more transparent fiduciary process, each implementing entity will nominate their representatives who will assist the fiduciary PMT in evaluating bids received in response to tenders for goods, works, and services. Further details of the proposed institutional arrangements for Project implementation are in Annex 6.

C. Monitoring and evaluation of outcomes/results

41. Overall responsibility for Project monitoring and evaluation (M&E) will vest with SHS, DES and MAFI. The M&E activities will be performed according to the framework described in Annex 3, which includes qualitative and quantitative measurements of Project outcomes and outputs. Project outcomes related to strengthening severe weather forecasting, lead time and accuracy of forecasts/nowcasts will be measured by a set of quantitative data to be regularly monitored bi-annually throughout the Project lifetime. Project outcomes related to increased capacity to coordinate disaster response will be measured by Government, which will carry out two inter-sectoral exercises under the National Commission for Emergency Situations, and coordinated by the DES, to test ECC operation at the Project mid-term and Project end. The proposed Project will support an independent M&E of the drills. Following each exercise, reports will include test evaluations and recommendations for improvements.

D. Sustainability

42. *Institutional sustainability.* Government commitment to the Project objective is a good indicator of its sustainability. Borrower ownership has been clear during the Project preparation stage. The State Chancellery, which is in charge of donor aid coordination, will lead an inter-ministerial steering committee including the Ministry of Finance. The Government Strategic

[11] Commission Staff Working Document accompanying the Communication from the Commission to the European Parliament and the Council: Eastern Partnership {COM(2008) 823}.

Planning Committee vetted the proposed Project; the Committee screens all investment proposals to ensure alignment with Moldova's priorities in the post-financial crisis. The SHS and DES have worked closely with the task team to develop Project components and activities, and have been providing all counterpart inputs. The proposed fiduciary PMT includes well-qualified staff with experience in other Bank-financed projects and SHS and DES operations. The SHS has technically competent staff to work with Bank-financed equipment, although more training will be provided in collaboration with other partners such as the WMO and the Finnish Meteorological Institute (FMI) and with the help of a GFDRR grant. The DES communication and IT divisions are adequately staffed to support ECC operation. Moreover, staff will disseminate knowledge gained through Project-provided training under DES and other agencies to other users, which will ensure that decision-support systems are properly used and maintained.

43. *Technical sustainability.* Buildings constructed under the Project, will be maintained beyond Project implementation following normal procedures used for such structures. The long-term sustainability of investments made under the proposed Project depends upon continuing Government budgetary support. Government and implementing agencies have been informed of the need to ensure adequate operating and maintenance budgets. Given the level of commitment demonstrated by the lead agencies and members of the steering committee, and the fact that the ECC and weather forecasting systems and equipment will be in daily use, there is every reason to believe that Government support will continue for DCRMP initiatives. Furthermore, as explained in the PAD section on critical risks, locating the Doppler radar at a site owned by MoldATSA, the airport authority, will significantly reduce ongoing O&M costs for the SHS, due to cost sharing with the airport authority. Monitoring of budget lines for incremental O&M costs for the DES will be undertaken, although such costs are likely to be low.

E. Critical risks and possible controversial aspects

44. *Project sites.* The task team worked closely with SHS on social aspects of the EIA. Visits to project sites identified for construction of new weather and hydrological stations confirmed no significant negative social impacts or resettlement issues arising from planned works in Balti, Ceadir-Lunga Soroca, Malovata Veche and Leova.

45. *Financing of Maintenance and Operating Costs.* As discussed above, the team advised Government that incremental O&M costs may result from some investments and that Government or implementing agencies would bear such costs to ensure post-Project sustainability. If these costs are not budgeted, equipment will likely operate less efficiently. However, Government has indicated to the team that adequate steps will be taken to effectively operate and maintain new equipment purchased under the DCRMP. Specifically, the incremental O&M costs for the Doppler radar, the largest proposed Project investment, will be shared with the airport authority, since radar will also be used for aviation. The long-term sustainability of the emergency communication and information system deployed in the ECC will have Government support to operate and maintain it. Budgetary allocations for the DES have been steadily increasing and there is every reason to believe that sufficient allocations will be available for O&M of the ECC, which will occupy one floor of the DES headquarters.

46. *Implementation capacity and coordination.* This is a risk area given the generally low level of capacity in Moldova and the multiple implementing entities that can lead to coordination

difficulties. The Bank will work closely with the SHS and the DES and help strengthen their capacity with potential support from other partners such as the UNDP, EC, Finnish Meteorological Institute and WMO. Furthermore, a GFDRR grant will directly support capacity building activities to help effectively implement this Project. While different agencies are in charge of implementing individual components, the overall leadership for the project will be provided by a steering committee headed by the Minister of State and all ministries and agencies have agreed to that.

47. *Political risks associated with international data sharing.* The success of the proposed Project will partly depend on the ability of the SHS to partner with other countries and institutions to share weather-related data. Investments to support hydromet services will improve the quality and quantity of data that can be shared with neighboring countries or with the World Meteorological Organization. In turn, neighboring country hydromet services can share their data with the SHS. Some of this cooperation is already taking place. However, there is a risk that political factors may impede such cooperation depending on the preferences of governments in Moldova and its neighboring countries. While such political risks are difficult to mitigate, it is possible to deepen technical cooperation between the SHS and hydromet services in neighboring countries, especially within the ambit of frameworks established by WMO.

F. Loan/credit conditions and covenants

48. Loan effectiveness conditions include:

- Joint adoption by MoE, MoIA, and MAFI of the Project Operational Manual in a manner satisfactory to IDA.

49. Conditions applicable to project implementation:

- Treasury will open foreign currency project designated account in an acceptable commercial bank;
- The Recipient will maintain a financial management system acceptable to IDA;
- The Recipient will prepare quarterly project management-oriented Interim Financial Reports (IFRs) incorporating financial information, procurement monitoring, and physical progress information, and submit them to IDA within 45 days after each calendar quarter-end;
- Project financial statements, withdrawal applications, and designated account will be audited by independent auditors acceptable to IDA and on terms of reference acceptable to IDA. The annual audited financial statements and audit reports will be provided to IDA within six months of the end of each fiscal year;
- The Recipient will monitor and evaluate the progress of the project and prepare semi-annual Project Reports to be transmitted to IDA not later than one month after the end of the period covered by such report;
- The Recipient shall prepare a report on the execution of the project not later than March 31, 2015 or any later date as agreed with IDA.

IV. APPRAISAL SUMMARY

A. Economic and financial analyses

50. Studies have found that investments in infrastructure and services associated with hydrometeorological services exhibit substantial returns to investment. For analytical purposes, Project economic benefits are assumed to be the difference between damages and losses that would occur under with and without Project scenarios due to natural hazards. Economic costs are Project costs expressed in shadow prices. In qualitative terms, key Project benefits include (i) lives saved and injuries reduced, (ii) sustained crucial economic activity, (iii) reduced agricultural losses, (iv) energy conservation, (v) promotion of safe and timely transport by road, rail, and air, (vi) reduced losses in tourism, (vii) avoided severe capital losses as a result of secondary disasters, (viii) avoided time loss for businesses, and (ix) avoided chaos in the aftermath of disasters. The benefits in quantitative terms were estimated based on macroeconomic aggregate data with several assumptions including on (i) national GDP growth, (ii) average annual economic loss from natural disasters, (iii) annual preventable economic loss; and (iv) the Project contribution. Although economic benefits are calculated at the aggregate level, the parameters used in the above-mentioned assumptions include the expected contributions of the project to reduced losses from natural hazards in key sectors including agriculture and infrastructure. Using the restrictive assumptions and parameters discussed in Annex 9, the estimated economic rate of return (ERR) is 25 percent, the net present value of the net benefits is US$10.3 million, and the benefit-cost ratio is 2.0. These figures represent the most conservative levels of economic benefits, and exceed the opportunity cost of capital of 12 percent. Therefore, the project is considered economically viable.

51. Financial analysis is not applicable for this Project, since it is non-revenue generating.

B. Technical

52. Technical requirements for equipment to be procured reflect both general updating of technologies to current standards (Doppler-capable weather radar for the hydrometeorological services) and adaptation to national needs. As for establishing the ECC, IT and communications equipment will reflect current available technologies adapted to national needs and capacities. Civil works will include refurbishment, renovation of existing facilities, construction of small buildings, and installation of weather radar at a site owned by MoldATSA.

C. Fiduciary

53. The implementation of the substance of the components will be carried out by individual implementing agencies. However, due to their lack of experience in implementing Bank-financed projects, the existing POPs PMT, in the Ministry of Environment will manage fiduciary arrangements for all proposed Project components, i.e. procurement, financial management,

monitoring and evaluation, and reporting. The PMT has experience working with the SHS under the POPs[12] Project, and with the DES; therefore, it is well-positioned to support these agencies.

54. ***Financial Management.*** The proposed Project FM arrangements have been reviewed and based on this assessment, it was decided that the PMT has acceptable FM arrangements in place. However, it was agreed that several actions will be implemented so that overall Project financial management arrangements will satisfy the World Bank requirements; these actions are expected to be fulfilled prior to negotiations.

55. The Bank has considered the recent improvement in the Public Financial Management (PFM) environment in Moldova when reviewing and assessing the financial management of this Project. The implications of the PFM issues for the Project have been addressed by the following main actions: (a) a detailed review of the systems was performed for the implementing agencies, PMT and Treasury; (b) the existing PMT capacity will be used, combined with enhanced controls and increased accountability by implementing agencies; (c) Project budgets will be developed and approved annually by the implementing agencies with PMT assistance and by the Project steering committee; (d) Project financial statements will be audited annually by an independent auditor acceptable to IDA.

56. The PMT would handle fiduciary functions of the entire Project, and this would include preparation of consolidated quarterly IFRs including all Project components and sources of funding and audit of annual project financial statements.

57. The overall FM risk for the Project before mitigation measures is substantial and after mitigation measures, the risk is moderate. Detailed FM arrangements are in Annex 7.

58. ***Procurement.*** Project procurement will be carried out in accordance with the World Bank "Guidelines: Procurement under IBRD Loans and IDA Credits" published May 2004 and revised in October 2006 (Procurement Guidelines); and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" published May 2004 and revised in October 2006 (Consultant Guidelines); and the provisions stipulated in the Financial Agreement (FA). For each contract to be financed under the Financing Agreement (FA), the various procurement or consultant selection methods, the need for pre-qualification, estimated costs, prior review requirements, and time frame have been agreed between the Borrower and the Bank in the Procurement Plan (PP). The PP will be updated at least annually or as required to reflect the actual Project implementation needs and improvements in institutional capacity. A General Procurement Notice (GPN) will be published in UNDB on-line and in print and in dgMarket online. Specific Procurement Notices (SPN) will be published for all ICB procurement and Consulting contracts as per Guidelines as the corresponding bidding documents and RFPs become ready and available. Contract Awards will be posted on UNDP on-line and dgMarket as required under the Guidelines.

[12] Persistent Organic Pollutants (POPs) Stockpiles Management & Destruction GEF Project (closing date is December 31, 2010)

D. Social

59. Project social outcomes are expected to be positive. A key social development outcome will be decreased human vulnerability to risk of natural hazards; the Project will reduce human, economic, and financial losses due to natural hazards, which will be achieved by strengthening institutional and technical capacity for disaster management and emergency responses; providing early-warning of weather-related hazards through provision of accurate hydrometeorological forecasts and services; and by helping individuals, particularly farmers, be aware of and adapt to, threats from climate variability, and other natural hazards.

60. Based on the proposed activities, the Project is not anticipated to have any significant adverse social impacts. There will be no land acquisition to trigger resettlement. Five new weather stations will be constructed on government owned land—the state or local public administration; the land is not used by local people, either legally or illegally. Public consultations were conducted for all five sites within the framework of the Environmental Assessment (EA) and Environmental Management Plan (EMP) before Appraisal; local people were informed about Project scope, impact, and expected benefits.

61. An important Project aspect is timely dissemination of forecasts and warnings to communities, farms and villages at risk for hazards. To ensure that these services are accessible to those who are most vulnerable (e.g., small farmers and populations of remote rural villages who depend on subsistence agriculture), information sharing services should be provided in an equitable manner i.e., by combining free services, paid services, and services financed by cost-sharing with local and regional authorities. Achieving an equitable balance among these services should be addressed within the Project scope, in dialogue with SHS, Government, and other stakeholders.

E. Environment

62. Outside of technical assistance (TA) and capacity building activities, the Project will also support several small-scale construction activities for a tower for installing a weather radar Chisinau International Airport, weather and hydrologic stations in Leova, Ceadir-Lunga, Balti, Soroca, and Malovata-Veche locations. Proposed sites are located outside residential areas or on the outskirts of towns and villages. There are no significant natural habitats and or physical cultural resources near the sites. Locations were selected to ensure proper meteorological and hydrological observations and to provide representative data.

63. Based on the proposed activities the Project is not expected to generate any large-scale and significant environmental and social impacts. Potential adverse environmental impacts are related to the construction activities, are minor, temporary, and easily mitigated:

- *Dust, noise and vibration:* These impacts shall occur during construction activities on all sites and are site specific.
- *Land contamination:* construction activities may cause some soil contamination by hydrocarbons, which could contaminate surface and underground water;
- *Waste handling and spill response:* Routine construction activities will generate solid and liquid waste including drywall, machine oil, paints, and solvents. Minor spills of fuel and

other materials are likely to occur during construction. Improper handling of on-site waste and response to spills could result in adverse effects on the local environment including ground water, surface waters, terrestrial ecosystems, and local residents;

- *Waste-water discharge:* construction activities may generate sanitary wastewater discharge;
- *Potential impacts associated with indoor construction activities* include use of noxious/toxic solvents and glues and of lead-based paints.

64. All potential environmental impacts are minor and easily managed during Project implementation. As required by the World Bank and national EIA legislation, an Environmental Assessment (EA) was carried out by the Borrower, who prepared an Environmental Management Plan (EMP). The EMP covers typical mitigation approaches to common civil works with localized impacts and is based on preliminary environmental site evaluation, and on national construction standards. It is proposed that the contractor will ensure safety of workers, will undertake measures for preventing dust and noise pollution, proper handling, transportation and disposal of construction and medical waste materials. The EMP also includes monitoring activities with measures to track mitigation measure effectiveness. Per World Bank requirements, before appraisal, the EMP was disclosed and consultations held in all proposed construction sites.

