A grayscale photograph of a flooded landscape, showing a wide river or floodplain with water reflecting the sky. The background shows distant hills and some structures partially submerged.

Republic of Moldova

Post Disaster Needs Assessment

Floods 2010

Main Report

A report prepared by the Government of the Republic of Moldova with support from the European Union, the United Nations, and the World Bank



# Foreword

In June of 2010, torrential rains across Ukraine and northern Moldova increased the water level of the Prut and Nistru rivers. The Prut River flooding caused the greatest damage, affecting the western districts of the country. By its magnitude and coverage, this has turned to be the worst flooding in decades. The damage affected nearly 13,000 people, destroying critical infrastructure, washing away crops and livestock, damaging homes, and causing displacement.

In the aftermath of the flooding, the Government of Moldova undertook measures to mitigate the immediate effects of the floods, mobilizing emergency assistance to meet the most pressing needs of people in the affected regions. Government institutions acted promptly in response to the disaster in the worst affected areas of Hâncești and Cantemir districts.

Temporary settlements have been established; water, food supplies, and non-food items (tents, blankets, and water purification tablets) have also been made available. Local security and healthcare facilities have been strengthened as part of the response effort. Dams at risk of breaking and causing even more damage have been reinforced. The Government through various line ministries and agencies provided logistical support, airlifting capacity, vehicles, and motor boats.

Parallel efforts were undertaken to mobilize the maximum resources possible. One of the first actions by the Government was an appeal to the international and donor community by Prime Minister Vladimir Filat to secure sufficient resources for the immediate response, as well as for the rehabilitation and reconstruction of the

flooded areas. A special account was opened for collecting monetary donations; private undertakings have been encouraged.

The Prime Minister's appeal elicited a response with significant help coming from friendly nations and institutions all over the world.

While these efforts were mainly channelled toward immediate humanitarian assistance, it was agreed that a comprehensive assessment process was necessary to estimate the flood consequences and to better plan recovery actions. As a result, a Post-Disaster Needs Assessment (PDNA) was conducted by the Government of Moldova and supported by the European Union, the United Nations, and the World Bank, with the support of the Global Facility for Disaster Reduction and Recovery (GFDRR).

In a short period, local and international experts worked together to produce the PDNA. The document presents a holistic approach to recovery and reconstruction efforts and also aims to provide the Government with options for working toward longer term, sustainable disaster risk reduction.

The 2010 floods highlight the importance of reducing disaster risks in Moldova, particularly as predictions indicate the country faces a greater likelihood of extreme temperature and precipitation patterns due to climate variability.

This assessment report provides a clear analysis of the extent of the damage and losses caused by the floods, the hardship suffered by the people, as well as the

impacts on the economy and the environment. Furthermore, it identifies financing needs required to formulate early recovery actions, implement medium-term recovery and reconstruction plans, and develop a long-term risk management and reduction strategy.

The Government of Moldova would like to thank the PDNA team for its swift response to the request for assistance, for the dedication shown throughout the assessment, and for the quality of this report. The PDNA offers an outstanding example of effective coordination between various development partners and the Government of the Republic of Moldova.

Victor BODIU  
Minister of State  
State Chancellery  
Government of Moldova

# Acknowledgements

This report was prepared by the Government of the Republic of Moldova with support from members of the international community, including the European Union, the United Nations, and the World Bank.

In the weeks following the floods of 2010, the Government of the Republic of Moldova conducted the initial damage assessments with the assistance of a team from the United Nations. The results of these assessments provided a basis for immediate response and short-term recovery.

After the initial humanitarian relief phase, the Government initiated a Post-Disaster Needs Assessment (PDNA), which was overseen by Vadim Pistrinciuc, Deputy Minister of Social Protection, supported by Melanie Marlett, World Bank Country Manager, Matilda Dimovska, United Nations Development Programme Deputy Resident Representative, and Wolfgang Behrendt, Charge d'affaires of the Delegation of the European Union to the Republic of Moldova. The PDNA team is indebted to the initial evaluation teams for their guidance and assistance.

The entire process was facilitated by the Global Facility for Disaster Recovery and Reconstruction (GFDRR).

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Photographs used in this publication were taken by the PDNA team.

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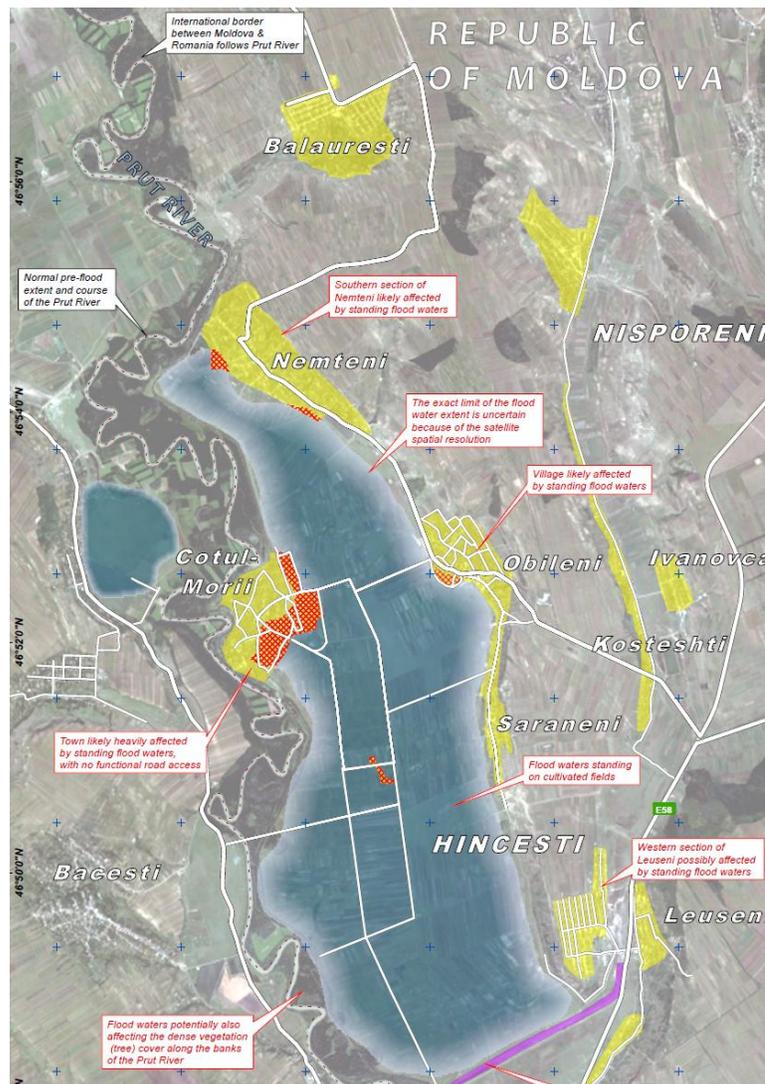
CPESS	Civil Protection and Emergency Situations Service
DaLA	Damage and Loss Assessment
DPPI	Disaster Prevention and Preparedness Initiative
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EC	European Commission
EU	European Union
EWS	Early Warning System
FAO	Food and Agricultural Organization
GDP	Gross Domestic Product
GFDRR	Global Facility for Disaster Reduction and Recovery
HDI	Human Development Index
HRNA	Human Recovery Needs Assessment
HDI	Human Development Index
LLRM	Local Level Risk Management
MAFI	Ministry of Agriculture and Food Industry
MDL	Moldovan Lei
MoE	Ministry of Economy
PDNA	Post-Disaster Needs Assessment
RCC	Regional Coordination Council
SHS	State Hydrometeorological Service
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
WB	World Bank
WFP	World Food Programme
WHO	World Health Organization

# Executive Summary

## A. The Disaster

In the second half of June 2010, there was heavy rainfall in northern Moldova, as well as in the Carpathian Mountains (in Romania and Ukraine) where the Prut and Nistru rivers have their sources. This resulted in peak flood levels for the Prut River, putting extreme water pressure on the poorly maintained dam, which protects the Moldovan valley downstream. A dam breach on the night of July 5-6, 2010, caused extensive flooding in the Prut River valley, forcing the evacuation of more than 3,100 people (2,300 people in Hancesti district, followed by 800 more in Cantemir), and damaging almost 1,100 homes.

The damaged dam near the Prut River in the northern part of the flooded area (near Nemteni) was under water and in a difficult location to access. At the time of the PDNA mission, necessary structural engineering to repair and seal the dam's water leakage had been very slow, since an access road was still being built. Another protective dam was located close to the border crossing between Romania and the Republic of Moldova at the Leuseni-Albita Bridge. The dam at the southern edge had an accumulation canal to control high flood waters from the nearby Prut River. On July 15, this dam had to be artificially breached to allow a discharge of water from the inundation zone back into the Prut River. The unrepaired northern dam and the Prut River leaking water into the inundation zone create a serious situation. The southern side of the Prut River was allowing flood water out.



Satellite-Detected Standing Flood Waters along the Prut River, Nesporeni and Hancesti Districts, Republic of Moldova (Source: UNOSAT)

The overall situation improved very slowly because the outflow was too limited (some 75 m<sup>3</sup>/s). According to the national water authority, Apele Moldovei, increased water levels also were observed in the Nistru River, leading to dam fortification in Stefan-Voda and Anenii Noi. Downstream in the southern region of the flooded zone, preliminary assessments of dam safety were conducted—between Leova and the discharge point of the Prut River into the Danube—and the situation was assessed as not critical. However, on July 19-20 after a new dam broke and started to leak near the village of Gotești, an additional 70 houses and 2,500 hectares of agricultural land in Stoianovca and Ghioltosu (Cantemir district) were at risk of flooding.

In the aftermath, the Government of Moldova staged a commendable relief effort, involving about 2,500 staff from the Ministry of Interior, Civil Protection and Emergency Situations Service (CPESS), National Army, Border Guards Service, local public administration, civilians, and volunteers, as well as foreign experts. A Special Committee to deal with the emergency situation chaired by the Minister of State was established. To more effectively coordinate the response, the committee was based in the flooded areas in the following weeks.

The Government of Moldova requested development partners to undertake a joint Post-Disaster Needs Assessment (PDNA). In response, the development partners organized a team of local and international experts to initiate the PDNA process for the flooded areas.

## **B. Economic and Social Impacts**

**The floods caused an adverse economic impact on GDP of about 0.15 percent.** The floods primarily affected rural and agricultural regions of the country. The damage among different sectors of economic activity in the affected areas is of special relevance: total damage sustained in the infrastructure sector was 66 percent and in the productive sector was 25 percent. The structure of losses is also concentrated heavily in the infrastructure (42 percent) and productive (46 percent) sectors. While damage and losses in the social and cross-cutting sectors are not large in financial terms, as seen in the case of other natural disasters, the human dimension is critical in terms of lost incomes and property that make the affected population especially vulnerable and in need.