F. Safeguard policies

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment (OP/BP 4.01)	[X]	[ ]
Natural Habitats (OP/BP 4.04)	[ ]	[X]
Pest Management (OP 4.09)	[ ]	[X]
Indigenous Peoples (OP/BP 4.10)	[ ]	[X]
Physical Cultural Resources (OP/BP 4.11)	[ ]	[X]
Involuntary Resettlement (OP/BP 4.12)	[ ]	[X]
Forests (OP/BP 4.36)	[ ]	[X]
Safety of Dams (OP/BP 4.37)	[ ]	[X]
Projects on International Waterways (OP/BP 7.50)	[ ]	[X]
Projects in Disputed Areas (OP/BP 7.60)*	[ ]	[X]

65. The project triggers OP 4.01 (Environmental Assessment) and was determined to be World Bank environmental assessment category "B."

G. Policy Exceptions and Readiness

66. No policy exceptions are proposed and the project is ready for the implementation.

* *By supporting the proposed project, the Bank does not intend to prejudice the final determination of the parties' claims on the disputed areas*

Annex 1: Country and Sector or Program Background

MOLDOVA: DISASTER AND CLIMATE RISK MANAGEMENT PROJECT

Regional context

67. South Eastern Europe (SEE) is prone to a variety of natural disasters, including floods, droughts, forest fires, earthquakes, and landslides. The impact of climatic changes, accompanied by changes in land use patterns and human settlement in areas that are prone to disasters will increase the risk from weather-related hazards in the coming years. According to projections, the following may be expected from climate change: (i) increases in weather variability; (ii) new extreme values of temperatures, precipitation or wind speed; (iii) new exposures; and (iv) more frequent and damaging disasters.

68. A recent hazard risk assessment carried out for 11 countries of SEE[13] examined the occurrence of different hazards such as earthquakes, floods, landslides, drought, extreme temperature, windstorms, wildfires, epidemics, and technological hazards, and found that all the countries, except Moldova and Slovenia, are prone to seven or more hazards.

69. Disasters have a significant impact on the economic performance and may affect country macroeconomic situation. The most important macroeconomic effects are those related to GDP, sectoral production, the current account balance, indebtedness and public finances.[14] Significant economic losses due to drought have been recorded in Albania, Bosnia and Herzegovina, Croatia, Macedonia, Moldova and Romania.[15] Considering that some climate change projections show temperature rises of up to 4-5°C on average in South Eastern Europe, and yearly rainfall decline of up to 40 percent[16], the frequency of droughts and the economic damages they cause may become more pronounced.

Moldova's vulnerability to natural hazards

70. Moldova is a landlocked country, located between Romania to the west and Ukraine to the north, east and south, with a total area of 33,840 square kilometers. The largest part of the country lies between two rivers, the Nistru and the Prut. The western border of Moldova is formed by the Prut River, which joins the Danube before flowing into the Black Sea. In the north-east, the Nistru is the main river, flowing through the country from north to south. The geographic location of Moldova determines the moderate continental climate, which transitions from an Atlantic Ocean climate to an East-European continental one. This transitional climatic character causes hydrometeorological hazards, such as flood, drought, frost and windstorms, which adversely affect the national economy. However, Moldova's rich soil and temperate continental climate (with warm summers and mild winters) have made the country one of the region's most productive agricultural areas, and a major supplier for its agricultural products.

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[13] *Synthesis Report on South Eastern Europe Countries Disaster Risk*; RMSI; 2007

[14] *Preventable Losses: Saving Lives and Property through Hazard Risk Management*; Christoph Pusch; World Bank 2004

[15] *Synthesis Report on South Eastern Europe Countries Disaster Risk*; RMSI; 2007

[16] *Adapting to Climate Change in Europe – Options for EU Action*; Commission of European Communities; 2007

71. Moldova is highly vulnerable to floods. EM-DAT data for the country, available from 1984, shows that from 1984 to 2006, floods accounted for 50 percent of all disasters. It is very interesting to note that the country reported only hydrometeorological hazards during this period. Moldova is also prone to other natural disasters, such as windstorms, drought, epidemic, extreme temperature, landslide and frost. Historic records show that earthquakes have also occurred as the country is located in proximity to the Vrancea seismic zone.

72. The occurrence of natural disasters during this period (1984-2006) peaked during 1999-2003, with five events in five years; in the last three years (2004-2006), two events were reported. There were no technological disasters recorded by EM-DAT in Moldova during this period.

73. As mentioned earlier, there was a steady increase in the number of events over the time between 1984 and 2003. The number of deaths recorded is highest during 1994-1998. The economic losses showed a decreasing trend, though the number of victims increased, especially during the period 1999-2003. The rise in the number of victims in this period is due to the severe drought of 2000.

74. As per country-level statistics, nine severe droughts occurred in the country during the period 1990-2007. The 2000 drought was severe and crippled Moldovan agriculture in the spring and summer of the year, affecting about 2.6 million people. The proportion of overall agricultural losses in affected areas was between 70 percent and 90 percent (UNDP). According to the United Nations Office for the Coordination of Humanitarian Affairs, the windstorm and frost of November 2000 caused an estimated damage of USD 20.8 million. The economic loss due to all the various hazards comes to about 2.13 percent of the country's GDP, which is equivalent to an annual average loss of USD 61 million. Economic losses reported are mostly due to hydrometeorological hazards.

75. Records report a severe earthquake of magnitude 7.3 in Chisinau in 1940. Moldova is near the Vrancea seismic zone located in Romania. The earthquake on 17 August 1999 affected towns in both Moldova and Ukraine, including Chisinau, Simferopol and communities all around Black Sea coast of Crimea, with an intensity of 2-3 MSK, according to the Geophysical Survey, Russian Academy of Sciences.

Institutional arrangements for disaster risk management

76. Disaster prevention, response, relief and recovery are key functions within the mandate of the State Department of Exceptional Situations (DES), which has been part of the Ministry of Internal Affairs since 2004. The central departments of DES are organized into: operations, civil protection, fire and rescue services, finance, and judicial affairs. DES has about 2,600 staff including about 640 assigned to the civil protection. These are deployed in 54 DES sub-units in all raions (districts) and individual municipalities. To respond to major disasters, the DES has two army brigades at its disposal, and each administrative district is required to maintain a response team, usually comprising 10 to 12 persons with basic emergency response training. The DES has also 3 specialized units (for search and rescue) in the North, Center, and South.

77. In 2001, Moldova created the Republican Commission for Emergency Situations as the main entity to manage major emergencies. Its Head is the Prime Minister; the Deputy Head is the Director of the State Department of Exceptional Situations (DES). The Commission meets semi-annually and includes representatives of all line ministries and executive branches. District and local emergency commissions have a similar structure and include heads of local governments and relevant public services. During emergencies, members are notified immediately and meet to evaluate the level of threat to the population, the economy, and infrastructure, and to agree on the response. The emergency commissions and DES create five-year preparedness and response plans, and hold regular meetings to discuss, update, and ratify them. District and local-level emergency plans are updated annually, similarly to sector plans, for example, for flood protection. DES-coordinated emergency response exercises are carried out on average every five years.

78. The DES, like many other agencies, lacks the financial resources for necessary equipment which is mostly obsolete. DES staff salaries consume most of the budget, while a very small proportion is used for investments. In the recent years, only about 1 percent of the annual budget has been allocated for capital investments and about 10-12 percent for goods and services. The 2009 budget for DES is about US$10.3 million and has been steadily increasing in the last years.

79. In addition, the Government has a Reserve Fund managed by the Ministry of Finance for emergency interventions by all concerned agencies, but it does not cover investment costs. The Reserve Fund constitutes up to 2 percent of the national budget. It is non-accumulating and replenished by annual appropriations. The allocation can be augmented by transfers from other budget lines in case of major disasters. Overall, about 70 percent of the Fund is used to compensate losses from natural hazards.

80. Government agencies communicate by telephone, fax, and mobile phone, and via limited use of radio communications. DES staff has access to dedicated radio communication channels but most of the technology is outdated. Each response organization has its own internal radio frequency, and inter-agency communication among medical units, police and fire brigades can be established over a standard frequency, activated during emergencies. In practice, mobile phones dominate communication among disaster response units. Emergency communication and disaster management information systems are deficient; DES has no emergency management center or modern information technology to facilitate coordination during emergencies.

81. Moldova signed several agreements with countries in the region, such as Ukraine, Russia, Belarus, and is a member of organizations responsible for cross-border emergencies international cooperation, such as the Regional Cooperation Council (RCC) and Disaster Prevention and Preparedness Initiative (DPPI) for the South Eastern Europe.

Status of State Hydrometeorological Service

82. The State Hydrometeorological Service (SHS) is active in many sectors including (i) weather forecasting and host of the national meteorological observation network; (ii) meteorological research and development (R&D); (iii) hydrological forecasting and host of the national hydrological observation network; hydrological R&D; (v) air quality measurements and services; (vi) water quality measurements and services; and (vii) commercial services.

83. The current SHS meteorological and hydrological data network is in need of upgrading and automation. Replacing defective equipment and automating old manual gauges will build a foundation needed for improved weather forecasting, i.e., for short-term forecasting as well as a data system needed for long-term climate forecasting. The network of existing weather stations will need to be either replaced or damaged sensors and instruments replaced.

84. In addition to the DES, the SHS provides critical support in disaster preparedness and prevention by providing Government agencies, and the public with accurate and timely daily and up to five-day forecasts of weather emergencies. Floods, flash floods, severe weather, hail, and high winds are the biggest threats to human life and the existing SHS data network is inadequate to provide short-term (0-12 hours) or longer-term forecasts. SHS also lacks capacity to provide localized forecasts using weather radar. Although some radar data are available within the country, for example, from the airport in Chisinau, data are neither reliable nor digitized, which limits its application. Romanian radar data are available intermittently but are not useful to quantify rainfall estimates. Furthermore, under existing conditions, the SHS is unable fulfill its international commitments for supplying hydrometeorological data to strengthen regional and global cooperation needed to improve hydrometeorological modeling and services, and promote human safety and economic development.

Annex 2: Major Related Projects Financed by the Bank and/or other Agencies

MOLDOVA: DISASTER AND CLIMATE RISK MANAGEMENT PROJECT

- World Bank, Albania Disaster Risk Mitigation and Adaptation Project (P110845). Approved: June 19, 2008; current closing date: February 28, 2012. Latest ratings: Unsatisfactory for Implementation Progress and Development Objective.

- World Bank, Croatia Disaster Risk Mitigation and Adaptation Project (P109603). (Pipeline).

- Weather and Climate Services in Europe and Central Asia: A Regional Review, World Bank.

- Country Profile: Moldova for the UN/ISDR Project: "Strengthening of Hydrometeorological Services in South Eastern Europe".

- National Strategy for Natural Hazard Mitigation (NSNHM) 2008 – 2015; Business Consulting Institute, Chisinau, Moldova.

- Rural Productivity in Moldova – Managing Natural Vulnerability; World Bank (2007).

Annex 3: Results Framework and Monitoring

MOLDOVA: DISASTER AND CLIMATE RISK MANAGEMENT PROJECT

Results Framework

PDO	Project Outcome Indicators	Use of Project Outcome Information
The project objective is to strengthen the State Hydro-meteorological Service's (SHS) ability to forecast severe weather and improve Moldova's capacity to prepare for and respond to natural disasters.	More accurate and specific forecasting of weather conditions Expanded lead-time of weather warnings to users, particularly Department of Exceptional Situations (DES) Strengthened capacity to coordinate response to emergencies	Mitigation of economic and social losses caused by severe weather and other emergencies.

Intermediate Outcomes	Intermediate Outcome Indicators	Use of Intermediate Outcome Monitoring
Component A: Strengthen the SHS's Severe Weather Forecasting Capacity		
SHS provides more accurate and timely weather forecasts and warnings (to DES, Government agencies, households, farmers, others)	Installation of Doppler radar which improves precision of forecasting severe weather Nowcasting tools, data collection and dissemination is improved	Address gaps in obtaining small scale rainfall estimation, severe weather, hail, wind shear that are needed for accurate and timely warnings Improve accuracy and timeliness of severe weather and flash flood warnings to population at risk
Component B: Improve Disaster Preparedness and Emergency Response		
GoM is better able to manage emergencies and coordinate disaster response	The Emergency Command Center (ECC) is established, tested and operational. The users of ECC are trained to operate the emergency management system.	Assess effectiveness of the coordination system Define additional needs and further needed improvements
Component C: Initiate Activities for Adaptation to Climate Risks in Agriculture		
Grants/demonstration to farmers about adaptation to climate risks, on a pilot basis	At least 50 investment grants are provided and introduced at demonstration plots (farmers receive information about practical techniques for adaptation to climate risks on pilot basis)	Define additional knowledge gaps and requirements by the farmers

Arrangements for results monitoring

		Data Collection and Reporting						
	Baseline	**YR1**	**YR2**	**YR3**	**YR4**	**Frequency and Reports**	**Data Collection Instruments**	**Responsibility for Data Collection**
Project Outcome Indicators								
More accurate and specific forecasting of weather conditions	Scale of weather forecasts at 5000 sq km			.	Scale of weather forecasts reduced to 300 sq km	Semi-annual progress reports	Project data base.	SHS
Expanded lead-time of weather warnings to users, particularly DES	Lead time for severe weather warnings only 10 minutes to 1 hour			Lead time for severe weather warnings expanded to 12 hours		Semi-annual progress reports	Project data base.	SHS
Strengthened capacity to coordinate response to emergencies	No Emergency Command Center to coordinate response among relevant agencies			At least 40 staff members of DES and other users are trained in the system established in ECC Emergency response drill carried out shows capacity improvements in coordination of functions	Emergency response drill shows capacity improvements as compared to the baseline and the recent test of the system	Two emergency coordination response exercises reports	Project data base.	DES

		Data Collection and Reporting						
	Baseline	**YR1**	**YR2**	**YR3**	**YR4**	**Frequency and Reports**	**Data Collection Instruments**	**Responsibility for Data Collection**
Intermediate Outcome Indicators								
Installation of Doppler radar which improves precision of forecasting severe weather	No effective radar is currently installed	Installation of automated network proceeds; data accuracy improves	Doppler radar installed (Precipitation estimates to 10mm accuracy)	As the radar is installed, improved forecasts are produced with warnings when appropriate	As the radar is installed, improved forecasts are produced with warnings when appropriate	semi-annual progress reports	Project data base	SHS
Nowcasting tools, data collection and dissemination improved	The process of automated data collection or dissemination is not available for an early warning system	Installation of automated network proceeds	Early warning products and services are developed	Operational nowcasting is realized: automated data are collected, disseminated, and integrated with radar and flash flood system resulting in timely warnings for users		Bi-annual reports.	Project data base	SHS
The ECC is established, tested and operational	An additional floor is built to accommodate the ECC	Architectural and information system designs are completed.	Refurbishment works are in progress	Refurbishment is completed and the equipment and software are installed	ECC has been tested and is operational	Bi-annual project reports.	Project data base.	DES

		Data Collection and Reporting						
	Baseline	**YR1**	**YR2**	**YR3**	**YR4**	**Frequency and Reports**	**Data Collection Instruments**	**Responsibility for Data Collection**
ECC users are trained to operate the emergency management system.	No staff currently trained in the emergency management information system				Relevant personnel (at least 80) trained in the emergency management system established in ECC			
At least 50 investment grants provided and put on the demonstration plots (farmers receive information about practical techniques for adaptation to climate risks on pilot basis)	No activities exist to disseminate practical experience on adaptation to climate risks other than drought.	10 demonstration plots are established 15 demonstration and dissemination events are organized	25 demonstration plots are established; 30 demonstration and dissemination events are organized	40 demonstration plots are established; 45 demonstration and dissemination events are organized	50 demonstration plots are established; 60 demonstration and dissemination events are organized	Semi-annual progress reports	Project data base.	MAFI

Annex 4: Detailed Project Description

MOLDOVA: DISASTER AND CLIMATE RISK MANAGEMENT PROJECT

Component A: Strengthen the SHS's Severe Weather Forecasting Capacity (total cost: US$4.8 million)

85. This component aims to strengthen the State Hydrometeorological Service's ability to forecast severe weather and provide decision makers and other users with more effective, diverse, and timely forecasts and warnings. This will contribute to the prevention and better preparedness for hydrometeorological disasters. Establishing an effective forecasting, warning and response system for communities and farms at risk requires the combination of meteorological and hydrological data, forecast models, tools, and trained forecasters linked to disaster management agencies. The objective of this component will be achieved through the following activities.

Sub-Component A.1 – Develop of Early Warning/Nowcasting Capabilities

86. Severe weather, flash floods and floods result in economic losses that could be reduced if a "nowcasting" system is established. This sub-component focuses on strengthening data, communications, computer, and modeling technology so that more accurate warnings can be produced, with greater lead time scaled down to pinpoint the impact of the weather hazard. Limitations in the availability of data, its quality, and the availability of tools and models currently restrict capabilities of the service. The areas of greatest limitations (and greatest need by users) are the short-term (zero to 12 hour time frame known as nowcasting) forecasts and warnings (such as severe weather, floods, hail, high winds and frost) and the long term (monthly to seasonal climate) forecasts. The latter are particularly needed by agricultural sector, along with the drought forecasting capability. Building the nowcasting system will be accomplished primarily by automating data collection, processing and distribution to users faster for all scales of weather forecasting.. This improvement in warning lead time and accuracy will benefit the population at risk as it is linked with the establishment of an Emergency Command Center and improvements in communications capability of responders.

87. Hydrologic gauges on the Nistru River will be automated. A new hydrologic station will be built at an existing key reservoir and 4 meteorological stations will be constructed to operate, maintain and calibrate meteorological observation equipment. Meteorological and hydrological (joint) observing stations will be established at the Dubasari Reservoir. Meteorological observing stations will be established in Balti, Soroca, Leova, Ceadir-Lunga, and Malovata Veche. These are critical sites that lack data and facilities to analyze meteorological and agro-meteorological data and information. A full housing facility will be constructed at these locations and weather stations established. Establishing these operational data systems will provide accurate observations that will be rapidly processed and distributed to users for improved decision making. In addition to the automation of the network, computers and software will be acquired to accelerate data processing, quality control and customizing information.

88. As a first step in developing severe weather modeling capability, a flash flood forecast modeling system will be implemented to improve lead time and to give forecasters the capability to warn residents of very small river basins (300 sq km), the scale of flash floods. The Flash Flood Guidance (FFG) system is a diagnostic tool for the forecaster to predict flash floods. It is currently operational in Central America, the Mekong river valley, Romania and is in the development phase for South Africa and the Middle East. This system uses either radar or satellite data to estimate rainfall.

89. Significant progress in communications technology allows for the rapid transmission of data, forecasts and information over large distances and to remote locations. Hydrometeorological data and forecasts lose value with time. The faster data and forecasts can be sent to users, the more time is available for response actions which may result in saving lives and reducing property damages. Dissemination of forecasts and warnings to communities, farms and villages at risk for hazards, such as hail or flooding, is frequently a weak link. The addition of computers to SHS will allow more data entry to occur faster and become available to users, such as agriculture and DES. The addition of a direct communications link to DES also translates to more time to evacuate residents threatened by severe weather. This information will also be available to the Adverse Weather Advisory Services developed as part of Component C for Agriculture.

90. *Regional Cooperation*. The addition of more accurate, higher resolution and timely hydromet data leads to potential benefits for the entire South Eastern Europe region. More meteorological observations can be communicated via the World Meteorological Organization (WMO) Global Telecommunication System (GTS) for input to numerical weather forecast models which improves the accuracy of weather forecasting for surrounding countries. Higher resolution hydrological data in the Nistru river basin will benefit Ukraine. The addition of high resolution radar data (especially rainfall estimates) to a regional radar mosaic will have benefits to neighboring countries in assessing and forecasting severe weather. Sharing hydrometeorological data is the policy of the WMO and most National Meteorological and Hydrological Services (NMHS's) share data. Moldova has agreements with surrounding countries to share and receive vital hydrological and meteorological data. There is a risk, however, that governments will decide not to share data or to charge for information. These restrictive policies can lead to reduced accuracy of forecasts or failure to warn vulnerable populations. Every effort should be expended to encourage regional data sharing and cooperative exchange of data and forecasts.

Sub-Component A.2 –Dual Polarization Radar Technology for Localized Forecasts

91. The addition of a radar in the Chisinau region will provide critical information for detecting severe weather events, provide monitoring of areas that cannot be monitored with surface weather stations, provide detection of wind shear which is a hazard to aviation and will be able to undertake wide-area assessments of precipitation, which can increase the lead time for flood and flash warnings. Radar data will be a valuable input to the new generation of high-resolution numerical weather prediction models that SHS will adopt in the future.

92. A dual polarization Doppler radar will add the necessary detection and surveillance resolution needed for SHS forecasters to detect and warn citizens of severe weather. The radar

proposed is the most effective tool used in hydrometeorological operations today to predict and warn users of floods (along with flash floods), high winds, hail, and other severe weather threats. The combination of an Integrated Meteorological Workstation (nowcasting tool) and a hydrologic (flash flood) modeling system will provide best practices in delivering effective warnings to DES, agricultural sector, the media and many other users.

93. The proposed Project will also finance training and capacity building activities in radar related services to ensure proper utilization and sustainability of activities associated with this sub-component.

Sub-Component A.3 – Development of Plans for Seasonal/Climate Forecasts

94. The next phase in strengthening hydrometeorological forecasting for droughts involves expanding forecasting capability to monthly and seasonal scales.

95. Building a real-time hydrometeorological data system is a first step to improve medium-range to long-term forecasting. There are 20 agro-meteorological posts and 14 agro-meteorological stations. Agro-meteorological observations include weather data but add variables collected such as solar radiation, evaporation and soil moisture. The biggest need by SHS is for soil moisture measuring devices. Currently soil moisture data measurement is made by antiquated procedures that take a long time and are not very valuable to farmers. This information is needed continuously through the growing season.

96. A total of 35 soil moisture probes will be procured to provide real time soil moisture information to farmers. Measuring solar radiation is important for agriculture and the data needed for climate and climate change analysis. Four actiminograph instruments will be procured for Balti, Chisinau, Stephan Voda and Cahul to measure solar radiation.

97. It is recognized by SHS that creating a state-of-the-art forecast service will not occur overnight but rather over a period of time in a multi phased approach. This first step will focus on strengthening the weakest components, which is principally data deficiencies followed by nowcasting tools. There are many other improvements to be recommended that should follow this project in building a strong hydrometeorological service. Finally these steps to strengthen data availability, quality and distribution will improve all scales of weather, water and climate forecasts including improving the accuracy of climate models.

Component B: Improve Disaster Preparedness and Emergency Response (total cost: US$2.70 million)

98. This component aims to strengthen the government capacity to manage emergencies and coordinate disaster response among local units and government agencies by establishing and operating the Emergency Command Center (ECC), and supporting associated capacity-building activities.

Proposed Project Support

99. Currently, emergency communication among relevant agencies is carried out through standard means such as telephone, fax and mobile phone, and very limited radio communication.

DES staff has access to dedicated radio communication channels but the system is mostly equipped with old technology. While various organizations have their own internal radio frequencies, communication across agencies such as the medical units, police and fire brigades can be established over a standard frequency activated in times of emergency. In practice, mobile phones are mostly used to maintain the communication between the response units. Emergency communication and disaster management information systems are deficient, and the DES and Republican Commission for Emergency Situations do not have an emergency management center or a situation room in which to facilitate the coordination of inter-agency functions and use modern IT technologies.

100. The component will support the enhancement of DES capabilities to carry out its mandate to manage emergencies and coordinate other agencies in response to the catastrophic events. Presently, the Department or the GoM in general, does not have any functional space or the decision support system to fulfill this role effectively and to house the Commission for Emergency Situations during disasters. The DES has recently retrofitted its headquarters building in Chisinau to make it structurally safe and added a third floor which may be further designed to accommodate the establishment of the Emergency Command Center (ECC).

101. The project will support the establishment of the ECC which will have architectural features which will facilitate joint response with representatives of the relevant agencies and could gather decision-makers. It will be operational 24/7 and equipped with the decision-support system enabling a flow of crucial data to and from the Department, such as hydrometeorological forecasts and alerts, which in turn, would allow DES issue timely warning, and undertake prevention and response measures, including an evacuation of the affected population, if needed. This ECC will enhance the cooperation between the relevant sectors and the decision-making process prior and during the disasters.

102. During project preparation, the Government established a Working Group comprising 15 agencies which are future users of ECC and constitute a broad disaster risk management system. The Working Group already convened and is coordinated by DES. It includes, among others, representatives of the Ministries of Internal Affairs; Environment; Health; Agriculture, Defense; External Affairs Communications; SHS, Apele Moldovei; the Forestry Agency;; Information and Security Services; Information Technologies and Communication; Border Control; and others. These organizations are part of the existing National Commission for Emergency Situations. The group provides input and advice on the functions of the planned information decision-support system. Prior to project appraisal, the DES, drawing on the advice from the Working Group began developing the TORs for architectural design of the facility and for the feasibility and design study for the ECC.

103. During the implementation stage, the Working Group will provide feedback on the operation of the system, will assist in monitoring and evaluation of the system's functionality, participate in training and exercises, and if necessary, recommend adjustments.

Sub-Component B.1 - Feasibility Study and Design

104. The project will support feasibility and design studies that will form the basis for establishment of the ECC. The two studies will include: (a) architectural design of the ECC

within the provided space in the DES headquarters which will ensure the seismic resilience of its structural and non-structural features, as well as the functionality of the space; and (b) design of the information management system linking DES with its local offices and key sectoral institutions, such as SHS, Ministry of Environment, Ministry of Agriculture, Institute of Geology and Geophysics, and others. The design should ensure sharing of information among the central and local offices, have voice and data transfer capacity, allow for two-way processing of information, support daily operations of the organization, and integrate existing legacy systems. The design will take into account existing coordination mechanisms and views of other agencies that have a role in disaster preparedness and response.

Sub-Component B.2 - Establish Emergency Command Center

105. Following the completion of the feasibility and design studies, the project will support the establishment of the ECC through financing of: (i) renovation and refurbishment works in the facility; (ii) acquisition of furniture and equipment for the ECC; (iii) procurement of IT hardware; (iv) procurement of emergency information management software; and (v) acquisition of communication equipment.

Sub-Component B.3 – Capacity Building and Evaluation

106. The ECC will be staffed with DES employees and, when needed, with the personnel from other agencies, particularly during emergencies. The project will help build capacity in the DES and other relevant agencies through the provision of training in emergency management information system, focusing on the operation of the IT decision-support system. It is planned that about 100 people from 15 agencies and all territorial DES units (regional and local) will be trained. To ensure sustainability and promote knowledge transfer, this will take a form of the trainer's training so that this staff can further assist and transfer knowledge to colleagues.

107. In order to monitor and evaluate the outcomes of the component, the GoM will conduct two inter-sectoral exercises under the auspices of the national Commission for Emergency Situations and coordinated by the DES. These drills will test operation of the ECC at the mid-term and end of the project. The project will support an independent monitoring and evaluation of the drills. Following each exercise, reports will be developed that will evaluate their results and recommend improvements.

108. ***Parallel Donor Support to Capacity Building***. The proposed project will provide the Government with technical tools and investments to improve its capacity to coordinate the response to disasters and emergencies through the creation of the ECC, improved access to information, voice and data transmission capabilities, and training. These activities were developed as part of a broader program to build capacity in the area of disaster risk management. Additional support is also planned by donors such as the European Commission (EC) and the UNDP, which have been developing TA programs.

109. The EC is launching a 4-year program on Prevention, Preparedness and Response to Natural and Man-made Disasters as part of the Eastern Partnership Flagship Initiative for a group

of countries, including Moldova.[17] The Euro 6 million program has an objective of strengthening disaster management capacities through: reviews of the civil protection capacities, the legislative framework, risk assessments, and enhanced cooperation with the EU Civil Protection Mechanism. It will support studies, training and exercises in emergency management and the DES could be one of the main beneficiaries in Moldova.[18]

110. UNDP is expected to assist the GoM through a Euro 1.8 million Disaster and Climate Risk Reduction Project which could provide technical assistance and training to strengthen the disaster risk assessment capacity and develop a country disaster and climate change risk management strategy. The project could help Moldova prioritize actions to be included in national disaster risk reduction and climate risk management strategies and policies. It is expected that the project will contribute to the development of contingency plans at the national and local levels. For the latter, a local risk management toolkit will be developed, along with local plans, awareness raising materials, and training for pilot communities.