Estimates show that the value of asset destruction (damage) is MDL 234.61 million and that the reduction in economic flows (losses), arising from the flooding, amounts to a further MDL 302.82 million.<sup>1</sup>

When breaking down the flood effects by individual sectors of economic activity, the damage is concentrated heavily in sectors such as housing (MDL 84.0 million or 36 percent of the total), transport (MDL 61.8 million or 26 percent), and agriculture (MDL 56.13 million or 24 percent).

### **Damage, Losses, and Needs Assessment**

**This Post-Disaster Needs Assessment analysis covers damage and losses, as well as economic and social impacts.** *Damage* (direct impact) refers to the impact on assets, stock

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<sup>1</sup> A uniform exchange rate of 12.82 Moldovan Lei per one US Dollar is used throughout the assessment, representing the average 2010 exchange rate as of August 10, 2010.

(including final goods, raw materials), and property. *Losses* (indirect impact) refer to flows that will be affected, such as production declines, reduced incomes, and increased expenditures, over a time period until the economy and assets are recovered. *Economic and social impacts* include macroeconomic impacts, poverty impacts, employment and livelihoods impacts, and social impacts.

**The PDNA estimated that damage and losses from the floods amount to a total of MDL 537.42 million or USD 41.92 million (Table 1a).** While the damage to assets occurred at the time of the floods, the associated changes in economic flows will last beyond the present calendar year. In some sectors and cases, the effects may be felt in 2011, depending on the speed and efficiency of the post-disaster recovery and reconstruction activities.

**Table 1a: Summary of Disaster Effects by Sector (in MDL million)**

<i>(in millions of MDL)</i> Sector/Sub-Sector	Damage	Losses	Total
<b>Infrastructure</b>			
Embankments/Flood Control	0.04	-	<b>0.04</b>
Energy	6.56	2.16	<b>6.56</b>
Housing	84.00	9.40	<b>93.40</b>
Roads	25.65	87.91	<b>113.56</b>
Railways	36.15	9.90	<b>46.05</b>
Water and Sanitation	2.00	16.70	<b>18.70</b>
<b>Productive</b>			
Agriculture	56.13	139.67	<b>195.80</b>
Livelihoods	3.10	4.05	<b>7.15</b>
<b>Social</b>			
Education	2.65	18.94	<b>21.59</b>
Health	0.95	2.86	<b>3.82</b>
Social Protection	-	-	-
<b>Cross-cutting</b>			
Environment	17.37	11.22	<b>28.59</b>
Disaster Risk Management	-	-	-
<b>TOTAL (in MDL)</b>	<b>234.61</b>	<b>302.82</b>	<b>537.43</b>
<b>TOTAL (in USD)</b>	<b>18.30</b>	<b>23.62</b>	<b>41.92</b>

Note: Currency conversion rate: MDL 12.82 = USD 1 (average for 2010)

**The assessment of damage and losses provides a basis for determining recovery and reconstruction needs.** The estimation of losses provides an indication of the recovery needs to address the reduction or decline in economic activity and in personal and household income. The two estimates are then combined to establish overall needs to achieve full recovery of economic activities at the macroeconomic level and at the individual or household level.

**A total of MDL 396.43 million (USD 30.92 million) is required to meet short-term recovery needs until December 31, 2010. A total of MDL 597.05 million (USD 46.57 million) is**

**required for the medium-term recovery and reconstruction efforts until June 2012 (Table 1b).** Larger investments, particularly in disaster risk management, may need to be considered in the longer term. The exact public sector need depends on the Government's choices on which programmes to implement, the timing and pacing of the programmes, and the effectiveness with which these programmes are implemented. Financing can come from a variety of sources, including the national budget, local government budgets, private sector contributions, and grants and concessional loans from development partners.

**Table 1b: Summary of Financing Needs by Sector (in MDL million)**

<i>(in millions of MDL)</i>			
<b>Sector/Sub-Sector</b>	<b>Short-term Needs</b>	<b>Medium-term Needs</b>	<b>Total</b>
<b>Infrastructure</b>			
Embankments/Flood Control	12.49	157.90	<b>170.38</b>
Energy	6.56	22.76	<b>29.32</b>
Housing	219.00	156.50	<b>375.50</b>
Roads	18.22	10.22	<b>28.44</b>
Railways	-	35.91	<b>35.91</b>
Water and Sanitation	6.74	12.00	<b>18.74</b>
<b>Productive</b>			
Agriculture	61.31	93.37	<b>154.67</b>
Livelihoods	8.93	16.50	<b>25.43</b>
<b>Social</b>			
Education	26.32	12.60	<b>38.92</b>
Health	21.98	8.66	<b>30.64</b>
Social Protection	11.31	2.67	<b>13.98</b>
<b>Cross-cutting</b>			
Environment	0.20	15.49	<b>15.69</b>
Disaster Risk Management	3.38	52.48	<b>55.87</b>
<b>TOTAL (in MDL)</b>	<b>396.43</b>	<b>597.05</b>	<b>993.48</b>
<b>TOTAL (in USD)</b>	<b>30.92</b>	<b>46.57</b>	<b>77.49</b>

Note: Currency conversion rate: MDL 12.82 = USD 1 (average for 2010)

**Financing needs may be large, but the cost of doing nothing would be larger.** The PDNA estimates the total cost of recovery and reconstruction at MDL 993.48 million (USD 77.49 million). Given the limited capacity of the flood and disaster management system in Moldova and the increased frequency and intensity of floods, such costs can be expected to recur more frequently unless serious efforts are made to mitigate the effects of future disasters.

### **C. Recovery and Reconstruction Framework**

The PDNA forms the basis for a comprehensive recovery and reconstruction framework that combines short-term, medium-term, and long-term needs. Given the nature of Moldova's floods,

the focus of the PDNA has been on short-term recovery needs, which encompasses the first six-month period (up to December 31, 2010), and the medium-term recovery and reconstruction needs, spanning an estimated two years (up to June 30, 2012). In some specific areas, long-term needs have been identified within the context of disaster risk management to reduce vulnerability and risk of occurrence of a similar disaster in the future.

### ***Strategic Priorities***

An effective recovery and reconstruction programme has to address the needs of those most affected by the floods. The preparation of such a programme could be guided by a framework that focuses on three priority issues: (i) housing support for dislocated families; (ii) restoration of livelihoods; and (iii) disaster risk management and flood risk management.

**Housing and Land Use:** The flood had significant impact on the lives of the exposed people, damaging and destroying their houses and forcing them to be displaced. The majority of the displaced population (with the exception of those in Cotul Morii) are staying with their relatives. While they have access to basic services such as water, electricity, and sanitation, they are crowded into small spaces because several households have to share a small house. In many instances, those who evacuated to their relatives' dwellings are able to stay within their villages; nonetheless, they do not have access to their agricultural land, on which they rely to earn income. The onset of winter is likely to make matters worse for the displaced population. Therefore, housing reconstruction has emerged as a top short-term priority. In addressing housing reconstruction, the following principles should be kept in mind: (i) participatory planning; (ii) timeliness and feasibility; and (iii) national ownership.

**Livelihoods/Agriculture/Social Protection:** The issue of assistance with reconstruction of the future new homes by the flood victims on a cash for work and public works basis could be critical. Equally important is the necessity for due consideration and planning for post-disaster livelihoods. There is a need to assist the districts and communities to plan and implement a post-disaster livelihoods strategy, focusing on re-establishing lost non-agricultural economic activities, diversification of the local economy, and generating sustainable livelihoods, especially in the most severely affected areas.

**Disaster Risk Management and Flood Management:** While flood management is an integral part of disaster risk management (DRM), it requires special mention as a separate priority given the immediate cause of the current disaster. DRM, however, is a broader concept that can help a country become proactive, coherent, and effective when it comes to preparing for natural (or man-made) disasters, reducing associated risks or dealing with consequences when disasters do occur. Section V of the PDNA is devoted entirely to disaster risk management in order to highlight this critical issue.

**Flood Risk Management:** From urgent measures to repair breaches in embankments to more strategic rehabilitation and reconstruction of this system, the needs in this area are immense and strengthening the system is a vital part of the country's ability to manage flood risks. A way forward would be to focus on the short-term needs identified by this PDNA and then, in the medium term, to focus on serious measures for strengthening flood management, starting with

the finalization of a strategy on the development and management of water resources and protection against floods.

#### **D. Guiding Principles for Recovery and Reconstruction**

**A set of guiding principles could govern implementation of the recovery and reconstruction programme.** The purpose of these principles is to enhance the effectiveness of recovery and reconstruction efforts, increase transparency and accountability, and ensure that resources are translated into results on the ground.

##### ***A transparent, accountable, and results-based recovery and reconstruction programme***

- Comprehensive and straightforward systems for monitoring activities, tracking funds, and evaluating projects and programmes will be implemented by all stakeholders, including the provision of regular and transparent reporting against all funding sources.
- Results and progress could be tracked and reported to the public and development partners through regular meetings, the media, and a dedicated recovery and reconstruction website.
- Independent complaints handling mechanisms should be integrated into major projects to enable greater accountability. To the extent possible, existing mechanisms could be employed, as opposed to creating new ones.

##### ***Community-based, people-centred, and equitable approaches***

- Community-based participatory approaches that engage local communities in decision-making, implementation, and monitoring of activities will be adopted to increase the quality and speed of reconstruction, aligning projects with real needs and lowering the risk of misuse of funds.
- Projects should maximize the use of local initiative, resources, and capacities. Planning and execution will be based on local knowledge, skills, materials, and methods, taking into account the need for affordable solutions.
- Although disasters increase the vulnerability of all, groups who are already disadvantaged may need special assistance and protection. Particular priority will be given to poor, marginalized female-headed households, children (including children without parental care), elderly, and people with disabilities. The focus will be to strengthen their coping mechanisms to prevent institutionalisation and separation of families.
- The capacity of local communities will be built at every stage of the recovery and reconstruction effort with a focus on reducing vulnerability to future disasters.

##### ***Reduction of future risks***

With floods becoming a regular risk in Moldova, integrated disaster risk management plans that consider all likely significant hazards are needed to reduce the impact of future disasters. Disaster risk management is directly dependent on the safety of the flood control system, which in turn affects different sectors of the economy including agriculture, housing, infrastructure, etc.

As Moldova appears to be experiencing an increase in the frequency and severity of natural disasters, climate change adaptation (CCA) is also important to keep in mind. Consequently CCA should remain on the priority list for disaster risk management. The agricultural sector is likely to be particularly affected by climate variability, and the adoption of practices that could minimize the consequences of potentially adverse climate change should be given serious consideration. The Government and international partners can play a key role in improving the capacity of the farmers in rural areas to reduce climatic variation risk or to utilize climatic variations to their maximum level through knowledge transfer and agrometeorological tools, monitoring with vulnerability assessments, and technical support to reduce the disaster risk. Institutional and legislative systems need improvement in Moldova with particularly reference to the development of a National Disaster Risk Reduction (DRR) Strategy, which should integrate a climate change adaptation component to the overall strategy.

# Section I. The Disaster

## 1.1 The 2010 Floods

The Republic of Moldova is prone to different kinds of natural hazards, including drought, floods, severe weather, earthquakes, and landslides. On average, northern Moldova experiences a drought once every ten years, central Moldova once every five to six years, and southern Moldova once every three to four years.<sup>2</sup> Average annual losses between 1996 and 2004 were around USD 19 million per year.<sup>3</sup> Abnormally high temperatures and low rainfall over a three-year period resulted in a severe drought in 2007, which crippled Moldova's agricultural sector and resulted in USD 1.2 billion in losses.<sup>4</sup> The effects of poor nutrition were exacerbated by reduced access to potable water, particularly in rural areas where 45 percent of the population relies on wells as their main source of drinking water. Heavy rains result in frequent floods (an average of 1.2 per year, 1992-2005), to which 40 percent of the country's settled areas are exposed. Average annual flood damage is around USD 5 million.<sup>5</sup> In 2008, the country experienced severe torrential rains. Together with releases from upstream in Ukraine, these rains led to flooding in both the northern and southern regions from which Moldova incurred USD 120 million in losses.<sup>6</sup>

In the second half of June 2010, heavy rains in northern Moldova, as well as the Carpathians (in Romania and Ukraine) where the Prut and Nistru rivers have their sources, resulted in a peak flood level of the Prut River. This put extreme water pressure on the poorly maintained dam that protected the Moldovan valley downstream. The dam breach on the night of July 5-6 caused an extensive flood into the valley, forcing the immediate evacuation of more than 2,300 persons in Hancesti district.



The damaged dam near the Prut River in the northern part of the flooded area (near Nemteni) was under water and in a difficult location to access. To date, any necessary structural engineering to repair and seal the dam's water leakage has been very slow, since the access road is still being built. Another protective dam is located close to the border crossing between Romania and the Republic of Moldova at the Leuseni-Albita Bridge. The dam at the southern

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<sup>2</sup> Drought has become more frequent and intense during the last two decades, appearing nine times (1990, 1992, 1994, 1996, 2000, 2001, 2003, 2007), leading to significant crop losses. In 1990, 1992, 2003, and 2007 drought was observed during the entire growing season. In the remaining years, drought struck during summertime.

<sup>3</sup> Societatea de Cruce Rosie a Moldovei and Departamentul Situatsii Exceptionale al Republicii Moldova, 2005, *Opredelele uviazivosti districtsov i naseleennykh punktov Respublki Moldova k chrezvychainym situatsiiam prirodno i tekhnogennogo kharaktera*.

<sup>4</sup> National Hydrometeorological Service and Ministry of Agriculture and Food Industry.

<sup>5</sup> World Bank, 2007, *Rural Productivity in Moldova – Managing Natural Vulnerability*.

<sup>6</sup> Official estimates.

edge has an accumulation canal to control high flood waters from nearby Prut River. This dam had to be breached artificially to allow a discharge (around July 15) of water from the inundation zone back into the Prut River. The unrepaired northern dam and the Prut River water leaking into the inundation zone create a serious situation. The southern side of the Prut River is allowing flood water out.

The overall situation has improved very slowly because the outflow is too limited (some 75 m<sup>3</sup>/s). According to the water national authority, Apele Moldovei, water level increases also were also observed in the Nistru River, and thus the dams were fortified in Stefan-Voda and Anenii Noi. Downstream in the southern region of the flooded zone, preliminary assessments of the safety of the dams have been done between Leova and the discharge point of the Prut River into the Danube; the situation was assessed as not critical. However, on July 19-20 after a new dam broke and started to leak near the village of Gotești, an additional 70 houses and 2,500 hectares of agricultural land in Stoianovca and Ghioltosu (Cantemir district) were at risk of flooding, 800 people being evacuated in the Cantemir district.

## **1.2 Social and Economic Background of the Affected Areas**

There are 198,173 inhabitants living in the communities that constitute the flooded area. The affected area is predominantly rural (75 percent) in nature, and an estimated 10 percent of the population is permanently relocated for reasons connected with migration, education, etc. Of the 76,128 families, over 70 percent are located rural areas. Of the rural families, 3.8 percent have 3 or more children under the age of 18 and three times as many have disabled members than is the case with urban families (MoE, 2008).

In this area the business sector, regardless of location in the flooded zones, is small compared to urban areas. Most of the businesses process agro-products and engage in trade, light industry, and services. In 2009 average microenterprise size in the affected districts was 2.8 employees, and the average turnover per employee was MDL 86,500. The bulk of economic activity is agricultural in nature with 25,545 agricultural producers on less than 10 ha of land—the level at which farms are considered to be economically viable. These agricultural producers, effectively operating on a subsistence basis, account for 99 percent of all farmers in the flood area.

## **1.3 Immediate Response**

The national response to the flooding had to be prompt, and the Government took immediate measures with their own resources to minimize the consequences. A Special Committee to deal with the emergency situation chaired by the Minister of State was established. To more effectively coordinate the response, the committee was based in the flooded areas in the following weeks. To help with evacuation, disaster prevention, and delivery of urgent assistance, all available forces were involved: about 2,500 staff from the Ministry of Internal Affairs, CPESS, National Army, Border Guards Service, local public administration, civilians, and volunteers, as well as foreign experts. Table 2 shows details of the response timeline.

To mobilize the maximum resources possible, parallel efforts have been undertaken since the first day. One of the first actions by the Government was for Prime Minister Vladimir Filat to

address the international and donor community to secure sufficient resources for the immediate response, for the rehabilitation of the flooded areas, and for the elimination of flood consequences. A special account was opened for collecting monetary donations, and private assistance has been encouraged.

The Government has started planning for the building of 700 houses on a new village site in a risk-free area already identified and with site preparation works completed. To ensure the assessment of losses and to coordinate mitigation activities, on July 14 the Government created a special National Commission chaired by the Prime Minister. It is composed of most ministers, representatives of relevant agencies, and representatives of local and central public administration. The commission will be responsible for the following:

- Conduct (together with development partners) a damage assessment and establish key measures to mitigate the consequences of the floods, including the identification of required resources;
- Coordinate the implementation of mitigation activities and monitor use of the materials and financial resources allocated for this purpose; and
- Ensure the transparent distribution of humanitarian assistance and financial donations for persons affected by the floods.

On July 21, the Government approved the creation of a commission to design the mechanism for water fund management and flood protection. The commission will be led by Mr. Valeriu Lazar, Deputy Prime Minister (hereafter referred to as Lazar Commission), and will conduct a study of flood risk areas from the Prut and Nistru rivers, as well as near smaller rivers, and will assess the quality of existing dams. As a result of the commission's work, an action plan will be designed, covering measures for the construction, reconstruction, and fortification of dams, as well as hydro-technical systems, irrigation, pumping, and water evacuation systems. A strategy on the development and management of water resources and protection against floods will also be initiated. This PDNA could be used as an input to the work of the Lazar Commission.

<b>Table 2: Timeline of Immediate Disaster Management Efforts</b>	
July 6	A command centre lead by the Government was established in first 24 hours; Special Working Group chaired by Minister of State instituted and deployed in flood area during the peak of the disaster (three weeks)
July 6-10	725 persons immediately dispatched to the field (Army, Carabinieri, Police)
July 6-10	Around 1,300 families evacuated from flooded and risk areas; 1,800 rescue/evacuation missions in first three days (goods and people)
July 6-10	Available aid immediately deployed from state resources: food, water, medicines, tents, fuel
July 7	Appeal by Prime Minister Vladimir Filat to the international community and development partners
July 7	Special account opened with the Ministry of Finance for collecting private donations.
July 9	Permanent information of the population (mobile audio devices, billboards, door-to-door) carried out
Starting July 8	First aid from development partners arrives in the field; coordination assistance assigned with Aid Coordination Unit in the State Chancellery; at regional (district) level, assistance distribution coordinated by District Emergency Situations Committees
July 8-15	30 km of new temporary dams built and permanently maintained; over 200 households and 2 roads saved from flood
July 10-12	2 bridges reinforced; alternative access roads built to flooded areas
July 10-13	4 mobile emergency posts, 3 permanent posts, and over 240 people assisted; evacuated people

	vaccinated against A Hepatitis.
Ongoing	With common (Government and development partners) efforts, immediate needs assessed and ensured until September 30
July 9-12	12 road police posts and one reinforced police department in Obileni instituted; 15 collection and distribution points permanently guarded
July 9-13	Site in a risk-free area for building 700 new houses identified; planning and design works carried out
July 15	First preparations for the Post-Disaster Needs Assessment exercise
August 2-12	Mixed team of Government, UN, World Bank, and European Union experts start the Post-Disaster Needs Assessment.

#### **1.4 Request for Assistance and International Response**

The Government issued a request to a number of external partners, asking for support in mitigating the consequences of the floods. In response to this appeal, initial assistance was provided by a number of donors. Others are providing in kind assistance, i.e., boats, sand bags, boots, and pumps needed to remove the water from the flooded buildings, as well as related manpower. In addition, the Government of Moldova requested the European Union, United Nations, and World Bank to support it by conducting a Post-Disaster Needs Assessment. This report is a result of that request.

# Section II. Estimate of Damage, Losses, Needs, and Human Development Impact

## 2.1 Objectives

Following the request for assistance from the Government of Moldova, a Post-Disaster Needs Assessment has been conducted by the Government of Moldova supported by the European Union, United Nations, and World Bank with the assistance of the Global Facility for Disaster Reduction and Recovery (GFDRR).

The following were the main objectives of the exercise:

- Determine the socio-economic impact of the disaster, including the valuation of damage, losses, and human recovery needs;
- Identify the damage, losses, and associated costs to physical structures, disruption of essential public services, and alteration of community processes in the public and private sector;
- Identify recovery and reconstruction needs per sector, including human recovery needs, and establish the cost of response options in the short and medium term to inform the development of the recovery framework;
- Provide inputs to the Government in designing a strategy on the development and management of water resources and protection against floods, including identification, prioritization, and costing of newly emerging activities associated with the recovery and reconstruction efforts proposed after the current disaster;
- Establish a coordinating mechanism among the international technical and financial partners to enable the Government-led assessment and implementation strategy to be adequately supported; and
- Build initial capacity of the Government and local partners to conduct such assessments in the future.