Component C: Initiate Activities for Adaptation to Climate Risks in Agriculture (total cost: US$2.0 million)

111. The objective of the component is to improve the practical application of agro-meteorological information in the agriculture sector in order to increase its resilience towards adverse weather effects. This objective will be achieved through support to the following activities:

Sub-Component C.1 – Development of a Just-in Time Communication Platform

112. This sub-component will support the development of the software and hardware of a mobile JIT communication platform that could serve as a tool to rapidly disseminate critical, localized weather information to farmers and rural communities. The project will finance the design and testing of the communication platform, including free dissemination of the service to a farmer focus group. The design will define information flows for severe weather alerts from the SHS to farmers via a content provider associated with the Ministry of Agriculture and Food Industry, in collaboration with mobile communication companies. Following the design and testing phases the platform could be fully rolled out by MAFI, in collaboration with the SHS and mobile phone companies. Furthermore, the platform could be expanded into an early warning system that would combine current and forecasted agro-meteorological data to simulate scenarios for crop development, and provide farmers with advice on necessary mitigation agronomical measures. Finally, the platform can be modulated to include dissemination of other critical information to farmers, such as on markets and extension information. In this context, synergies with the e-Governance project, currently under preparation, will also be explored.

113. The main challenge in implementing this component is to assure the farmers of the highest quality and reliability of the information passed to them. On the supply side, the project will address the quality issue by building the capacity of the State Hydrometeorological Service. Critically important is the competence of the final content provider who will be responsible for

[17] Belarus, Ukraine, Armenia, Azerbaijan, and Georgia will also be part of the EC-financed program.
[18] Commission Staff Working Document accompanying the Communication from the Commission to the European Parliament and the Council: Eastern Partnership {COM(2008) 823}.

integrating, analyzing and contextualizing raw agro-meteorological data, and for formulating messages to farmers. To implement the component, MAFI will competitively select an entity with proven experience in rural extension services, and with a potential to sustain the platform's content expansions into other activities mentioned above. The content provider will cooperate closely with and be monitored by MAFI.

Sub-Component C.2 – Adverse Weather Adaptation Advisory Services

114. Sub-component C.2 will provide technical advisory services, including grants to farmers, farmer groups and rural communities for piloting and testing activities to increase awareness about coping and adaptation techniques to make agriculture more resilient to adverse weather. It will build on the country's experience with demonstration plots for adaptation to drought through extension services. It will also expand the existing knowledge base and awareness in the farming community about adaptation techniques to a wider spectrum of risks, such as: (i) frost; (ii) excess snow and water cover of winter crops; (iii) hail storms; (iv) drought; (v) inundation of crops from torrential downpours and rising river waters. The supported investments will include on-farm irrigation, water harvesting basins, anti-hail net systems, protective forest belts, conservation land cultivation, as well as other activities having adaptation potential. The beneficiaries of the grants will be selected through a competitive scheme with technical, social and financial eligibility criteria. The following table provides information on the types of core weather hazards and possible mitigation techniques qualifying for support.

Weather risks	**Farm-level vulnerability**	**Coping and adaptation measures and techniques**
Frost	Winter cereal crops and rapeseed; ealry spring and late vegetables; fodder crops; perennial plantations; greenhouses; animal husbandry.	Crop rotation techniques; protective forest belts and hedging; greenhouse heating systems; construction of fodder sheds; spray irrigation systems; smoke bombs; crop heating; wind machines; cold air drainage implements; soil and plant covers.
Excess snow and water cover of winter crops	Winter cereal crops and rapeseed; fodder crops.	Soil leveling; protective forest belts and hedging; spring harrowing.
Hail storms	Seasonal crops and plantations; perrenial plantations; greenhouses.	Hail nets.
Drought	Seasonal crops and plantations; perrenial plantations; animal husbandry.	Farm-based irrigation; water harvesting ponds; conservation land cultivation; fodder sheds.
Inundation of crops from torrential downpours and rising river waters	Seasonal crops and plantations; perrenial plantations; animal husbandry.	Land leveling; drainage systems; water harvisting ponds for excess flows; protective forests belts and other forms of hedging.

115. The proposed activities require the sub-component to be implemented by an entity with experience in rural extension services. This is due to two reasons. Firstly, there is a need to have an integration of passive and active measures. In other words, this sub-component is not simply financing investments into technologies that by themselves lead to mitigation of risks, but rather it takes a holistic approach where investments are supplemented with a set of preventive

measures. For example, financing a wind machine or a crop heater to help a farmer cope with frost will be just one element in a comprehensive protection plan which may also include such important mitigation measures as: proper site selection, managing cold air drainage, plant selection, canopying of trees, plant nutritional management, proper pruning, trunk painting and wraps, planting and harvesting dates, etc. Therefore the implementation of this sub-component goes beyond a simple fiduciary task of providing funding against a set of eligibility criteria.

116. Secondly, as mentioned above, the objective of the sub-component is to increase farmer awareness about coping and adaptation techniques. This can only be achieved by engaging an extension organization. The MAFI will implement this sub-component through a competitively selected private or nonprofit organization which has a network of consultants and is geographically well represented. This is particularly important for the up-take of grants, as the consultants will work closely with potential beneficiaries to develop proposals, but also for the down-stream dissemination and awareness-raising. The sub-component will be implemented in consultation with and monitored by MAFI. MAFI will prepare an Operational Manual acceptable to the Bank that will guide the work of the consultant selected to implement the sub-component. The Operational Manual (OM) draws on the experience from similar schemes successfully implemented through other Bank-financed projects, such as the Rural Investment and Services Project II (Drought Adaptation Advisory Services).

Component D: Project Management (total cost: US$0.5 million)

117. This component will provide fiduciary support for the implementation of the three components. The fiduciary services will be centralized for and the POPs Project Management Team (PMT) housed in the Ministry of Environment will be the proposed Project's fiduciary entity. In particular, the support will enhance the financial management and procurement functions as well as, if necessary, the technical aspects of project implementation, including monitoring and evaluation.

Annex 5: Project Costs

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Project Cost By Component and/or Activity	Local US $ million	Foreign US $ million	Total US $ million
A. Strengthen the SHS Severe Weather Forecasting Capacity	**0.30**	**4.07**	**4.36**
B. Improve Disaster Preparedness and Emergency Response	**0.62**	**1.83**	**2.45**
C. Initiate Activities for Adaptation to Climate Risks in Agriculture	**1.83**	**0.00**	**1.83**
D. Project Management	**0.45**	**0.00**	**0.45**
Total Baseline Cost	3.19	5.90	9.09
Physical Contingencies	0.16	0.29	0.45
Price Contingencies	0.16	0.29	0.45
Total Project Costs[1]			10.00
Front-end Fee			0.00
Total Financing Required			**10.00**

Financing Plan (US$ million)			
Source	**Local**	**Foreign**	**Total**
Borrower	-	-	-
IDA	3.51	6.49	10.00
Total	3.51	6.49	10.00

*includes contingencies

Annex 6: Implementation Arrangements

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118. The Government of Moldova will set up a steering committee to provide strategic guidance and facilitate inter-agency coordination during the implementation of the proposed DCRMP. The steering committee will be headed by the Minister of State who is in charge of donor aid coordination. The other members of the steering committee will include representatives from the Ministry of Finance, the Ministry of Environment, the Ministry of Agriculture and Food Industry, and the Ministry of Internal Affairs. In addition, the Director of the State Hydrometeorological Service (SHS) and the Department of Exceptional Situations (DES) will be part of the steering committee. It should be noted that the SHS reports to the Ministry of Environment and the DES reports to the Ministry of Internal Affairs. The Government also intends to invite its donor partners to join the steering committee.

119. Implementation of the three components of the proposed DCRMP will be undertaken by the respective line ministries. Therefore, Ministry of Environment will implement Component A, the Ministry of Internal Affairs will implement Component B, and the Ministry of Agriculture and Food Industry will implement Component C. Given that the SHS is in charge of weather forecasting, and it reports to the Ministry of Environment, it will implement Component A on behalf of the Ministry of Environment. Similarly, since the DES is in charge of emergency management, and since it reports to the Ministry of Internal Affairs, the DES will implement Component B on a day-to-day basis.

120. Fiduciary arrangements for all components will be managed by an existing Project Management Team (PMT) in the Ministry of Environment. As is the case with other World Bank-supported investment operations, centralizing fiduciary support is an efficient way for working in low capacity environments. Implementing ministries and agencies can focus on the substantive elements of project implementation and experienced fiduciary support units can facilitate overall implementation. A PMT currently supporting the implementation of the Persistent Organic Pollutants (POPs) project will provide fiduciary services for the proposed DCRMP. This PMT has not only worked with World Bank but has prior experience in working with both the SHS and the DES. Since the implementation of POPs is coming to a close, this PMT, which is housed in the Ministry of Environment, will be available to devote its resources to support the implementation of the proposed DCRMP.

121. The overall responsibility for project monitoring and evaluation (M&E) will vest with SHS, DES and MAFI. The monitoring and evaluation activities will be performed in accordance with the framework described in Annex 3. This framework includes both qualitative and quantitative measurements of project outcomes and outputs. With regards to the project outcome related to the improved weather monitoring and forecasting, the lead time and accuracy of forecasts/nowcasts will be measured by a set of quantitative data to be regularly monitored bi-annually throughout the life of the project. With regard to the expected project outcome related to increased capacity to respond to emergencies, the most effective M&E activities are related to the mock exercises and tests of the emergency response system carried out with multiple

response units. Such exercises and their evaluations will be conducted around the mid-term and at the end of the project.

122. To ensure efficient implementation of the proposed Project, each implementing entity will nominate a focal point. This focal point will be the primary counterpart for the World Bank's task team and for the fiduciary PMT. To ensure a more transparent fiduciary process, each implementing entity will nominate their representatives who will assist the fiduciary PMT in evaluating bids received in response to tenders for goods and services. The implementing agencies will provide the names of these evaluators. The Government has been advised that to facilitate project implementation and to assist focal points at the DES and MAFI, component coordinators could be financed under the proposed Project for up to 2 years.

123. In conclusion, the steering committee headed by the Minister of State has the final decision power during project implementation. Substantive implementation of individual components will be performed by the respective line ministries and their agencies. Contracts will be signed by Ministers in charge of their respective components, or their designated representatives. Fiduciary services will be provided for all components by a central PMT.

Annex 7: Financial Management and Disbursement Arrangements

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124. *Country Issues.* Weaknesses in the Moldovan public financial management (PFM) system are well understood and a broad PFM reform program is under way. As a result of these efforts, the credibility of the Moldova PFM framework has been enhanced, as evidenced by improvement of Public Expenditure and Financial Accountability (PEFA) scores between 2006 and 2008. Major assistance is already being provided by the Bank under the PFM Project, co-financed by SIDA and the Dutch Government. The project is supporting improvements in: (i) budget preparation and execution; (ii) accounting and reporting; (iii) development of Financial Management Information Systems (FMIS) and cash management; (iv) internal auditing; and, (v) PFM-related training. Technical assistance (TA) for the Court of Accounts is under implementation and the dialogue on procurement reform agenda is ongoing. The existing instruments already mobilized through a concerted multi-donor effort appear to be sufficient to support the critical PFM agenda.

125. *Risk Analysis.* The overall financial management risk for the project is substantial before mitigation measures, and with adequate mitigation measures agreed, the financial management residual risk is rated moderate. The table below summarizes the financial management assessment and risk ratings of this project:

	FM Risk	Risk Mitigating Measures	Residual Risk
INHERENT RISKS			
1. ***Country Level:*** Weak PFM institutions, high level of corruption (additional information is included in country issues in the next section).	H	The PMT under the Ministry of Environment will maintain a robust financial management system, ensure project financial statements audit by acceptable auditors, use the PMT FM and procurement capacity to build-up and strengthen the capacity of implementing agencies' staff.	S
2. ***Entity Level:*** Risk of political interference in the management and staff of the implementing agencies and PMT.	H	Any changes in the implementation arrangements will have to be agreed with IDA. All changes to the structure and staffing of the implementing agency and PMT affecting the project implementation arrangements will be monitored by IDA. Procurement will be very closely monitored by IDA. An inter-ministerial steering committee will be established through the GoM decision to provide strategic guidance and oversight.	S
3. ***Project Level***: The increased reliance on country financial management systems of the Treasury.	H	A number of risk mitigation measures (see below) are designed to minimize the risk of misuse of funds.	S
OVERALL INHERENT RISK	H		S

	FM Risk	Risk Mitigating Measures	Residual Risk
CONTROL RISKS			
4. ***Budget***	S	Project budgets based on procurement plan agreed with the Bank, developed by PMT and approved yearly by the implementing agencies, project steering committee, and MoF. Budgets implementation will be monitored through financial reporting.	M
5. ***Accounting***	S	The PMT will use a comprehensive automated accounting system adjusted for the Project needs to satisfy both statutory and Bank accounting and reporting requirements.	M
6. ***Internal Controls*** – adequate controls over the use of funds.	S	Additional procedures will be developed for the project; greater involvement of the implementing agencies' staff and management in approval process, independent auditors and component coordinators to provide support for the implementing agencies on project implementation.	M
7. ***Funds flow*** – use of the Treasury, which has limited foreign currency experience, may cause delays in payments processing.	S	There are an increasing number of projects implemented in Moldova using the Treasury for funds flow, so Treasury has some experience. Detailed procedures are put in place. WB disbursement guidelines will be used.	M
8. ***Financial Reporting***	S	The upgraded accounting system will generate reports automatically. Simple reporting formats will be used consistent with MoF project formats.	M
9. ***Auditing***	S	Annual project financial statements audits will be carried out by independent auditors and on terms of reference, both acceptable to IDA and audit report reviewed by country FMS.	M
OVERALL CONTROL RISK	**S**		**M**
OVERALL FM RISK	**S**		**M**

Risk rating: H (High), S (Substantial), M (Moderate), N (Negligible or Low)

126. *Strengths.* The significant strengths that provide a basis of reliance on the project's financial management arrangements include:

(i) the flow of Project funds through the Treasury, which will perform ex-ante controls on all contract payments and exert the risk mitigation measures in place for project financial management;
(ii) the existing PMT has experience implementing World Bank funded projects.