The scope of the PDNA included areas affected by the July 2010 floods.

## 2.2 Methodology

The present Post-Disaster Needs Assessment (PDNA) combines the recognized Damage and Losses Assessment methodology (DaLA) for the assessment of damage, losses, and needs with a UN assessment methodology to capture human development impact and recovery needs. Prior to the assessment, one-day training on the assessment methodology was carried out for the Government and all the international agencies involved in the PDNA to enable a more efficient kickoff of the exercise. The following sectors and subsectors are included in the assessment:

- Infrastructure:
  - Flood Control and Dam Management
  - Housing and Land Use
  - Energy
  - Transport
  - Water Supply and Sanitation

- Productive:
  - Agriculture (crops, livestock, land)
  - Livelihoods and Small Trading
- Social:
  - Education
  - Health and Nutrition
  - Social Protection
- Cross-cutting
  - Environment
  - Disaster Risk Management (discussed separately in Section V)

The 2010 floods caused destruction of physical assets and decline in economic flows in Moldova. Estimates show that the value of destruction of assets (damage) is MDL 234.61 million and that the reduction in economic flows (losses), arising from the flooding, amounts to a further MDL 302.82 million.<sup>7</sup>

The differences in damage among sectors of economic activity in the affected areas are also of special relevance with the infrastructure sector sustaining 66 percent and the productive sector 25 percent of the total damage. The structure of losses is also concentrated heavily in the infrastructure (42 percent) and productive (47 percent) sectors. While damage and losses in the social and cross-cutting sectors are not large in financial terms, as seen in the case of other natural disasters, the human dimension is critical in terms of lost incomes and property that make the affected population especially vulnerable and in need.

When breaking down the effects of the floods by individual sectors of economic activity, the damage is concentrated heavily in sectors such as housing (MDL 84.0 million or 36 percent of the total), agriculture (MDL 56.13 million or 24 percent) and transport (MDL 61.8 million or 26 percent).

## **2.3 Sector Impacts**

### **FLOOD CONTROL AND DAM MANAGEMENT**

#### **A. Pre-disaster Situation**

The country has a flood protection system inherited from Soviet times, most of which under the management of the Apele Moldovei - a specialized agency within the Ministry of Environment in charge of water resources management. These dams and dykes protect 90 settlements and approximately 87,000 hectares of agriculture lands plus forests and pastures. They are used for flood control, irrigation, recreation, energy, or multipurpose tasks, therefore, their social and economic functions are very important.

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<sup>7</sup> A uniform exchange rate of 12.82 Moldovan Lei per one US Dollar was used throughout the assessment, representing the 2010 average exchange rate as of August 10, 2010.

## B. Flood Impact on the Sector

Extreme rainfall upstream of the Prut River originated the breakup of several embankments in the villages<sup>8</sup> Nemteni in Hancesti, district, and Stoianovca, Antonesti, and Gotesti in Cantemir district with high losses in assets and livelihood. Other dams constitute a major threat, as they can break up and flood further. The dyke in Cantemir was breached and requires urgent repairs, putting at risk 9,448 people, 2,276 houses, and extensive agriculture fields (22,000 ha). Emergency measures include discharging water from the flooded valleys through artificial breaches of the dykes, allowing flood water to flow back to the Prut River. Overall, there is a critical lack of an effective monitoring system with a need to update procedures and provisions of equipment (Annex 1).

## C. Damage and Losses

The largest damage was incurred in Hancesti and Cantemir districts. Altogether around 400m of dykes were breached and will have to be repaired; many dams are at risk and will have to be rehabilitated. Table 3 contains estimates of damage, losses, and needs in flood control and dam management.

## D. Recovery and Reconstruction Needs

Many affected areas remain under water. An early need relates to pumping water out of flooded irrigation and drainage stations. There is also an urgent need to repair protective dams in Hancesti and Cantemir districts. Furthermore, state flood-control dams need to be cleared of shrubs and trees. Apele Moldovei should also consider developing working drawings for the repair of dangerous areas on protective dams. In addition, a technical and economic study of the flooded and potentially flooded areas along Nistru and Prut rivers is recommended with further actions targeting the vulnerable sites following a thorough investigation. These steps will help identify priorities for flood risk mitigation.

Another important step is to align the normative base with the lessons learned from the 2008 and 2010 floods. An assessment of current policy and legislation related to water resources management is critical to bring them up to international standards, as well as to intensify cooperation in this area with the neighbouring countries. Work could also be initiated to develop an integrated flood management system to align with the existing ones according to Standard Operation Procedures (SOPs) of the European Union Directive 2007/60/EC. Finally the Government could consider setting up a state protective dams monitoring service in a relevant organization.

**Table 3: Damage, Losses, and Needs in Flood Control and Dam Management**

Currency	Damage and Losses			Needs		
	Damage	Losses	Total	Short-term	Medium-term	Total
<b>MDL million</b>	<b>0.04</b>	-	<b>0.04</b>	<b>12.85</b>	<b>157.9</b>	<b>170.75</b>
<b>USD million</b>	<b>0.00</b>	-	<b>0.00</b>	<b>1.00</b>	<b>12.32</b>	<b>13.32</b>

Source: PDNA Estimates

<sup>8</sup> Adapted from World Bank (WB) and Food and Agriculture Organization of the United Nations (FAO) (2006). A Hazardous Existence: Managing Natural Livelihood Threats in Rural Moldova. Chisinau, June 2006.

## **HOUSING AND LAND USE**

### **A. Pre-disaster Situation**

Lands in the affected areas are classified as agricultural and residential, and these areas are highly vulnerable to natural disasters, such as floods, landslides, and earthquakes. In the affected villages, housing and land are privately owned. Most housing units are single story with no water supply or sewerage infrastructure: five to ten households share a common well to access water. Electricity networks are available, and most roads are not paved.

### **B. Flood Impact**

Flood affected the villages and agricultural lands located in the lower level of the basin alongside the Prut River, resulting in damage and destruction of agricultural land, housing, infrastructure, household goods, and livestock. Among 11 villages located in the basin, Cotul Morii was the most severely damaged and is being relocated.

### **C. Damage and Losses**

The impact of flood on housing is reported from Hancești, Nisporeni, Cantemir, and Ungheni districts. There were almost 1,100 housing units were destroyed; eight units housings partially damaged.<sup>9</sup> Moveable household goods were removed from houses as much as possible in the early stage of flooding although many household goods were still entirely or partially destroyed. Evacuations included 1,241 households from the affected villages and 144 households from the unaffected risk areas.

### **D. Recovery and Reconstruction Needs**

Land rights and poor cadastre records are important related issues. While 60 percent of Moldovan territories are officially registered, most of the villages affected by the flood do not have up-to-date cadastral information. This poses serious challenges to recovery and reconstruction of the housing and land use sector. Table 4 shows estimates of damage, losses and needs in the housing and land use sector.

Housing and land management sector needs can be categorized into the following three areas: (1) provision of adequate temporary shelter; (2) registration of land and real property ownership so that exposed people can relocate without threats to their land rights and security of tenure; and (3) housing reconstruction. All activities relating to these needs should be led by the public sector.

Recovery and reconstruction of the housing and land use sector in the affected areas should be governed by three principles: (1) people-centred approach; (2) timeliness and feasibility; and (3) national ownership.

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<sup>9</sup> Destroyed refers to houses that have been identified as uninhabitable due to flood damage, including those that were washed away. Partially damaged units are those which were partially flooded but still inhabitable. In some partially damaged houses, however, the foundations were affected, which caused cracks in walls that would ultimately need to be rebuilt.

**Table 4: Damage, Losses, and Needs in the Housing and Land Use Sector**

Currency	Damage and Losses			Needs		
	Damage	Losses	Total	Short-term	Medium-term	Total
MDL million	84.00	9.40	93.40	219.00	156.50	375.50
USD million	6.55	0.73	7.28	17.08	12.21	29.29

Source: PDNA Estimates

## ENERGY

### A. Pre-disaster Situation

The power sector in Moldova represents strategic infrastructure for the national economy, as well as an important public service with social impact. Electricity is the only universal utility service in Moldova with 98 percent of households connected to the power grid. In addition to the human development aspect of residential power service, the agricultural sector is also an important consumer of electricity in Moldova. The reliability of service to this sector, which is a major employer in rural locations where most of the nation's poor are concentrated, is crucial for ensuring agriculture's position as an engine of growth in Moldova.

The settlements affected by floods are not connected to the gas network with the exception of the village of Nemteni.

### B. Flood Impact

Worst affected by the floods were the electricity consumers in the four flooded villages in the Hancesti district and partially in other localities in the districts downstream. This area is serviced by FCC Union Fenosa,<sup>10</sup> which acted promptly to eliminate potential accidents by electrocution, while ensuring a reliable power supply to consumers in risk-free adjacent areas.

### C. Damage and Loss Assessment

Total damages to electricity equipment were estimated at about MDL 6.6 million. This represents the amount estimated for investments to restore damaged infrastructure, as well as to construct a new extension grid to supply power to the new residential site planned by the Government to relocate Cotul Morii village.

Potential short- and mid-term losses by the company because of lost consumers could be estimated at MDL 540 thousand and MDL 1.62 million respectively, totalling about MDL 2.2 million over the next 24 months. Table 5 provides an estimate of potential losses to the company because of lost consumers.<sup>11</sup>

No significant losses have been registered in the existing gas distribution network of Nemteni.

### D. Recovery and Reconstruction Needs

<sup>10</sup> Union Fenosa ([www.ufmoldova.com](http://www.ufmoldova.com)) is the electricity distribution company acting in the centre and south of Moldova. It serves about 75 percent of the country's electricity demand.

<sup>11</sup> Incurring losses could, however, stop as soon as the damaged systems are restored and the new residential site is inhabited.

Table 5 contains the damage and short-term needs estimates for energy sector. The Government announced its readiness for providing basic infrastructure services to the new residential site for residents relocated from Cotul Morii village, including electricity and natural gas. The investments in new electricity infrastructure will be made by Union Fenosa and will be accounted as new investments in the future tariff revision by the energy regulator.

Regarding gas, however, in addition to building the internal distribution network, there is the need to build about 36 km of gas transmission pipe with an estimated cost of MDL 16.2 million to connect the new site and neighbouring affected villages to the high-pressure gas main.

**Table 5: Damage, Losses, and Needs in Energy**

Currency	Damage and Losses			Needs		
	Damage	Losses	Total	Short-term	Medium-term	Total
MDL million	6.56	2.16	6.56	6.56	16.2	22.76
USD million	0.51	-	0.51	0.51	1.26	1.78

Source: PDNA Estimates

## TRANSPORT

### A. Pre-disaster Situation

Road transport subsector – The districts where the road network was affected by the floods along the Prut River (Hancesti, Cantemir, Ungheni, Cahul) are served by a road network consisting of 1,898.2 km of public roads of which 640.6 km are national roads (all hard-paved) and 1,257.6 are local roads (1,132.8 km hard-paved). Road transport is an important, efficient, and relatively secure means of transportation adapted to the internal demand of a small territory and to trade with main CIS and neighbouring countries. In 2009, road transport accounted for 82 percent of total freight transport and 98 percent of passenger traffic in the country.

Rail transport subsector – Moldova has a total of nine railway connections with neighbouring networks. As of 2009, the total railway line length was 1,157 km. The density of the existing railway is equivalent to the relevant value for neighbouring countries (Ukraine and Romania). Although declining, rail freight transport still provides an important level of services and is responsible for about 17 percent of the total freight in Moldova.

### B. Flood Impact on the Sector

While the floods had a severe local impact on a number of communities, especially in Hancesti district where the village of Cotul Morii was totally submerged under water, the affected roads as a share of total road network was not significant. Approximately 18 km of village streets were flooded, and portions of local roads and national roads remain under water.

The floods affected two portions of the railroad along the Prut River: the Cahul-Giurgiulesti



railroad and 11 km of railroad in the Prut-to-Cahul sector were flooded. The Prut-to-Cahul sector is still under water, thereby disrupting normal passenger and freight traffic.

### **C. Damage and Loss Assessment**

It was not possible to properly ascertain the physical damage caused to the roads by the floods as most of them were still under water. Based on certain assumptions, the total damages to the road network are estimated at MDL 25,651,365.

Losses are associated with higher vehicle operating costs and longer travel times as a result of worsened conditions or longer detours that drivers have to take. The loss calculation for the local roads is essentially impossible to make at the moment due to the lack of traffic data, showing no figures in the respective line. Based on the assumption that it would take about 12 months to restore the R34 section to its pre-flood condition, the losses incurred made of higher vehicle operating cost plus time costs were estimated at MDL 87,910,735.

In the railways sector, the total damage estimate of MDL 36,148,677 was provided by the state-owned Moldovan Railway Company, assuming a need for capital repair of the flooded sections plus the replacement of the telecommunications equipment that was submerged under water. The losses incurred by the railway were estimated as forgone revenue due to disruption of normal traffic. The total amount of losses to the railway sector assuming that it will take 12 months to restore the normal traffic is estimated at MDL 9,904,012.

Table 6 provides total transport sector damage, losses, and needs estimates.

### **D. Recovery and Reconstruction Needs**

Roads – In terms of response, the Government reacted fast by creating an alternative graded bypass route parallel to the R34 road. This road would need to be upgraded to allow the resumption of normal traffic, which is currently diverted to the national R56 and M3 roads. This upgrade would both reduce the indirect costs and prevent damage caused to the R56 and M3 roads, which have an inferior design to the R34 road.

Given the proposed relocation of all Cotul Morii inhabitants and some of the inhabitants from Sarateni and Nemteni villages, an eight-kilometre access road to the new village site is a short-term priority need. Making village streets passable to basic community infrastructure, such as schools and health posts is the last short-term need. The total cost of short-term needs is estimated at MDL 18,219,276. In the medium term, 1.5 km of the access road to Sarateni will require rehabilitation within the next 12 months. Given the large accumulation of water on the R34 road, its slow departure, and the coming cold season, it is expected that its reconstruction to pre-disaster level will also take up to 12 months. The cost of these medium-term needs is estimated at MDL 10,216,592.

Railways – The Government has already restored the damage to the Cahul-Giurgiulesti section of the railway. It is expected that the restoration of the Prut-to-Cahul section to the pre-flood level will take up to 12 months. Once the water recedes from the railway section, it is important to make a more accurate assessment of the rehabilitation needs.

**Table 6: Damage, Losses, and Needs in the Transport Sector**

Currency	Damage and Losses			Needs		
	Damage	Losses	Total	Short-term	Medium-term	Total
MDL million	61.80	97.81	159.61	18.22	46.13	64.35
USD million	4.82	7.63	12.45	1.42	3.60	5.02

Source: PDNA Estimates

## WATER SUPPLY AND SANITATION

### A. Pre-disaster Situation

Water Supply and Sanitation – Moldova’s water resources imply that the country is water-stressed. The Nistru River accounts for 84 percent of all water withdrawn, followed by the Prut River, and by ground water supplies. The Nistru and Prut are classified as moderately contaminated with water quality deteriorating downstream. Groundwater quality is uneven with a preoccupying build up of nitrates, ammonia, fluorides, and iron in some areas. The quality and reliability of Moldova’s water supply and wastewater services are generally deficient, the biggest problem of which is in the rural areas.

Solid Waste Management – Solid waste management in Moldova is a public utility decentralized to local public authorities. Overall monitoring and sector policies fall under the Ministry of Environment. Rural communities in Moldova have no organized solid waste collection and disposal. In most rural areas, households transport their own solid waste and dump it in a designated barren field outside village boundaries with no further processing. This represents a serious environmental problem.

### B. Flood Impact on the Sector

Damage and losses in the water supply and sanitation sector can be considered as relatively small, considering its pre-disaster poorly developed infrastructure. The biggest damage was done to shallow waters, some artesian wells suffered, and a small number of piped systems were affected.

As there is no organized system for collection and disposal of household solid waste in rural areas, these potential losses are reduced to the clean up and removal of old accumulated solid waste by local authorities and private households.

### C. Damage and Losses

About 500 out of approximately 3,500 shallow wells and springs and 13 out of 120 artesian wells in about 17 villages were reported flooded and/or affected due to contamination by infiltration of flooded waters. Most affected was the district of Hancesti with 214 wells flooded.

In the affected areas, flooding waters washed up solid waste, contributing to additional pollution of flooded areas. Table 7 provides estimates for damage, losses, and needs in the water and sanitation sector.

## D. Recovery and Reconstruction Needs

Water and sanitation infrastructure is obsolete and/or poorly developed throughout the country, especially in the rural areas, including the localities affected by floods. It is recommended, therefore, that the recovery and reconstruction strategy focuses on small-scale projects at the household and community level, such as upgrading and improving existing sanitation facilities, protecting existing water sources, and reducing groundwater contamination risk by household sanitation and domestic livestock infiltrations. These actions could be undertaken with reduced costs and using local labour.

The Government adopted a decision to relocate Cotul Morii to a new site by building about 700 new houses and providing public utilities infrastructure too, including water and sanitation. The Government should also consider including the already existing neighbouring dwellings (Leusoaia) in the proposed infrastructure development project.

While planning and deciding on the new construction or extension of the water and sanitation infrastructure, the operational and maintenance costs need to be considered, as well as the organizational set up of consumers of water supply and sanitation services.

**Table 7: Damage, Losses, and Needs in the Water and Sanitation Sector**

Currency	Damage and Losses			Needs		
	Damage	Losses	Total	Short-term	Medium-term	Total
MDL million	2.00	16.70	18.70	6.74	12.00	18.74
USD million	0.16	1.30	1.46	0.53	0.94	1.46

*Source: PDNA Estimates*

## AGRICULTURE (Crops, Livestock, Irrigation/Drainage, and Land)

### A. Pre-disaster Situation

The agricultural sector, including crops, livestock, forestry, and fisheries, contributes to about 10 percent of the GDP and remains the most important source of livelihoods in rural areas. Agricultural production and processing generate about 40 percent of export revenues and employ more than 40 percent of the labour force. The main agricultural export products are wine, fruits, vegetables, and industrial crops.

### B. Flood Impact on the Sector

Heavy rains in Ukraine, Romania, and Northern Moldova during the second and third weeks of July caused significant floods along the Prut and Nistru (Dniester) rivers. Dilapidated embankments, drainage, and irrigation systems, as well as poorly managed water systems, were the ingredients of a potent recipe for disaster, which left many communities vulnerable. The floods have affected nearly 13,000 people in 16 districts.

### C. Damage and Loss Estimates

An estimated 6,144 ha of prime agricultural land has been affected, out of which 4,432 ha are completely submerged. Current indications are that the submerged areas may not be ready for cultivation over at least two additional cropping seasons (2011-2012). The Hancesti and Cantemir districts are the worst affected, accounting for most of the submerged areas. A total of

12 drainage and irrigation schemes in four districts have been damaged. Total damage and losses in the agricultural sector have been estimated at about MDL 195.8 million. Estimates of damage, losses, and needs in the agricultural sector are in Table 8.

In addition to the floods that affected a limited number of districts, hail and heavy rains in late spring and early summer also caused significant damage to crops. Government estimates indicate that more than 30 percent of crops may have been lost due to hail and heavy rains in the country. The great majority of lost crops are of high value, such as vegetables, vineyards, and orchards, which are likely to have significant repercussions for food and livelihood security in the country. A national-level crop assessment, while desirable, was not within the scope of the PDNA mission.

#### **D. Recovery and Reconstruction Needs**

The recovery strategy takes into account the short- and medium-term needs of the affected population and their host families. The needs are also based on the Government’s existing and medium-term plans, programmes, and strategy for the agricultural sector.

The proposed activities in the agricultural sector envisage supporting households and the need for protracted relief operations, while building future resilience and improving food and livelihood security among the target communities. Whereas these proposals and activities are presented separately, almost all are inter-related. An integrated crop-livestock system has already taken shape for a number of years. Irrigation and drainage are necessary to produce high-value crops and to reduce the risk of crop losses to drought and high water tables. These seemingly disjointed proposals may be considered as components of a rehabilitation programme.

It is important to note that the brief concepts presented below require further feasibility studies, which was not allowed for within the scope of the PDNA mission. The overall objectives of the proposed interventions are (i) meet the immediate needs of the flood-affected farming households and their hosts and the need for a protracted relief operation; and (ii) improve livelihood and food security of the affected population.