127. *Weaknesses and Action Plan.* There are a number of actions agreed upon that will be implemented so that the financial management arrangements will satisfy the WB requirements, as follows:

Condition	Responsibility	Deadline
Develop and submit for the Bank's approval the financial management manual.	PMT jointly with MoE (SHS), MoIA (DES), and MAFI	Prior to negotiations
Treasury to open foreign currency project designated account in an acceptable commercial bank	PMT, Treasury	After the Project is declared effective

128. *Project Implementing Entity.* The implementation of project activities will be coordinated by an inter-ministerial steering committee to be chaired by the State Minister who is member of the Government. The State Minister is the head of the State Chancellery which has overall responsibility for the organization of the Government's activities to implement the internal and external policy of the state, establishment of the general framework on setting the priority activities of the Government, monitoring of the implementation of the Government's program, etc. The Ministry of Environment (SHS) and the Ministry of Internal Affairs (DES) will implement the first two components and the third component will be implemented by the Ministry of Agriculture and Food Industry. Each beneficiary agency may be strengthened with a component coordinator whose main responsibilities will be to manage and implement project activities. The existing PMT subordinated to the Ministry of Environment will assist the implementing agencies in fiduciary arrangements for the entire project, and will facilitate coordination and monitoring in partnership with the implementing agencies. This means that the PMT would handle the fiduciary functions for the entire project and this would include the compliance with the relevant procurement procedures and regulations, proper maintenance of the project Designated Account and project accounting records, management of funds flow, preparation of consolidated of quarterly IFRs and audit of annual project financial statements. The PMT was created for the implementation of the Persistent Organic Pollutants (POPS) Stockpiles Management and Destruction GEF Project which has a current Closing Date of December 31, 2010. The Government Decree which would designate the PMT as a fiduciary agent for the project concerned directly responsible to the State Minister is under preparation. The Treasury will perform all project payments based on appropriate requests from the PMT. *The risk associated with implementing entity is moderate after mitigation measures.*

129. *Accounting and Staffing.* The existing POPS Project PMT FM staff with adequate capacity will be used for this Project. Currently, the PMT consists of the project manager, financial officer, procurement specialist, project assistant and a driver. Each Ministry has designated staff for dealing with project matters. In addition, each beneficiary agency may be strengthened with a component coordinator whose main responsibilities will be to monitor and provide support to them in the implementation of the project activities. The Project's accounting books and records will be maintained by the PMT on a modified accrual basis and presented in Moldovan Lei (MDL) with the exception of the books and records of the DA which will be maintained in the currency of the credit and in MDL. Accounting policies and procedures of the Project will be reflected in the project Financial Manual developed, which will be part of the Project Operational Manual. Accounting policies will include the following major assumptions: (i) modified accrual accounting as the basis for recording transactions; (ii) reporting should be done in MDL and in the currency of the DA; and (iii) the cash method based project IFRs should be prepared covering all the project activities. *The risk associated with accounting is substantial before mitigation measures, and is assessed as moderate after mitigation measures.*

130. *Budget and Planning.* The annual budgets will be based on the procurement plan and the Project Implementation Plan. These budgets will form the basis for allocating funds to project activities and for requesting funds for payments via the Treasury. Budgets will be initially approved by each implementing agency for the part they are responsible for, and then submitted to the PMT which will consolidate them into single project budget and then sent for further approval of the inter-ministerial steering committee, before being submitted to the MoF. The annual budgets will be continuously monitored through interim reporting. Further work needs to

be done as regards the assessment of the budgetary and planning capacity of the implementing agencies.

131. The annual budget as well as the three-year budget within the MTEF is prepared by the implementing agencies on the basis of the proposals submitted by their subordinated divisions and approved by the line ministries in the case of DES and SHS. The budgets are communicated then to the MoF. The annual approved budgets are made public on the webpage of the MoF and in the official gazette. The project budget will be included as a line in the state budget, separately for each line Minister. *The risk associated with planning and budgeting is assessed as moderate after mitigation measures.*

132. *Information Systems.* The PMT has in place financial management, accounting and reporting systems developed during implementation of previous projects (the project and statutory accounting – using automated commercial accounting software). A new module for the project concerned will be created on the basis of existing software. The project expenditures will be recorded as a separate division in the accounting software. The software contains different integrated modules: fixed assets module, bookkeeping, payments, salaries etc. as well as a module developed especially to comply with the WB requirements. The software is able to produce reliable interim financial reporting statements and Statements of Expenditure (SoE). *The risk associated with information systems is assessed as moderate.*

133. *Internal Controls and Internal Audit.* The project will utilize existing internal controls within the PMT and the Treasury, and supplement these with additional controls to ensure that funds are used effectively and efficiently for the purposes intended. The internal controls include: (i) procurement controls – World Bank procurement procedures will apply; (ii) budgetary controls – the budget will be approved by the inter-ministerial steering committee and the MoF and monitored via interim financial reporting; (iii) Treasury controls --payments will flow through the Treasury; (iv) accounting controls – additional appropriate controls will be implemented; (v) quality controls – component coordinators and relevant implementing agencies' and PMT staff will verify all invoices and quality and quantity of goods and services received by PMT and implementing agencies before payments are made; (vi) management controls – the project inter-ministerial steering committee will be appointed to coordinate and provide general oversight; (vii) audit controls - an independent acceptable audit firm acceptable to IDA will audit annually the project financial statements, based on audit terms of reference acceptable to IDA; and (viii) supervision controls - the World Bank team will regularly carry out supervision of the project.

134. The PMT will document the internal control mechanisms to be followed in the project financial management manual. The manual will cover all financial management and administrative procedures, including accounting and record-keeping, flow of funds, and reporting procedures. The manual will reflect the internal structure relevant to the project, administrative arrangements, internal control procedures, including procedures for authorization of expenditures, maintenance of records, safeguarding of assets, segregation of duties to avoid conflict of interest, clearly define conflict of interest and related party transactions (real and apparent) and provide safeguards to protect the organization from them, regular reconciliation of bank account statements, Bank signing mandate (to include at least two signatories) and withdrawal applications signing mandate, regular reporting to ensure close monitoring of project

activities, and complaints resolution mechanism. In addition, all the works, goods and services delivered in favor of beneficiaries should be dully transferred to them by PMT.

135. The PMT will build upon the existing internal control framework to ensure that all project procedures and controls are adequately documented; contract monitoring and invoice payment procedures are consistently adhered to and documented. Before signing the contracts, the project teams will verify, duly document and compare unit prices obtained with those available on the local and international market, using the Internet or other available sources of data. Then, for each contract, a monitoring sheet would be opened, filled in, and updated by the PMT, as follows: (a) date of the contract; (b) number of the contract; (c) name of the contractor; (d) contract start date; (e) contract end date; (f) name of the assigned on site supervisor inspector for works or recipient for goods or services, where relevant; (g) name of the assigned contract monitoring staff within the project team; (h) contract value; (i) list of invoices received for the contract; (j) amounts paid in respect of the contract; (k) date of the last inspection, where relevant; and (l) record of procurement complaints.

136. For each payment, the following standard checklist would be filled-in prior to the payment of any invoice to ensure that all appropriate contract monitoring procedures have been carried out, confirming: (a) that the invoice was accompanied by an appropriate certified completion certificate by the assigned resident inspector or other goods received note or acknowledgement of receipt of the goods or services; (b) the mathematical accuracy of the invoice; (c) that the invoice agrees to the terms of payment as specified in the contract; (d) that the works described in the invoice and resident inspector's report are those contracted for; (e) the approval by the relevant staff member; (f) the approval by the relevant staff of the implementing agencies/component coordinator and PMT manager; (g) the date of payment of the invoice; and (h) that the contract monitoring sheet has been updated.

137. The other procedures that would be performed include: (a) close on a timely basis monthly project accounting books; (b) close on a timely basis yearly project accounting books; (c) check the mathematical accuracy of the IFRs inputs with the accounting records; (d) check the opening figures of the IFRs with the closing figures of the previous quarter; (e) check the IFRs figures for consistency between the various reports (Statement of Sources and Uses of Funds, Summary reports used as basis for withdrawals, Uses of Funds by Project Activities, Designated Account Statements, Physical Progress Reports, Procurement Reports and Contract Monitoring); (f) monthly Treasury and bank accounts statements reconciliation with project accounting records; (g) monthly WB disbursement records reconciliation with project accounting books, including SDR/USD reconciliation; and (h) inventory and fixed assets stock taking at least once per year and more often if needed, including periodical monitoring of assets purchased for beneficiaries on their existence and use.

138. Internal audit as a modern function has just started to develop in Moldova with the support of the PFM Project. The internal audit departments of the implementing ministries have been recently created through the reorganization of the Ministries concerned in December 2009 and thus have just started their activity. The Project may rely in the future to the extent possible on Government internal audit capacity. The internal audit functions of the implementing agencies need to be described and it will be done during the appraisal. *The risk associated with*

internal controls is substantial before mitigation measures, and is assessed as moderate after mitigation measures.

139. *External Audit.* Currently, the Moldovan supreme audit institution, the Court of Accounts (CoA), is authorized to perform external compliance audits of the implementing entities, including of this project, in accordance with statutory framework. The CoA is currently not considered an acceptable auditor to audit Bank-funded Projects in Moldova. There is a possibility that the CoA will be used for external audits at later project stages when sufficient capacity is created at the CoA and the CoA is considered acceptable auditor for Bank funded projects in Moldova.

140. The PMT will be responsible for the timely compilation of the annual aggregated project financial statements for the independent external audit. The PMT will be in charge with the whole project auditing and timely submission of the audit report to the Bank. The Project financial statements will be audited annually both by independent auditors acceptable to IDA and based on terms of reference acceptable to IDA. In addition, the annual audit will cover the grants management and execution to be performed by a private or non-profit organization which will be selected through a competitive process under sub-component C.2. The terms of reference for the audit will be agreed upon and attached to the minutes of negotiations. The audit scope will include the Project's books and records as maintained by the PMT, all withdrawal applications, the designated account, and representative sample of assets and records at implementing agencies to confirm existence and use of purchased assets and/or works, checking grants execution. The audited financial statements mentioned above, together with the auditor's opinions and the management letters, detailing internal control issues, will be provided to IDA within six months of the end of the reporting period (the fiscal year). The cost of the project and entities audits will be financed from the proceeds of the project.

141. No significant issues were raised by the auditors with respect to project financial statements under the POPS Project implemented by the PMT. The management letter repeatedly raised the issue for the improvement of the accounting system that was successfully addressed and starting with the FMRs for the first quarter of 2009 the system is able to produce reliable financial statements and disbursement reports.

Audit Report	***Due date***
Project financial statements (PFS), including SOEs and designated accounts. The PFSs include sources and uses of funds by category, by components and by all financing sources, if more than one; SOE statements, statement of Designated Account, notes to financial statements, and reconciliation statement. The PFS will include all project components implemented by all implementing agencies.	Within six months of the end of each fiscal year and also at the closing of the project

The risk associated with external audit is considered moderate.

142. *Funds Flow and Disbursement Arrangements.* There will be one designated account opened for the project proceeds managed by the PMT. Project funds will flow from the IDA credit, by direct payments or via the Designated Account (DA), which will be replenished on a transactional basis using Statements of Expenditure and full documentation as appropriate. The accounts will be opened by the Treasury in a commercial bank acceptable to IDA. Foreign currency amounts will be either paid directly to foreign suppliers or exchanged as needed in local

currency, to cover eligible expenditures payments in local currency to suppliers, from the designated accounts into local currency transfer accounts also opened by the Treasury in a commercial bank acceptable to IDA. Details of expenditures against contracts that will require full documentation and expenditures that may be submitted under Statement of Expenditures are provided in the Disbursement Letter.

Funds Flow from the World Bank

- The Treasury (Chisinau territorial office) will open foreign currency designated account in a commercial bank acceptable to IDA;
- The World Bank will, at the request of the PMT, transfer funds (from the Credit) to the foreign currency designated account;
- The Chisinau territorial treasury office will make payments to contractors and consultants based on payment orders submitted by PMT.

Direct Payments to Contractors/Consultants

- Direct payments can be made for invoiced amounts exceeding the threshold stated in the disbursement letter, based on specific requests of the PMT.

Payments for Works, Goods and Consultant Services

- The PMT will handle the procurement process following agreed procurement procedures.
- The PMT will obtain the World Bank's No-Objections in respect of all prior review contracts at all stages of the procurement process.
- The PMT will award a contract to the selected contractor/supplier; the contract will be signed by the entitled staff of the implementing agencies within the components they are responsible for.
- Once an invoice is received from a works contractor, the works on-site supervisor would certify the quantity and quality of the works covered by the invoice and forward the certified invoice to the PMT. The PMT will duly document receipt of works by beneficiary implementing agency.
- Once an invoice is received from a goods supplier or a consultant, the relevant PMT staff jointly with the relevant component coordinator and staff of the implementing agency will perform the verifications such as conformity with the contractual terms, quality of goods delivered or the consulting work outputs, arithmetical accuracy, etc.; the PMT will duly document receipt of works by beneficiary implementing agencies.
- The payment order including the supporting documentation will be signed by the PMT manager and submitted to the Treasury (Chisinau territorial office) for payment.
- The Chisinau territorial treasury office will make the payment directly to the contractor and inform the PMT about the completed payment. The treasury office will also submit regular bank statements to the PMT for preparing necessary reconciliation.

The risk associated with funds flow and disbursement is considered as moderate after mitigating measures.

Withdrawal of the Proceeds of the Credit

Category	Amount of the Credit Allocated (expressed in SDR)	% of Expenditures to be financed
Goods, works, consultants' services, including training, Incremental Operating Costs and Technical Advisory Services for the Project	6,800,000	100%
Total	6,800,000	100%

143. *Financial Management Conditions and Covenants.* The following financial covenants will be applicable for the Project: (i) the borrower will maintain a financial management system acceptable to IDA; (ii) the borrower will prepare quarterly project management-oriented Interim Financial Reports (IFRs) incorporating financial information, procurement monitoring and physical progress information, and submit them to IDA within 45 days after each calendar quarter-end; (iii) the project's financial statements, withdrawal applications, designated account will be audited by independent auditors acceptable to IDA and on terms of reference acceptable to IDA. The annual audited financial statements and audit reports will be provided to IDA within six months of the end of each fiscal year.

144. Supervision *Plan.* As part of its project supervision missions, IDA will conduct risk-based financial management supervisions, at appropriate intervals. During project implementation, IDA will supervise the project's financial management arrangements in the following ways: (a) review the project's quarterly interim financial reports as well as the project's annual audited financial statements and auditor's management letter, remedial actions recommended in the auditor's Management Letters; (b) during IDA's on-site supervision missions, review the following key areas: (i) project accounting and internal control systems; (ii) budgeting and financial planning arrangements; (iii) disbursement management and financial flows, including counterpart funds, as applicable; and (iv) any incidences of corrupt practices involving project resources; and (c) joint financial management and procurement contract post reviews will be conducted once per year. As required, a WB-accredited Financial Management Specialist will assist in the supervision process.

Annex 8: Procurement Arrangements

MOLDOVA: DISASTER AND CLIMATE RISK MANAGEMENT PROJECT

A. General

145. Procurement for the project will be carried out in accordance with the World Bank's "Guidelines: Procurement under IBRD Loans and IDA Credits" published May 2004 and **revised in October 2006 and May 2010** (Procurement Guidelines); and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" published May 2004 and **revised in October 2006 and May 2010** (Consultant Guidelines) and the provisions stipulated in the Financial Agreement (FA). The various procurement actions under different expenditure categories are described in general below. For each contract to be financed under the FA, the various procurement or consultant selection methods, the need for pre-qualification, estimated costs, prior review requirements, and time frame have been agreed between the Borrower and the Bank in the Procurement Plan (PP). The PP will be updated at least annually or as required to reflect the actual project implementation needs and improvements in institutional capacity. A General Procurement Notice (GPN) will be published in UNDB on-line and in its printed version as well as in dgMarket online. Specific Procurement Notices (SPN) will be published for all ICB procurement and Consulting contracts as per Guidelines as the corresponding bidding documents and RFPs become ready and available. Contract Awards will be posted on UNDB on-line and dgMarket as required under the Guidelines.

B. Assessment of the Agency's capacity to implement procurement

146. A Country Procurement Assessment Report (CPAR) was prepared in June 2003. The report outlined a number of recommendations for strengthening the public procurement environment in Moldova, including legislative reform, improving procurement procedures and practices, institutional reform, and public sector capacity building. An update of the CPAR is underway and is expected to be completed by end of June 2010. The assessment has been carried out using the OECD/DAC methodology to benchmark the public procurement system of Moldova to the internationally accepted practices and standards. A plan of actions will be recommended as part of the CPAR together with a suggested timeframe for the implementation of each action.

147. A new Public Procurement Law was approved on April 13, 2007. The law brings public procurement in line with international standards and practices and addresses many of the weaknesses identified during the CPAR of 2003.

148. Fiduciary arrangements for all components will be managed by an existing Project Management Team (PMT) established under the Ministry of Environment which currently implements the GEF Persistent Organic Pollutants (POPs) Stockpiles Management and Destruction Project. Apart from POPs project, the PMT has successfully carried out similar responsibilities for three other operations: 1. GEF PDFB-MOLDOVA: Sustainable POPs Stockpiles Management Project; 2. GEF FSP-MOLDOVA: POPS Stockpiles Management and Destruction Project; 3. Canadian Grant for the Remediation of POP Pesticides Polluted Areas

and Inventory of PCB Contaminated Oil in Power Equipment. PMT also implemented a project financed by UNEP under the Quick Start Program which closed in February 2010. UNEP agreed that the PMT would apply the World Bank procurement procedures for procurement activities carried out under the project.

149. Currently the PMT is staffed with a project manager, a procurement specialist, a financial management specialist, a project assistant and a driver. The PMT staff has substantial experience in procurement of contracts of different nature (including ICB and QCBS), scope and value, including procurement of various goods, works and services.

150. The PMT will handle remaining procurement activities under the POPs project and the procurement activities of the DCRMP in parallel. The expected workload under both projects will not require additional procurement staff in the PMT due to the fact that the POPs project will close at the end of 2010 and not require extensive procurement work.

151. To strengthen the procurement capacities, the Procurement Expert attended one international training course (Turin, 2005) and a seminar on procurement (Kyiv, 2008). It is expected that he will attend other training courses/seminars organized by the World Bank in the region.

C. Procurement risk assessment

152. The overall procurement risk is rated "substantial" and "moderate" after mitigation. The risks associated with procurement and the mitigation measures were identified in the assessment of PMT's procurement capacity, conducted in May 2010, and are summarized in the table below:

Summary Risk Assessment

Description of risk	***Rating*** [a] ***of risk***	***Mitigation measures***	***Rating*** [a] ***of residual risk***
Lack of coordination of procurement activities due to the existence of three implementing ministries, including two agencies, involved in the project.	M	An efficient coordination mechanism will be established to ensure a successful interaction between the PMT and the beneficiary ministries. Each beneficiary agency will be strengthened with a component coordinator whose main responsibilities will be to manage and implement the project activities, with the fiduciary support of PMT. The project also foresees the creation of an inter-ministerial Steering Committee which will be chaired by a minister named by the Government.	L

No experience with World Bank projects and procurement procedures in the Ministry of Interior, one of the implementing agencies. Among the three implementing ministries only two (Ministry of Agriculture and Ministry of Environment) have extensive experience in this area.	S	The PMT staff and staff from the Ministry of Agriculture and Ministry of Environment, both of which have procurement expertise in Bank operations will closely work with the Ministry of Interior and help them with the preparation of required procurement documents. PMT staff will also provide basic training to relevant staff of the Ministry of Interior on procurement procedures under the Bank-financed operations. It is suggested that staff of the Ministry of Interior involved in procurement process will be invited to participate in the training courses/seminars organized by the Bank in the region.	M
The project will involve procurement of large value contracts for IT equipment and specialized equipment, including radars.	S	Procurement staff will attend training on specific type of procurement as needed. A good communication channel will be established between the PMT staff and the Bank Procurement staff assigned to the proposed project to ensure that IT procurements are carried out in line with the Bank guidelines. PMT staff will also seek advice and guidance of procurement consultants under other Bank-financed operations who have the experience in conducting large value IT procurements.	M
Average	S		M

H: High; S: Substantial; M: Moderate and L: Low.

D. Procurement implementation and arrangements

153. As indicated above, procurement activities will be carried out by the PMT staff in close cooperation/coordination with implementing agencies. The following procurements are planned under the project:

154. Procurement of Works: Works contracts to be procured under this project will include, but not be limited to: renovation and refurbishment of the Emergency Command Center (ECC).

155. Procurement of Goods*:* Goods contracts to be procured under this project will include, but not be limited to: (i) procurement of furniture, IT equipment, IT hardware and software for ECC; (ii) procurement of radar technology.

156. Selection of Consultants: Consultants' services contracts to be procured under this project will include, but not be limited to: (i) architectural design of ECC; (ii) design of the

information management system for ECC; (iii) independent consultant to monitor two inter-sectoral exercises coordinated by the State Department of Exceptional Situation (SDES) to test operation of the ECC at the mid-term and end of the project; (iv) consultant to review the legislative framework for the disaster risk management.

157. Shortlists for consultants' services for contracts estimated to be less than USD 100,000 or equivalent may be composed entirely of national consultants. It is also expected that consulting offices associated with local universities may be included in the shortlists. University-based consultants will not be given preference over other private consultants.

158. Training: The project will support the training for the users of IT decision-support system within the DES and SHS staff in the fields of nowcasting and IT, as well as procurement training for members of the PMT and the bid evaluation committees.

159. Operating Cost: These expenditures would cover salaries of PMT staff, office rent, vehicle rent for supervision, utility and communication costs, translation cost, bank charges, office supplies, advertisement cost, photocopying, mail, etc. which would be financed by the project as per annual budget approved by the Bank and procured using the implementing agency's administrative procedures which were reviewed and found acceptable to the Bank. Operating cost will not include salaries of civil servants.

160. Technical issues as part of procurement decisions*:* The Technical Specifications and TORs shall be developed by the relevant departments within the implementing agencies.

161. Domestic Preference: Domestic Preference may be applied in accordance with the Bank's Procurement Guidelines and the relevant Standard Bidding Documents for Goods and Works.

162. Filing and records keeping*:* Filing of relevant documents, including procurement related documents, and records keeping of the project will be done by the PMT and kept in the PMT's office. Agreed reporting format is included in the Project Operational Manual.

Procurement Plan

163. The proposed project is the first project in ECA region which will use the Procurement Plan Execution System (SEPA), a secure platform developed by the Bank to increase transparency in Bank-financed operations. The PMT has already developed the Procurement Plan (PP) using this tool. Once agreed with the Project Team, the PP will be updated annually or as required to reflect the actual project implementation needs and improvements in the implementing agency institutional capacity.

Procurement/Selection Method	Threshold	Prior Review	Comments
ICB (Goods)	> $ 200K	All	
ICB (Works)	> $ 1 Million	All	
NCB (Goods)	< $ 200K	First 2	
NCB (Works)	< $ 1 Million	First 2	
Shopping	< $ 100 K	None	
Direct Contracting*	-	All	
QCBS	> $ 200K	All	
FBS	-	First 2	
LCS	-	First 2	
CQ	< $ 200K	First 2	
Individual Consultants	-	First 2	
Single/Sole Source*	-	All	

*… all contracts subject to justification

Frequency of Procurement Supervision

164. In addition to the prior review supervision to be carried out by the Bank team, the capacity assessment of PMT recommends post reviews to be carried on at least 10 percent of the contracts subject to post review. It is expected that post reviews will be conducted during a supervision mission in the field at least once a year. A post review report will be prepared and filed in the procurement post review system.

Additional Provisions for National Competitive Bidding

165. The country's NCB conditions have been reviewed as part of the CPAR conducted in 2003 and have not been revised since then. Their revision is planned for the current CPAR which will be completed by the end of FY10.

166. In order to ensure economy, efficiency, transparency and broad consistency with the provisions of Section I of the Guidelines, the following criteria shall be followed in procurement under National Competitive Bidding procedures:

167. *Eligibility:* Bidding shall not be restricted to domestic firms.

168. *Procedures:* 'Open Tendering' shall be followed in all cases. Invitations to bid shall be advertised in at least one widely circulated national daily newspaper allowing a minimum of 30 days for the preparation and submission of bids.

169. *Pre-qualification:* When pre-qualification shall be required for large or complex works, invitations to prequalify for bidding shall be advertised in at least one widely circulated national daily newspaper a minimum of 30 days prior to the deadline for the submission of pre-qualification applications. Minimum experience, technical and financial requirements shall be

explicitly stated in the prequalification documents. Prequalification shall be determined by a 'pass/fail' method and not through use of a merit point system.

170. *Participation by Government-owned enterprises:* Government-owned enterprises in the Republic of Moldova shall be eligible to participate in bidding only if they can establish that they are legally and financially autonomous, operate under commercial law and are not a dependent agency of the Government. Furthermore, they will be subject to the same bid and performance security requirements as other bidders.

171. *Participation by Joint Ventures:* Participation shall be allowed from joint ventures on the condition that such joint venture partners will be jointly and severally liable under the Contract.

172. *Bidding Documents:* Procuring entities shall use the appropriate standard bidding documents for the procurement of goods, works or services, and shall contain draft contract and conditions of contract, all acceptable to the Bank.

173. Bid Opening and Bid Evaluation:

a) Bids shall be opened in public, immediately after the deadline for submission of bids.

b) Extension of bid validity shall be allowed once only for not more than 60 days. No further extensions should be requested without the prior approval of the Bank

c) Contracts shall be awarded to qualified bidders having submitted the lowest evaluated substantially responsive bid.

d) No preference shall apply under National Competitive Bidding.

174. *Price Adjustment:* Civil works contracts of long duration (e.g. more than eighteen (18) months) shall contain an appropriate price adjustment clause.

175. *Rejection of Bids:* All bids shall not be rejected and new bids solicited without the Bank's prior concurrence.

176. *Contracts:* Unless otherwise agreed, all contracts shall be in writing, signed and stamped by authorized signatories of the Purchaser and the Supplier and contain identical terms and conditions of contract to those included in the tender documents.

177. *Securities:* Bid Securities should not exceed 2% (two percent) of the estimated cost of the contract; Performance Securities not more than 10% (ten percent). No advance payments shall be made to Contractors without a suitable Advance Payment security. The wording of all such securities shall be included into the bidding documents and be acceptable to the Bank.

Anti Corruption Measures

178. The implementing agencies through the Project Management Team will respect the Fraud and Corruption provisions of the Procurement Guidelines or the Consultants Guidelines, paragraphs 1.14 and 1.22, respectively. The firms and individuals included into the World Bank

List of Ineligible Firms and Individuals will be excluded from participation in the competition for Bank-financed contracts. Unless otherwise indicated in such list, in the case of a debarred firm, ineligibility extends to any firm or individual which directly or indirectly controls the debarred firm or any firm which the debarred firm directly or indirectly controls; and in the case of a debarred individual, ineligibility extends to any firm which the debarred individual directly or indirectly controls. The current list can be found on www.worldbank.org.

179. On April 9, 2010 the World Bank Group signed an "Agreement for Mutual Enforcement of Debarment Decisions", more commonly referred to as the "Cross-Debarment Agreement." The agreement was also signed by four other Multilateral Development Banks (MDBs) including: the African Development Bank, the Asian Development Bank, the European Bank for Reconstruction and Development and the Inter-American Development Bank. It is anticipated that the agreement will become effective in June 2010 and it will apply to all IBRD and IDA-financed projects for which an invitation to negotiate was issued on or after May 1, 2010.

180. **SEPA:** In order to increase transparency and to provide public access to contracts executed under the proposed operation, the project has adopted the use of SEPA. It is a sound, reliable and secure electronic web-based tool which presents information related to planned/executed procurement activities under the project, their status, as well as specific details about each contract financed under the project. Apart from promoting transparency, the use of SEPA will also strengthen accountability and give the government and implementing agencies an instrument for managing procurement activities.

Annex 9: Economic and Financial Analysis

MOLDOVA: DISASTER AND CLIMATE RISK MANAGEMENT PROJECT

181. Natural disasters have significant consequences on the living conditions, economic performance, and environmental assets and services of affected countries, particularly in the developing world. Accordingly, there has been a growing emphasis and effort to mainstream disaster risk reduction (DRR) in the international development agenda. Existing literature suggests that activities in DRR can generate substantial economic returns to investment.

182. About 90 percent of people-affecting natural disasters in the world are caused by hydrometeorological events such as storms, droughts, and floods, and their impacts are expected to become more severe. As such, the need for the accuracy and the improved quality of weather and climate services is increasing. Investments in the infrastructure and services associated with hydrometeorological services exhibit substantial returns. Typical factors for the ratio of economic benefits to a national meteorological and hydrological service budget are estimated to be in the range of 5-10 to 1. In the United States, for example, a study finds benefit-cost ratio of meteorology expenditures to be 6.2 to 1 ($31.5 billion in benefits to $5.1 billion in costs). It is important to note, however, that hydrometeorological services have typical characteristics of public goods. Thus, despite the high benefit-cost ratios, public support would usually be called for in this area.