**Table 8: Damage, Losses, and Needs in Agriculture**

Currency	Damage and Losses			Needs		
	Damage	Losses	Total	Short-term	Medium-term	Total
MDL million	56.13	139.67	195.80	61.31	93.37	154.67
USD million	4.38	10.89	15.27	4.78	7.28	12.07

*Source: PDNA Estimates*

## **LIVELIHOODS AND SMALL TRADING**

### **A. Pre-disaster Situation**

A clear picture of the livelihood sector comprises all the settlements considered without taking into account the degree to which each was affected. There are 198,173 inhabitants living in the communities that constitute the affected area (Ministry of Economy [MoE], 2008). The area is predominantly rural in nature (75 percent) and around 10 percent of the population is estimated to be permanently relocated for reasons connected with migration, studies, etc.

The business sector, regardless of location relative to the flooded zones, is small compared to urban areas. Most of the businesses concentrate on agricultural processing, as well as trade, light industry, and services.

At the national level, the poverty in rural areas increased during 2009. This, combined with the loss of agricultural income, implies a significant decrease in incomes in the affected communities.

### **B. Flood Impact on the Sector**

The vast majority of the economy is rural and, therefore, agricultural in nature. From the perspective of the non-farm economic activities in the affected areas, the damage and losses are fairly mild, having affected only four shops and two industrial units. There was damage to some community infrastructure: two cultural centres, a library, and a church were affected. Kindergartens, schools, and health clinics are discussed and assessed in other sections of this report. All the damage and losses occurred in Cotul Morii village, except for a mill in Sarateni, a construction business in Gotesti village, and one culture centre in Obileni village.

### **C. Damage and Losses**

The total damage to the sector is estimated at MDL 3,102,000 while the estimated loss is MDL 4,051,200 (see Table 9). Therefore, compared with sectors such as housing and agriculture, the non-agricultural (small trading) sector experienced relatively modest damage and losses. This reflects the very high concentration of activities in the rural sector and the subsistence nature of the economy. The latter implies that, in addition to replacing the lost business activity, it is necessary to give significant policy attention to the need to raise both agricultural and non-agricultural incomes so as to sustain rural livelihoods. At the same time, it is necessary to diversify the local economy.

### **D. Recovery and Reconstruction Needs**

From a broad livelihoods and non-agricultural perspective, the issues considered in the PDNA represent a subset of the problems being experienced in the flooded affected area. The flood impact on basic needs and services necessitated emergency food provision, state financial support, and relocation of villages together with information on relocation. The Government has started the process of compensation for housing, lost crops, and livestock. Improvement in coordination and information, however, is highly recommended.

The issue of assistance with reconstruction of future new homes by flood victims on a cash for work and public works basis is critical. Equally important is the necessity for due consideration and planning for post-disaster livelihoods. The districts and communities need to plan and implement a post-disaster livelihoods strategy, focusing on re-establishing lost non-agricultural economic activities, diversifying the local economy, and generating sustainable livelihoods, especially in the most severely affected areas.

The strategy for recovery and reconstruction relies on the application of principles, such as awareness raising, regular and proactive information provision, consultation, and empowerment

of the local communities affected by the flood. This in turn necessitates effective coordination among the Government, the districts, and the communities and mayoralties at the lower geographical scale. In addition, a number of elements will be required to reduce the vulnerability of livelihoods (like cash for work, vocational training of affected people, etc.), as well as ensure the reduction of disaster risk.

**Table 9: Damage, Losses, and Needs in the Livelihoods and Small Trading Sector**

Currency	Damage and Losses			Needs		
	Damage	Losses	Total	Short-term	Medium-term	Total
MDL million	3.10	4.05	7.15	8.93	16.50	25.43
USD million	0.24	0.32	0.56	0.70	1.29	1.98

*Source: PDNA Estimates*

## EDUCATION

### A. Pre-disaster Situation

In the 2009/2010 school year there were 419 educational institutions in the Cantemir, Hancesti, Nisporeni, Stefan Voda, and Ungheni districts, including 201 pre-school institutions and 218 schools, gymnasiums and lyceums. The total number of enrolled children was 71,999, including 16,257 children in pre-school institutions and 55,742 students in schools. In the pre-flood period, there were 17 schools and 16 pre-school educational institutions in these most flood-affected villages.

### B. Flood Impact

The July 2010 floods affected 1,663 children (0-18 years old), including 455 children of pre-school age: Cantemir (279), Hancesti (1077), Nisporeni (27), Stefan Voda (62) and Ungheni (218). One third of the total number of children were directly affected and have been displaced, the rest were indirectly affected, as their families lost agricultural land or plots, crops, and other property.

There is no impact on the national education system as a whole. In Hancesti, the most affected district, however, the education sector deteriorated with several educational institutions affected directly and indirectly mainly in Cotul Morii, Sarateni, Obileni and Nemțeni. There are difficulties in ensuring that all children can go back to school by September 1st.

One kindergarten and one school in Cotul Morii village (Hancesti district) were completely destroyed by flood waters, as was the whole village. The personnel of the Cotul Morii School and kindergarten could lose their jobs, as the village and educational institutions no longer exist. No other public educational establishments (buildings or assets) in the flooded districts were affected by the disaster, although a few were used as temporary shelters (Obileni and Nemțeni gymnasiums; students hostel of Hâncesti College) for evacuees, rescuers, army, and the resettled population. These school premises are in disarray: they need to be renovated and put in order before the new school year starts on September 1.

### C. Damages and Losses

In Cotul Morii, all of the buildings and all assets of the gymnasium and kindergarten were damaged and lost. The Sarateni Gymnasium is affected indirectly with 50 of the 70 school children from families whose houses were flooded and will be resettled to other places. Twenty school-age children will remain in the village and will need transportation to a new school in a nearby village. Table 10 shows the estimates for damage, losses, and needs in the education sector of the affected area.

Teachers and other personnel employed in the educational sector in Cotul Morii (36) and Sarateni (14) are at risk of losing their jobs because of the flood impact. There is a need to consider their redeployment to other educational institutions, as well as their resettlement options to villages where additional classes are planned. In case they lose their jobs, they are entitled to unemployment benefits.

### D. Recovery and Reconstruction Needs

The main set of flood response measures in the education sector focuses on meeting children's right for education and development and on providing the flood-stricken children with access to educational institutions while preventing their separation from their families.

Education buildings that need to be built include the new school and kindergarten for the village of Cotul Morii after its relocation. In addition, conditions at the Obileni Gymnasium will need to adjust for the intake of the resettled children. Over 1,150 children from all flood affected areas need education grants to start school on September 1. This grant will cover the minimum, i.e., educational supplies. In addition, children who lost everything will need clothes for the whole school year.

**Table 10: Damage, Losses, and Needs in Education**

Currency	Damage and Losses			Needs		
	Damage	Losses	Total	Short-term	Medium-term	Total
MDL million	2.65	18.94	21.59	26.32	12.60	38.92
USD million	0.21	1.48	1.69	2.05	0.98	3.04

*Source: PDNA Estimates*

## HEALTH AND NUTRITION

### A. Pre-disaster Situation

Prior to the flood, 864 doctors and 2,790 nurses in public medical-sanitary institutions and private medical units provided the health care in the affected districts of Cantemir, Hancesti, Nisporeni, Ungheni, Cahul, and Briceni. The total population served in all the six districts was 570,500 people, including 31,816 children of age five and under. Currently the nutritional policies implemented in Moldova focus on promoting breastfeeding, reducing micronutrient deficiencies, and increasing access for pregnant women and under-age-five children to micronutrients by providing them with free iron and folic acid. In accordance with Ministry of Health standards, primary health care workers monitor the nutritional status of children.

## **B. Flood Impact on the Sector**

In affected areas, the number and type of medical institutions has not changed and has continued to work under a normal regime, except in Hancesti where prior to the flood there were four primary healthcare institutions serving over 6,000 people. Because of damage to physical infrastructure, three rural healthcare institutions have been temporary moved to other locations: the gymnasium in Obileni, the gymnasium in Nemteni, and the health centre in Nemteni. Four teams of doctors and nurses were working in these medical units providing healthcare around the clock. There were two additional health care units at the Construction College and Polyvalent School in Hancesti where over 250 affected people were relocated. In Cantemir district, a medical unit was opened in the Tiganca village gymnasium.

The Ministry of Health and local public administration authorities provided an appropriate response to the disaster, which reduced the potential damage to the health and food safety of the affected people.

## **C. Damage and Losses**

Damage and losses to physical infrastructure and medical equipment and furniture have been registered only in the Hancesti district where three medical institutions were affected by the flood. In Cotul Morii, Obileni, and Sarateni, the extent of flood damage and losses were different. Due to intensive use in the flood response, the medical equipment of the bacteriological laboratory of the Public Health Centre in Hancesti is out of order and an ambulance from Emergency Health Care Sub-station Hancesti was completely damaged. Estimates for damage, losses, and needs in the health and nutrition sectors are in Table 11.

## **D. Recovery and Reconstruction Needs**

To avoid a short-term negative impact on the population's access to quality health care services and to provide the smooth functioning of the medical institutions, financial resources should be identified to cover the expenditures incurred for medical specialists, secondary technical staff, construction of new medical institutions, provision of medical equipment, and modern means of communication and transport. In the medium- and long-term, the flood may have a negative impact on the nutritional status of population, especially of young children, due to the loss of agricultural products and livestock by households.

The strategy for health sector recovery and reconstruction in the affected areas is to restore and modernize the physical infrastructure of the medical institutions, provide human resources and transport, ensure the economic and physical accessibility to drugs, food safety, and nutrition, in particular for young children.

The short-term needs of the health sector include constructing a primary health care institution for the displaced communities of Cotul Morii and Sarateni villages in the Hancesti district; provision of disinfectants and consumables to ensure the protection of public health; coverage of losses due to the unplanned extra expenditures of the medical institutions; procurement of food for young children; launch of a public information campaign on the negative impact of flood consequences on health (informing about the harm of mould, indoor moisture, consumption of foodstuff products from flooded territories, use of water for drinking and cooking, and measures of protection against contagious diseases).

**Table 11: Damage, Losses, and Needs in Health and Nutrition**

Currency	Damage and Losses			Needs		
	Damage	Losses	Total	Short-term	Medium-term	Total
MDL million	0.95	2.86	3.82	21.98	8.66	30.64
USD million	0.07	0.22	0.30	1.71	0.68	2.39

Source: PDNA Estimates

## SOCIAL PROTECTION

### A. Pre-disaster Situation

The July 2010 floods along the Prut River resulted in the evacuation from 1,084 flooded houses and the adjacent area of 3,114 persons (1,293 families), including 614 children. This increased the number of vulnerable individuals and families and created immediate requirements for resettlement, food, water, sanitary and non-food supplies, compensation, and psychosocial support. The flood-stricken population is rural and relied predominantly upon income from their agricultural produce, almost all of which was lost in the flooding.