183. In this context, many national hydrometeorological services in Europe and Central Asia, including Moldova, are in need of further strengthening and modernization. Many national meteorological and hydrological services do not have the financial and human capacity to fully meet the international obligations and growing national needs. Moreover, these agencies do not have enough resources to invest and upgrade their service levels. Much more could be done to improve their services, and thereby reduce vulnerabilities of the countries to natural hazards. Moldova is a country with high exposures to a number of natural disaster risks, including storms, droughts, floods, extreme temperatures, landslide, frost, and earthquakes. The table below summarizes the damages cited in recent reviews.

184. Using the estimated damages in Table 1, the average annual economic loss in Moldova can be estimated as 1.76 percent of the country's GDP. Although there are some higher estimates of average annual economic losses available, this figure will be adopted as a basis for estimating the project's economic benefits, to be on the conservative side.[19]

[19] For example, the risk assessment conducted by the World Bank for Moldova finds the losses due to hazards to be 2.13 percent of the country's GDP. Moreover, a study on rural productivity in Moldova finds the country's average annual hazard damage to be between 5 and 15 percent. To be on the conservative side, however, this analysis adopts the lower, more conservative figure.

Table 1: Major natural disasters in Moldova, 1994-2010

Year	Disaster	Casualties	Affected people	Estimated Damages ($'000)
August 1994	Flood	47	25,000	300,000
November 1994	Storm	3	25,580	
July 1997	Flood	9	2,244	50,000
March 1999	Flood		1,713	4,000
May 2000	Drought	2		
November 2000	Storm		2,600,000	31,600
June 2002	Flood	1	500	832
August 2005	Flood		6,500	7,752
January 2006	Extreme temperature	13		
2007	Drought		210,394	406,000
July 2008	Flood	3	4,000	

Source: EM-DAT[20]

185. *Methodology.* Analysis of the project's economic feasibility was performed by comparing the expected stream of economic benefits, in terms of reduced vulnerability to natural hazards, with the economic costs of the project. While the estimation of the costs is relatively straight-forward (i.e., projects costs expressed in shadow prices), estimation of the benefits is more complex as they are by nature probabilistic, based on a number of assumptions. Furthermore, relevant data are not always readily available. In principle, the benefit of a project is the difference between streams of damages and losses that would occur under with- and without-project scenarios. There are, however, no fully accepted and institutionalized methods for estimating this, as well as on how to discount the future streams or how to value human life. Nonetheless, the present analysis focuses on the economic aspects, and conducts qualitative and quantitative CBA based on macro-economic aggregate data which include key sectors such as agriculture and infrastructure.

186. *Analysis.* The project will result in improved availability, quality, and timely provision of hydrometeorological information to Moldova's key weather dependent sectors and activities, including: agriculture, flood protection, transport, and energy. These sectors are users of weather information and warnings on severe weather events provided by the State Hydrometeorological Service of Moldova. The project is expected to contribute to the reduced losses in agriculture and other sectors, and preventive actions taken on the basis of these data were estimated to lead to avoided damages annually. Table 2 below summarizes the key benefits and costs identified.

[20] A disaster event registered in the EM-DAT data base meets at least one of the following criteria: (i) ten or more people are reported killed, (ii) hundred or more people are reported affected, (iii) a state of emergency was declared, or (iv) there was a call for international assistance. The economic impact of a disaster usually consists of direct (e.g. damage to infrastructure, crops, housing) and indirect (e.g. loss of revenues, unemployment, market destabilization) consequences on the local economy. The estimated damages capture values of all damages and economic losses directly or indirectly related to the disaster. The value is given in thousands ('000) at the date the disaster occurred.

Table 2: Summary of the Project Costs and Benefits

Project Component	Economic Cost* (US$ million)	Key Benefits
A. Strengthening SHS's Severe Weather Forecasting Capacity	4.80	• Lives saved, and injuries lessened • Sustaining crucial economic activity • Reduction in losses in agriculture • Conservation of energy • Promotion of safe and timely transport by road, rail, and air • Reduction in losses in tourism • Avoidance of more severe capital losses as a result of secondary disasters • Avoided time loss for businesses • Avoided chaos in the aftermath of disasters
B. Improve Disaster Preparedness and Emergency Response	2.70	
C. Initiate Activities for Adaptation to Climate Risks in Agriculture	2.01	
D. Project Management	0.50	

* Economic costs are assumed to be identical to the financial costs in this project because the Government of Moldova has confirmed that taxes and duties do not apply to the items to be procured for the project. Costs include contingencies and are estimates.

187. The approach taken for the quantitative analysis of the project is in line with the benchmarking method which uses macro-economic aggregates together with certain basic assumptions. This method has advantage over other approaches, such as sector-specific assessment and sociological survey, in that it can economize on the required data. Due to time and resources constraints, this approach is considered appropriate for the analysis of the project. Although economic benefits are calculated at the aggregate level, the benchmark parameters obtained from neighboring countries include key sectors including agriculture.

Table 3: Basic parameters for the economic analysis

Parameter	Abbreviation	Value	Unit	Notes
Moldova's Gross Domestic Product (GDP) for 19 years from 2009 (including 4 years of construction and 15 years of operation)	GDP	5.375	US$ billion	2010 figure. The economy is assumed to grow at 4% p.a., based on the geometric mean of the latest forecast for 2010-13.
Estimated Average Annual Economic Loss	AAEL	1.76	% of GDP	EM-DAT data for 1994-2010
Estimated Preventable Average Annual Economic Loss	PAAEL	14	% of AAEL	The lowest value from neighboring countries in the region[21]. Source: World Bank (2008)
Project's Contribution	PB	25	% of PAAEL	An assumption based on interviews with experts.
Project Costs during Implementation	PC	10.00	US$ million	Project cost
Operations and Maintenance Costs	OM	0.60	US$ million	Assumed to be 6% of PC.
Opportunity Cost of Capital	CC	12	%	World Bank assumption
Planning Horizon	T	19	Years	4 years construction and 15 years operations

[21] The figure obtained in this process roughly corresponds to estimates by VTT Technical Research on the potential socio-economic benefits of hydrometeorological services in Moldova which is between €12 and 19 million per year. The estimate draws on sector-specific assessments. Further, the value assumed is almost identical to the estimation of benefits from hydrometeorological services in Moldova mentioned in the study on "Strengthening the Hydrometeorological Services in South Eastern Europe".

188. The approach was based on the assumptions in Table 3.

189. *Results.* Based on the assumptions and parameters discussed above, the estimated economic rate of return (ERR) of the project is 25 percent. The NPV of the net benefits is US$10.3 million, and the benefit-cost ratio is 2.0. As noted earlier, this scenario is based on a number of very conservative assumptions, especially on AAEL and PAAEL, producing the most conservative level of economic benefits. If the assumptions on the respective parameters are relaxed, setting AAEL to be 2.13 percent and PAAEL to be 78.6 percent, the ERR would become 84 percent, the net benefit US$130.0 million with the benefit-cost ratio of 13.6. These ERR values still do not include social and environmental dimensions of the project benefit, and exceed the opportunity cost of capital of 12 percent. Therefore, the project is considered economically viable.

190. *Financial Analysis.* Financial analysis is not applicable to this project because it is not a revenue-generating project.

Annex 10: Safeguard Policy Issues

MOLDOVA: DISASTER AND CLIMATE RISK MANAGEMENT PROJECT

191. *Project location.* Outside of technical assistance (TA) and capacity building activities, the Project will also support several small-scale construction activities for a tower for installing a weather radar at the Chisinau International Airport, weather and hydrologic stations in Leova, Ceadir-Lunga, Balti, Soroca, and Malovata-Veche locations. Proposed sites are located outside residential areas or on the outskirts of towns and villages. There are no significant natural habitats and or physical cultural resources near the sites. Furthermore, construction will be done on available lands that are government-owned, either by the state or by the local public administration, and are not used by local people, legally or illegally, implying no involuntary resettlement issues. Locations were selected to ensure proper meteorological and hydrological observations and to provide representative data. The premises will accommodate the Hydrometeorological Service personnel in these areas that currently are based in old crumbling buildings which belonged to airports during Soviet period.

192. *Project environment category*. In accordance with the World Bank's safeguard policies and procedures, including OP/BP/GP 4.01 Environmental Assessment, this project has been classified as a Category B project for environmental assessment purposes. Based on that classification, the project Environmental Assessment (EA) includes an EA of the project sites and of the proposed *construction* activities, as well as a simple Environmental Management Plan (EMP) which specifies mitigation measures, monitoring activities, and its implementing arrangements. The EA and the EMP address the requirements of the applicable laws and regulations of the Government of Moldova, and the World Bank's safeguard policies and disclosure requirements.

193. *Purpose of the Environmental Assessment*. The purpose of the EA is to identify environmental impacts of the project (both positive and negative), and to specify appropriate preventive actions and mitigation measures (including appropriate monitoring) to prevent, eliminate or minimize any anticipated adverse impacts. An EA was carried out by an independent local consultant, based on which a simple EMP was prepared. The EA report was prepared based on the following: (i) analysis of the existing national legal documents, regulations and guidelines; (ii) WB safeguard policies, as well as guiding materials; (iii) national EA and construction legal framework; (iv) existing EIAs for similar projects; (v) environmental evaluation of the proposed project sites; and (vi) results of consultations with the representatives from all interested parties and stakeholders.

194. *National Regulatory framework for EA*. Moldova has in place a well developed EA system, environmental legal instruments, and technical standards which will be applied during Project implementation. The main regulatory acts in this area are: the Law on Environmental Protection; the Law on Ecological *Expertise* and Environment Impact Assessment; the Law on Quality in Construction; and the Law on Grounds of Town-planning and Territorial Development. The national EIA regulatory framework is generally in line with World Bank EA rules and procedures.

195. *EA Institutional framework and capacities.* The evaluation of the EA institutional capacity has shown that national institutions and implementing entities have relevant capacities to perform their duties concerning reviewing EA studies and enforcing the Environmental Management Framework (EMF) provisions. The implementation of project environmental safeguards will be done by the existing Project Management Team (PMT) under the Ministry of Environment (MOE). The PMT has an assigned staff member with such responsibilities, and adequate experience, as the PMT is currently implementing the full-size GEF POPs Stockpiles Management and Destruction Project, which is a Category A project. The results of implementation of the GEF POPs Project's environmental safeguards are considered very positive. The Project will support additional information dissemination and training activities to ensure the environmental requirements and the EMP provisions would be fully implemented.

196. *Potential environmental impacts.* It is expected that the project will not generate any large-scale and significant *environmental* and social impacts. Possible adverse environmental impacts are related to construction and operation phases and are the following:

- *Dust, noise and vibration*: These impacts shall occur during construction activities on all sites and are site specific. To avoid these impacts it is necessary to follow existing best construction practices which are well known and applied in the country and are reflected in the EMP;
- *Land contamination*: construction activities may cause some contamination of the soil by hydrocarbon. Movement of soil during construction works can also result in the contamination of surface and underground waters. Contractors should take measures to avoid this;
- *Waste handling and spill response*: Routine construction activities will generate solid and liquid waste including drywall, machine oil, paints, and solvents. Minor spills of fuel and other materials are likely to occur during construction. Improper handling of on-site waste and response to spills could result in adverse effects on the local environment including ground water, surface water, terrestrial ecosystems, as well as local residents;
- *Wastewater discharge*: construction activities may generate sanitary wastewater discharge. Permanent sanitary facilities should be envisaged at the construction site. The same facilities will be used during the operation phase. These should be installed and operated in accordance with the environmental regulations;
- *Potential impacts associated with indoor construction activities* in the case of the usage of noxious/toxic solvents and glues and of lead-based paints.

197. All these potential *environmental* impacts are minor and could be easily managed during construction and at the project implementation stage.

198. *Land acquisition and resettlement issues*. Construction of the premises will be done on available lands which are owned by the local public administration and will not imply any involuntary resettlement *issues*. The SHS has the right to use these sites as these belong to the State and in accordance with the Law these were handed over for use by the SHS. Furthermore, construction of the premises will be done on sites which are not legally and or illegally used by local population and, thus, will not imply any involuntary resettlement issues.

199. *Environmental Management Plan.* The EMP covers typical mitigation approaches to common civil works with localized impacts and is based on preliminary environmental site evaluation, evaluation of potential *environmental* and social impacts, as well as on national construction and environmental standards. It is proposed that the contractors will ensure workers' safety, will undertake relevant measures for preventing dust and noise pollution, and will ensure proper handling, transportation and disposal of construction waste materials. The EMP would be directly usable and applicable in bidding documents and as an integral part of contract documents for civil works under Bank-financed projects.

200. *EA reporting and consultatio*ns. The PMT of the Ministry of Environment and the State Hydrometeorological Service disclosed the draft summary of the EMP on the web-page of the PMT (www.moldovapops.md) and of the State Hydrometeorological Service (www.meteo.md) on March 03, 2010, inviting all the *interested* parties to provide comments and to attend the document's public consultation. Invitations, together with hard copies of the draft EMP, were also sent directly to the administration of the Chisinau city airport (MoldATSA) and involved localities. During March-May, 2010 the PMT and representatives from the State Hydrometeorological Service have conducted public consultations in all involved settlements where representatives from local councils, and rayon environmental and construction authorities participated. The meetings concluded that the draft EMP covers practically all potential impacts and possible mitigation measures. The final version of the EMP was provided to the World Bank, and will be used by the government agencies during implementation.