### B. Flood Impact on the Sector

Keeping with the Ministry of Labour, Social Protection, and Family's strategy, the systems at the district level were ready to implement the most urgently needed actions, including the provision of food and non-food aid to flood-stricken population and the registration of all beneficiaries for different short-term emergency and recovery assistance. Persons receiving Ajutor Social and nominative categorical compensations before the flooding continued to receive it afterwards. It is expected, however, due to the loss of agricultural land and other property that many additional persons and households will apply—and qualify—for targeted social assistance (Ajutor Social).

At the initial stage of the disaster, the social protection sections and districts' administrations distributed over 322.13 tons of emergency aid (i.e., foodstuffs, personal use items, hygienic products, and essential goods) to the affected and displaced population. Shortly after the disaster, the Government announced that every affected person was entitled to a one-time cash compensation of MDL 500.

### C. Damage and Losses

Physical damage to a building that housed a social protection unit occurred in Cotul Morii; the two staff were temporarily relocated to the offices in Obileni village. Table 12 provides estimates for damage, losses, and needs in social protection from the disaster.

### D. Recovery and Reconstruction

Field observations, meetings, and discussions with the affected people, social sector authorities, and social assistance providers informed work on the priority areas for mitigating the negative flood impacts on the most vulnerable groups and the recovery of poor rural communities: housing, social assistance, employment scheme, and psychosocial support to the flood-affected and displaced population.

People receiving nominative targeted social assistance before the floods continued receiving it after the floods. The number of recipients of targeted social assistance, however, will

significantly increase in the next couple of months, due to extensive losses increasing vulnerability and poverty (i.e. loss of personal land, livestock, and property).

Employment programmes, like active inclusion in public works on reconstruction, could decrease the need for additional benefits, while the well-promoted Ajutor Social programme re-directs the cash benefits flows toward the most vulnerable groups.

**Table 12: Damage, Losses, and Needs in Social Protection**

Currency	Damage and Losses			Needs		
	Damage	Losses	Total	Short-term	Medium-term	Total
MDL million	-	-	-	11.31	2.67	13.98
USD million	-	-	-	0.88	0.21	1.09

*Source: PDNA Estimates*

## 2.4 Cross-cutting Issues

### ENVIRONMENT

#### A. Pre-disaster Situation

Climatic and soil conditions allow the Prut River floodplain to have a diversity of forest and wetland ecosystems. There are 8,072 ha of forests and about 14,000 ha of natural lakes and wetlands, including two internationally important nature reserves: Prut de Jos and Padurea Domneasca. Prutul de Jos reserve has a total area of 1,691 ha and jointly with neighbouring natural Lake Manta represents a unique ecosystem considered the last natural wetland floodplain in the lower Danube region. The Padurea Domneasca forest nature reserve with an area of 6,500 ha is located in the mid Prut River valley and represents a unique ecosystem composed of meadow, oak forests, and wetlands. Both nature reserves support globally vulnerable and endangered fish, bird, and mammal species and are important for water wolf birds being located within one of the major international migratory corridors. The Prut River valley—and especially its flood zone was not subject to significant human impact. Most of the natural habitats, including its forests, were kept intact. Furthermore, with only a few exceptions, there were no potential sources of pollution (e.g., warehouses of agrichemicals, gasoline stations, and/or any industrial enterprises). Part of the floodplain in the mid and lower part of the river was drained and brought into agricultural production.

#### B. Flood Impact on the Sector

The environmental impacts of the May-July 2010 floods are low to moderate and largely relate to the following: (a) dispersion of household wastes into the Prut River; (b) inundation and contamination of community water wells, including deep water wells; (c) destruction of fish spawning grounds, breeding, and feeding areas; and, (d) impact on solid waste land fields. The damage to natural ecosystems and important habitats (forests and wetlands) was not significant. The long-term impacts during recovery and reconstruction time will be mostly dealing with the following: (i) solid waste and debris management; (ii) sourcing of construction materials; (iii) recovery and improvement of forest ecosystems, as well as reproduction of fish resources; (iv) strengthening environmental impact assessments (EIAs) and environmental management capacities of district environmental authorities and local councils.

Based on analytical data, it is possible to conclude that no serious contamination resulted from the flooding. At the same time, the flooding caused serious impacts on Prut River fish resources. Most of the fish spawning grounds, breeding, and feeding areas were destroyed. Valuable fish species migrated to the meadows of the river and, after the waters recede, will remain in separate ponds and lakes. Once the water level in these temporary reservoirs recedes, the high temperatures will cause fish to die and create considerable losses to river ecosystem. The flooding also damage to forest resources, especially to newly planted areas.

### **C. Damage and losses**



Table 13 provides an estimate of damage and losses. Direct damage to fish and forests resources is expected. Potential environmental losses might include the following: (a) Management of debris and wastes during recovery and reconstruction stages that might require additional resources and cause new environmental impacts; (b) Impact of sourcing reconstruction building materials for rebuilding and repair of houses, roads, bridges, etc., will require important supplies of natural resources, e.g., stones, clay soil, and sand. If managed poorly, accelerated extraction of these resources to meet increased demand

could result in negative environmental impacts; (c) Forest recovery and reconstruction costs take into account that the long flooding causes damage to the status of forests, improving their status requires additional sanitary cuttings, replanting, cleaning up, and maintenance activities; (d) Recovery measures for fish resources. The creation of a special reproduction centre for improving reproduction of the fish resources is proposed, and (e) Additional costs for conducting environmental assessment for the reconstruction programmes and projects and for strengthening environmental institutions as reconstruction requires increased demand for the district authorities' and local councils' environmental assessment and management.

### **D. Recovery and Reconstruction Needs**

The main environmental problems related to the current flooding are the volume of the debris to be collected and construction waste to be removed, the extent to which fish and forest resources have been damaged, and the quantity of agricultural and household pollutants entering into Prut River. These findings and proposed measures to address them should be incorporated into long-term restoration and reconstruction programmes to eliminate unacceptable environmental impacts from subsequent flooding. Specifically recurring losses and negative intrusions into environmental systems could be avoided, or at least minimized, by identifying, measuring, and interpreting the magnitude and significance of environmental impacts associated with flooding. The immediate recovery measures are related to conducting clean up, maintenance, sanitary cuttings, and replanting activities in the forest sector, as well as measures for increasing reproduction of fish resources.

**Table 13: Damage, Losses, and Needs in Environment**

Currency	Damage and Losses			Needs		
	Damage	Losses	Total	Short-term	Medium-term	Total
MDL million	17.37	11.22	28.59	0.20	15.49	15.69
USD million	1.35	0.88	2.23	0.02	1.21	1.22

*Source: PDNA Estimate*

## Section III. Economic and Social Impact

### 3.1 Macroeconomic Impact

According to preliminary PDNA analysis of damage and losses, the July floods caused by heavy rains in some parts of Romania, Moldova, and Ukraine had only a small impact on the GDP of Moldova for 2010—estimated at 0.15 percent of GDP—as the directly affected regions were engaged in agricultural production, which only accounts for about 8-9 percent of the Moldova's GDP. Once the projected public and private spending are included, however, the 2011-2012 GDP will be affected positively thanks to the recovery and reconstruction activity expected to take place those years (real GDP growth increasing by about 0.1-0.3 percentage points of GDP in 2011-2012). Based on sector information about losses, the two most affected GDP sectors are agriculture and transport (about 60 percent and 38 percent of GDP losses respectively). At the same time, short and medium term needs produced by the floods are equal to USD 77 million or about 1.4 percent of 2010 GDP.

Given that the total surface of agricultural land affected by floods does not exceed 0.4 percent of total agricultural land in Moldova, the impact of this natural disaster on agricultural exports will be negligible. No other exports are reported to be affected. The floods have directly affected more than 3,000 people. Some have relatives working abroad who will most likely respond by sending higher remittances to affected communities. It is difficult to estimate exactly how much their remittances will increase the overall level of remittances in the country. However, even taking into account a relatively conservative number of more than 300,000 Moldovans working abroad, the increase in the total number of remittances produced by members of affected families will most likely be hardly noticed. At the same time, short- and medium-term recovery needs will definitely generate an additional inflow of imports of different kinds. Based on the summary of damages, losses and needs in Tables 1a and 1b, additional imports may constitute up to USD 30 million in 2010 and USD 44.3 million in 2011 (0.8 percent and 0.91 percent of merchandise imports respectively). Therefore, the total negative impact of July floods on the Current Account Deficit of the Balance of Payments is estimated not to exceed 0.4-0.6 percent of GDP in 2010-2011. This amount will be lower if donors come up with additional money in the form of official transfers to compensate the damage and losses.

Assuming most of the recovery needs will be covered by the budget, its expenditures should increase respectively by up to MDL 394 million in 2010 and up to MDL 568 million in 2011. Thus, the deficit of the general government budget may increase by about 0.6 percent in 2010 and 0.8 percent in 2011. At the same time, it should be mentioned that the state budgets of 2010 and 2011 do not have the sources to cover these costs. Therefore, it is expected that these expenditures will be covered from the resources accumulated on the special account representing financial assistance aimed to remove the consequences of natural disasters (there was MDL 30.3 million accumulated on this account as of September 4, 2010, with MDL 2.7 million being already distributed), as well as from additional external non-reimbursable financial assistance.

### 3.2 Impact on Livelihoods and Incomes

There are 198,173 inhabitants living in the communities that constitute the flooded area. The affected area is predominantly rural (75 percent) and around 10 percent of the population is estimated to be permanently relocated for reasons connected with migration, studies, etc. Table 14 shows the nature of the population structure in the flooded area.

**Table 14: General Population Characteristics of the Flooded Communities (2008)**

Affected area	Population	Men	Women	Present	% Present
Urban areas (small towns)	49,289	23,069	26,020	44,420	90.1
Rural areas	148,884	73,608	75,476	136,100	91.4
Total	198,173	96,677	101,496	180,520	91.1

Source: Ministry of Economy (MoE)

There are 76,128 families in the affected area, over 70 percent of which are located rural areas: 3.8 percent of these families have 3+ children under the age of 18, and three times as many rural families have disabled members than is the case with urban families (MoE, 2008).

The business sector, regardless of location in the flooded zones, is small compared to urban areas. Most businesses concentrate on agro-processing, as well as trade, light industry, and services. In 2009 the size of the average microenterprise in the affected districts was 2.8 employees and the average turnover per employee was MDL 86,500 in microenterprises. The bulk of the economy in the affected area is agricultural in nature; there are 25,545 agricultural producers with less than 10 ha of land, the level at which the farmers are considered to be economically viable. These agricultural producers, effectively operating on a subsistence basis, account for 99 percent of all farmers in the area affected by the flood.