Annex 11: Project Preparation and Supervision

MOLDOVA: DISASTER AND CLIMATE RISK MANAGEMENT PROJECT

	Planned	Actual
PCN review	03/31/2009	11/25/2009
Initial PID to PIC	11/25/2009	12/02/2009
Initial ISDS to PIC	12/04/2009	12/14/2009
Appraisal	05/28/2010	06/04/2010
Negotiations	06/24/2010	06/25/2010
Board approval	08/05/2010	
Planned date of effectiveness	09/17/2010	
Planned date of mid-term review	08/31/2012	
Planned closing date	08/05/2014	

Key institutions responsible for preparation of the project:

State Chancellery
Ministry of Finance
Ministry of Environment
State Hydrometeorological Service (Ministry of Environment)
Ministry of Agriculture and Food Industry
Ministry of Internal Affairs
Department of Exceptional Situations, Ministry of Internal Affairs

Bank staff and consultants who worked on the project included:

Name	Title	Unit
Salman Anees	Sr. Urban Specialist	ECSS6
Anatol Gobjila	Sr. Operations Officer	ECSS3
Jolanta Kryspin-Watson	Operations Officer	ECSS6
Arcadie Capcelea	Environmental Specialist	ECSSD
Valerie Morrica	Social Development Specialist	ECSS4
Oxana Druta	Procurement Specialist	ECSC3
Knut Leipold	Sr. Procurement Specialist	ECSC2
Elena Corman	Procurement Assistant	ECCMD
Ruxandra Costache	Counsel	LEGEM
Hannah Koilpillai	Sr. Finance Officer	CTRFC
Mitsunori Motohashi	Young Professional	GFDRR
Curtis Barrett	Consultant	ECSSD
Silvia Pana-Carp	Consultant	ECSSD
Delphine Hamilton	Sr. Program Assistant	ECSSD
Lynette Alemar	Sr. Program Assistant	ECSSD

Annex 12: Documents in the Project File

MOLDOVA: DISASTER AND CLIMATE RISK MANAGEMENT PROJECT

- "South Eastern Europe Disaster Risk Mitigation and Adaptation Program"; World Bank; UN ISDR; March 2008

- "Mitigating the Adverse Financial Effects of Natural Hazards on the Economies of South Eastern Europe"; World Bank; UN ISDR; March 2008

- "South Eastern Europe Disaster Risk Mitigation and Adaptation Initiative – Risk Assessment for South Eastern Europe"; World Bank; UN ISDR; March 2008

- "Strengthening the Hydrometeorological Services in South Eastern Europe"; World Bank; UN ISDR; World Meteorological Organization; Finnish Meteorological Institute; August 2008

Annex 13: Statement of Loans and Credits

MOLDOVA: DISASTER AND CLIMATE RISK MANAGEMENT PROJECT

			Original Amount in US$ Millions						Difference between expected and actual disbursements	
Project ID	FY	Purpose	IBRD	IDA	SF	GEF	Cancel.	Undisb.	Orig.	Frm. Rev'd
P107612	2008	NATIONAL WATER SUPPLY & SANITATION	0.00	14.00	0.00	0.00	0.00	11.57	2.42	0.00
P100929	2007	ROAD SECTOR PROGRAM SUPPORT PROJECT	0.00	16.00	0.00	0.00	11.03	4.47	13.23	-0.32
P095250	2007	HEALTH SERVICES AND SOCIAL ASSISTANCE	0.00	17.00	0.00	0.00	0.00	12.46	5.23	2.98
P099841	2006	AVIAN FLU - MD	0.00	8.00	0.00	0.00	0.00	2.33	1.77	0.00
P090673	2006	RISP (APL #2)	0.00	31.00	0.00	0.00	0.00	12.47	-5.95	-2.26
P090340	2006	QUAL EDUC IN RUR AREAS OF MD	0.00	10.00	0.00	0.00	0.00	5.27	4.07	0.00
P089124	2006	COMPETITIVENESS ENHANCEMENT	0.00	33.80	0.00	0.00	0.00	30.27	5.03	6.06
P082916	2005	PUB FIN MGMT TA	0.00	8.55	0.00	0.00	0.00	9.03	8.55	0.00
P040558	2004	ENERGY 2	0.00	45.00	0.00	0.00	0.00	12.52	-1.67	-4.45
P079314	2004	SIF 2	0.00	45.00	0.00	0.00	0.00	24.21	-0.80	-1.10
		Total:	0.00	228.35	0.00	0.00	11.03	124.60	31.88	0.91

MOLDOVA
STATEMENT OF IFC's
Held and Disbursed Portfolio
In Millions of US Dollars

		Committed				**Disbursed**			
		IFC				**IFC**			
FY Approval	Company	Loan	Equity	Quasi	Partic.	Loan	Equity	Quasi	Partic.
2000	FinComBank	0.75	0.00	0.00	0.00	0.75	0.00	0.00	0.00
2004	FinComBank	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
1997	INCON	2.39	0.00	0.00	0.00	2.39	0.00	0.00	0.00
2006	Mobiasbanca	5.00	0.00	0.00	0.00	2.50	0.00	0.00	0.00
2000	Moldindconbank	0.19	0.00	0.00	0.00	0.19	0.00	0.00	0.00
2004	Moldindconbank	3.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00
2000	ProCredit MDA	0.00	0.00	0.90	0.00	0.00	0.00	0.90	0.00
2001	UF Moldova	20.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00
2001	Victoriabank	0.57	0.00	0.00	0.00	0.57	0.00	0.00	0.00
2004	Victoriabank	5.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00
1999	VoxTel	0.00	0.00	1.25	0.00	0.00	0.00	1.25	0.00
2000	VoxTel	0.00	0.00	0.07	0.00	0.00	0.00	0.07	0.00
2001	VoxTel	0.00	0.00	0.30	0.00	0.00	0.00	0.30	0.00
	Total portfolio:	37.90	0.00	2.52	0.00	30.40	0.00	2.52	0.00

		Approvals Pending Commitment			
FY Approval	Company	Loan	Equity	Quasi	Partic.
	Total pending commitment:	0.00	0.00	0.00	0.00

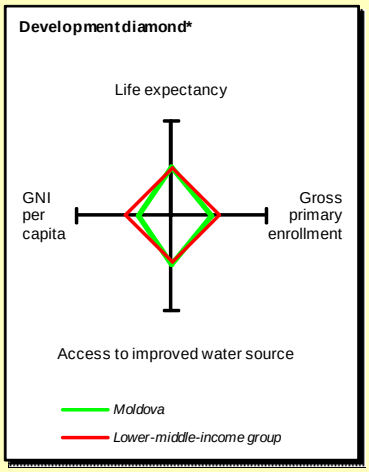
Annex 14: Country at a Glance

MOLDOVA: DISASTER AND CLIMATE RISK MANAGEMENT PROJECT

Moldova at a glance

12/9/09

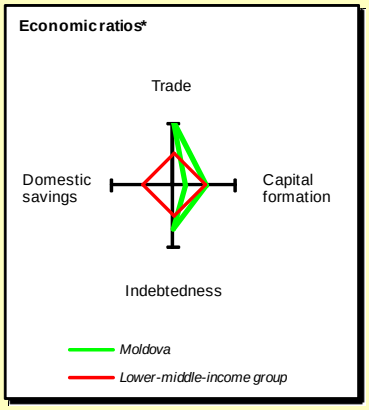
POVERTY and SOCIAL	Moldova	Europe & Central Asia	Lower-middle-income
2008			
Population, mid-year *(millions)*	3.6	441	3,702
GNI per capita *(Atlas method, US$)*	1,500	7,418	2,078
GNI *(Atlas method, US$ billions)*	5.3	3,274	7,692
Average annual growth, 2002-08			
Population *(%)*	-1.4	0.1	1.2
Labor force *(%)*	-2.4	1.0	1.6
Most recent estimate (latest year available, 2002-08)			
Poverty *(% of population below national poverty line)*	49	..	..
Urban population *(% of total population)*	43	64	41
Life expectancy at birth *(years)*	68	70	68
Infant mortality *(per 1,000 live births)*	15	21	46
Child malnutrition *(% of children under 5)*	3	..	26
Access to an improved water source *(% of population)*	90	95	86
Literacy *(% of population age 15+)*	99	98	83
Gross primary enrollment *(% of school-age population)*	89	98	109
Male	90	99	112
Female	88	97	106



KEY ECONOMIC RATIOS and LONG-TERM TRENDS

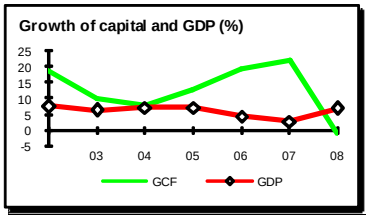
	1988	1998	2007	2008
GDP *(US$ billions)*	..	1.6	4.4	6.0
Gross capital formation/GDP	..	26.8	38.1	37.0
Exports of goods and services/GDP	..	48.5	47.5	40.7
Gross domestic savings/GDP	..	0.3	-11.6	-13.8
Gross national savings/GDP	..	6.4	24.6	20.3
Current account balance/GDP	..	-20.4	-15.3	-16.3
Interest payments/GDP	..	3.3	2.3	1.4
Total debt/GDP	..	64.7	72.3	62.6
Total debt service/exports	..	21.5	9.5	11.1
Present value of debt/GDP	..	..	65.4	56.5
Present value of debt/exports	..	..	80.8	76.0

	1988-98	1998-08	2007	2008	2008-12
(average annual growth)					
GDP	-11.7	5.6	3.0	7.2	-1.9
GDP per capita	-11.5	7.3	4.2	8.2	-3.8
Exports of goods and services	2.5	11.6	15.1	-11.4	-2.5



STRUCTURE of the ECONOMY

	1988	1998	2007	2008
(% of GDP)				
Agriculture	..	31.8	12.0	10.9
Industry	..	24.5	14.8	14.7
Manufacturing	..	17.2	14.2	14.1
Services	..	43.8	73.2	74.5
Household final consumption expenditure	..	85.7	92.7	93.3
General gov't final consumption expenditure	..	14.0	18.9	20.6
Imports of goods and services	..	75.0	97.1	91.5



	1988-98	1998-08	2007	2008
(average annual growth)				
Agriculture	-15.1	-0.8	-34.8	35.0
Industry	-16.2	2.1	-1.2	0.5
Manufacturing	..	5.5	-1.3	0.6
Services	0.1	8.8	24.1	0.0
Household final consumption expenditure	13.7	8.4	5.0	5.3
General gov't final consumption expenditure	-8.5	6.7	-6.8	13.2
Gross capital formation	-19.3	9.2	22.3	-0.9
Imports of goods and services	9.6	13.3	14.6	-6.1

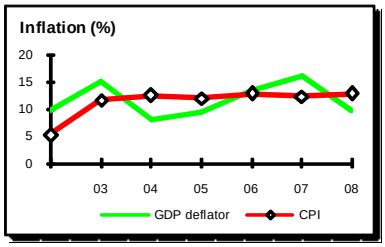
Note: 2008 data are preliminary estimates.

This table was produced from the Development Economics LDB database.

*The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

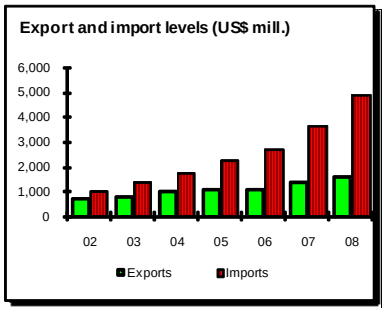
PRICES and GOVERNMENT FINANCE

	1988	1998	2007	2008
Domestic prices				
(% change)				
Consumer prices	..	8.0	12.3	12.7
Implicit GDP deflator	..	5.6	15.9	9.7
Government finance				
(% of GDP, includes current grants)				
Current revenue	..	38.9	41.0	40.0
Current budget balance	..	-1.6	6.5	5.5
Overall surplus/deficit	..	-6.7	-0.2	-1.0



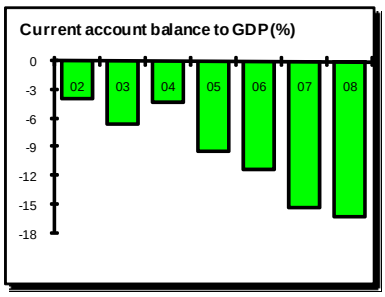
TRADE

	1988	1998	2007	2008
(US$ millions)				
Total exports (fob)	..	644	1,342	1,597
Live animals and animal products	..	35	14	10
Vegetable products	..	73	163	210
Manufactures	..	123	456	563
Total imports (cif)	..	1,024	3,690	4,899
Food	..	16	238	343
Fuel and energy	..	245	788	1,126
Capital goods	..	196	831	1,231
Export price index *(2000=100)*	..	123	178	215
Import price index *(2000=100)*	..	55	159	188
Terms of trade *(2000=100)*	..	225	112	115



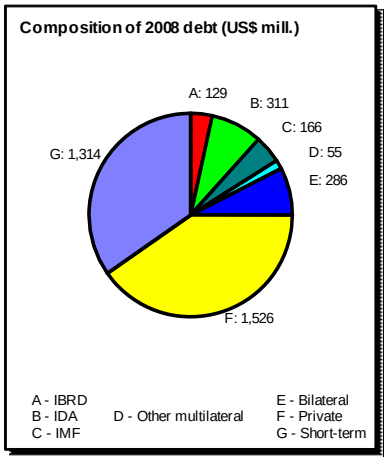
BALANCE of PAYMENTS

	1988	1998	2007	2008
(US$ millions)				
Exports of goods and services	..	796	1,998	2,483
Imports of goods and services	..	1,230	4,308	5,691
Resource balance	..	-435	-2,309	-3,208
Net income	..	35	416	598
Net current transfers	..	65	1,219	1,623
Current account balance	..	-335	-674	-987
Financing items (net)	..	109	1,203	1,439
Changes in net reserves	..	226	-529	-452
Memo:				
Reserves including gold *(US$ millions)*	..	140	1,334	1,912
Conversion rate *(DEC, local/US$)*	..	5.4	12.1	10.4



EXTERNAL DEBT and RESOURCE FLOWS

	1988	1998	2007	2008
(US$ millions)				
Total debt outstanding and disbursed	..	1,062	3,182	3,787
IBRD	..	169	141	129
IDA	..	38	292	311
Total debt service	..	201	339	501
IBRD	..	10	23	24
IDA	..	0	3	4
Composition of net resource flows				
Official grants	0	20	160	192
Official creditors	..	40	13	8
Private creditors	..	-19	358	380
Foreign direct investment (net inflows)	..	76	539	708
Portfolio equity (net inflows)	0	7	2	11
World Bank program				
Commitments	..	21	33	30
Disbursements	..	29	39	24
Principal repayments	..	1	16	19
Net flows	..	28	23	5
Interest payments	..	9	10	9
Net transfers	..	19	13	-4



Note: This table was produced from the Development Economics LDB database. 12/9/09

IBRD 33448R

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MOLDOVA

- SELECTED CITIES AND TOWNS
- AUTONOMOUS TERRITORIAL UNIT CAPITALS
- RAIONS OR MUNICIPALITIES CAPITALS*
- NATIONAL CAPITAL
- RIVERS
- MAIN ROADS
- RAILROADS
- AUTONOMOUS TERRITORIAL UNIT BOUNDARIES
- RAIONS OR MUNICIPALITIES BOUNDARIES
- INTERNATIONAL BOUNDARIES

*Names of the raions or municipalities are identical to their capitals.

MAY 2007