In 2009 Moldova's official national unemployment rate was a relatively modest 6.4 percent in comparison with neighbouring countries, although this is known to be an underestimate due in part to the degree of migration. The official national male unemployment rate of 7.8 percent is significantly higher than that of females at 4.9 percent; the youth (15-24 years) unemployment rate stands at 15.4 percent. The data from the flooded communities, however, show that the unemployment rate stands at 5.8 percent in urban areas but is more than double in rural areas at 12.7 percent. These figures are indicative only but illustrate the degree of the problem.

#### Poverty and Deprivation

Nationally the poverty level in rural areas increased during 2009: the absolute poverty rate reached 36.3 percent (+1.7 percentage points compared with 2008) for rural areas compared to 12.6 percent (-3.6 percentage points) in urban areas, including small towns (MoE, 2008). Out of the total number of flooded villages, ten communities are in the category of the most deprived communities at the national level, out of which three are from the Hancesti district (Cotul Morii, Obileni, Nemțeni), three from Cantemir (Tiganca, Stoianovca, Toceni), and the other four are from the districts of Ungheni (Petrești), Leova (Sărata-Răzeni), Nisporeni (Bărboieni) and Edineț (Lopatnic).

## Employment

Because the affected area is predominantly agricultural in nature, the employment impact of the flood has been relatively modest. The affected non-agricultural sector (comprising shops, mills, and construction units) employed 11 people, none of whom is working any longer. The owners of the respective businesses anticipate restarting their activities by the beginning of 2011, assuming they receive some financial support, for example, in the form of interest free loans. In the context of the cultural facilities (cultural centres, libraries, and churches), nine public officials were affected.

## Income

National data (see Table 15) show that income from wages is the most important source of family revenues, though this is more important in urban than rural areas (wages contribute 58.1 percent vs. 30.6 percent of the overall family income). The second most important source of income, in both urban and rural areas, is social contributions (14.8 percent vs. 20.6 percent), such as pensions and child benefits. A key source of income is remittances from family and friends working abroad, and this is particularly important in rural areas (12.6 percent vs. 22 percent). Since most rural activities in Moldova are subsistence in nature, income from agricultural activity remains relatively important in rural areas (18 percent); unsurprisingly it is negligible in urban areas (0.9 percent).

**Table 15: National Urban and Rural Incomes Data (2009)**

	Urban (MDL)	Rural (MDL)	Urban %	Rural %
Disposable income	1477.1	939.2	100.0	100.0
Income from wages	858.5	287.8	58.1	30.6
Income from agricultural activity	12.9	169.1	0.9	18.0
Income from non-agricultural activity	107.0	53.1	7.2	5.7
Income obtained from property	3.8	0.4	0.3	0.0
Social payments	218.6	193.1	14.8	20.6
Pensions	183.6	165.2	12.4	17.6
Child benefits	8.6	5.4	0.6	0.6
Compensations	7.8	8.8	0.5	0.9
Social aid	0.3	1.3	0.0	0.1
Other incomes	276.4	235.7	18.7	25.1
Remittances	185.5	207.0	12.6	22.0

*Data source: National Bureau of Statistics*

Remittances represent an important source of income to overcome poverty in the country, reducing by 11 percent the risk of the population falling below the poverty line (Poverty and Policy Impact Report, MoET, 2008). However, other sources of income data indicate that the level of remittances is being severely impacted by the economic crisis. Remittance levels in rural areas decreased significantly (17 percent) in early 2009, according to a joint UN/World Bank assessment (Impact of the Economic Crisis on Poverty and Social Exclusion in the Republic of

Moldova, 2009). Furthermore, between Q4 2008 and Q1 2009, income from self-employment in agriculture experienced a 25 percent contraction.

The steep decline in remittances, combined with the loss of agricultural and livestock income, implies a significant decrease in incomes in the affected communities. It is possible that the amount of remittances received by the families affected by the flood might increase to cover the losses of the household. Due to the global economic crisis, however, this cannot be taken for granted (informal discussions with flood victims suggest that there has not been an increase in remittance flows). It should be noted that remittances make up a larger part of revenues in better off households than in the poorer ones in Moldova, nevertheless, there is likely to be a negative impact that will affect the most vulnerable households disproportionately.

The loss of income from salaries and wages will almost certainly mean that the poverty levels in the affected areas are very likely to increase dramatically over the next 24 months, if compensatory action is not taken. The coincidence of the emergency situation with the wider financial and economic crises is likely to sharpen the poverty effects in the affected areas.

# Section IV. Recovery and Reconstruction Framework

## 4.1 Introduction

This section presents the requirements for recovery and reconstruction that will restore the livelihoods of affected individuals and households, as well as the economic output of the affected areas to pre-disaster levels, including rebuilding destroyed physical infrastructure assets and restoring services to their pre-disaster functioning level. Recovery and reconstruction take into account the principle of “building back better,” ensuring that damaged assets will be rebuilt in a way that reduces future disaster risk.

## 4.2 Recovery and Reconstruction Framework

The PDNA forms the basis for a comprehensive recovery and reconstruction framework that combines short-term, medium-term, and long-term needs. Given the nature of Moldova’s floods, the focus of the PDNA has been on short-term recovery needs, which encompasses the first six-month period (up to December 31, 2010) and the medium-term recovery and reconstruction needs, spanning an estimated two years (up to June 30, 2012). In some specific areas, long-term needs have been identified within the context of disaster risk management to reduce the vulnerability and risk of occurrence of a similar disaster in the future.

Post-disaster environments can pose challenges but also present opportunities to address difficult, long-standing development issues. While the floods have been localized in a few areas of the country, there is a lot of awareness of the risks associated with natural disasters and a keen desire to reduce risks and losses associated with them. With climate variability adding to uncertainties, developing countries such as Moldova have to do even more to safeguard gains in poverty reduction and economic growth.

The consequences of natural disasters will continue to take a toll on Moldova’s people and its economy if adequate measures are not taken to reduce risk. While the occurrence of the type of floods currently witnessed is described as relatively infrequent, the country is only two years removed from the severe flooding in 2008. Therefore, there is a need for the country to prepare itself for floods of this magnitude to happen more frequently in the future. This preparation has to be approached holistically with a particular focus on land use planning; maintenance, rehabilitation, or reconstruction of the flood management infrastructure; early warning forecasting; and the continued focus on strengthening the capacity of the country’s disaster response and coordination mechanisms, which can be critical in managing the consequences of natural disasters. Building back better is essential, but it is not enough. Assuming that the flooding could not have been prevented, its impact could have been reduced. For example, in the aftermath of a previous flood, the residents of the then-affected Cotul Morii village did not accept a relocation plan, instead rebuilding in the location that now is inundated and unsuitable for habitation. As a result, a high cost has been borne in terms of human suffering for the villagers and potential adverse impacts on the Government’s resources.

As is the case with most natural disasters, the floods affected the poor and vulnerable disproportionately, and efforts to help restore their housing and their livelihoods are urgently needed. More importantly, however, field visits by the different sectoral teams have revealed that there is a lack of a communication between different levels of Government and the affected population. At a time when dislocated (and sometimes separated) families may wonder about their misfortune, their lot can worsen if they lack a sense of what the future holds for them. Under such circumstances, it is imperative to discuss with affected people a roadmap to recovery and reconstruction, giving them an opportunity to participate in efforts to restore livelihoods and rebuild the fabric of their lives. While tending to the needs of those who have been displaced, the Government could also think through policies that might encourage the development of more disaster-resilient communities, as well as risk-reducing practices.

### ***Strategic Priorities***

An effective recovery and reconstruction programme has to address the needs of those most affected by the floods. The preparation of such a programme could be guided by a framework that focuses on three priority issues: (i) housing support for dislocated families; (ii) restoration of livelihoods; and (iii) disaster risk management and flood risk management.

**Housing and Land Use:** The flood had significant impact on the lives of the exposed people, damaging and destroying their houses and forcing them to be displaced. The majority of the displaced population (with the exception of those in Cotul Morii) are staying with their relatives. While they have access to basic services such as water, electricity, and sanitation, they are crowded into small spaces because several households have to share a small house. In many instances, those who evacuated to their relatives' dwellings are able to stay within their villages; nonetheless, they do not have access to their agricultural land, on which they rely to earn income. However, much of their agricultural land is also partially or entirely submerged. During a town hall meeting organized by the Government in conjunction with the PDNA exercise, an informal survey was conducted where the majority of people being housed at the Technical College for Building Construction in Hancești reported that they did not want to return to their previous villages. To ensure feasibility and sustainability of the recovery and reconstruction efforts, lands outside of the flood and landslide zones may need to be acquired so that exposed people can relocate safely. Furthermore, basic infrastructure services (water, electricity, roads, sanitation, gas, etc.) will be needed to ensure a reasonable quality of life for the displaced people. It may also be desirable that lands near the original villages are acquired for relocation, considering cultural connections of exposed people to their original lands. Finally, recovery and reconstruction of the housing and land use sector in the affected areas should be governed by three principles: (i) participatory planning; (ii) timeliness and feasibility; and (iii) national ownership.

**Livelihoods/Agriculture/Social Protection:** The issue of assistance with reconstruction of the future new homes by the flood victims on a cash for work and public works basis could be critical. Equally important is the necessity for due consideration and planning for post-disaster livelihoods. There is a need to assist the districts and communities to plan and implement a post-disaster livelihoods strategy, focusing on re-establishing lost non-agricultural economic activities, diversification of the local economy, and generating sustainable livelihoods, especially in the most severely affected areas. The strategy for recovery and reconstruction relies on the

application of several principles, such as awareness raising, regular and proactive information sharing, consultation, and empowerment of the local communities affected by the flood. This in turn necessitates effective coordination among the Government ministries (e.g., the Ministries of State, Interior, Economy, Agriculture, Construction and Regional Development and Labour, Social Protection and Family), as well as among the districts and the communities/mayoralities at the lower geographical scale.

**Disaster Risk Management and Flood Management:** While flood management is an integral part of disaster risk management (DRM), it requires special mention as a separate priority given the immediate cause of the current disaster. DRM, however, is a broader concept that can help a country become proactive, coherent, and effective when it comes to preparing for natural (or man-made) disasters, reducing associated risks, or dealing with consequences when disasters do occur. In Moldova's context, the Government has already initiated efforts to strengthen the country's DRM capacity. For example, just as the country was in the middle of dealing with the floods, a World Bank-supported project was approved that will strengthen the State Hydrometeorological Service's capacity to deliver better and more timely weather forecasts. In addition, the project will support the CPESS to better coordinate disaster response by establishing a modern emergency command centre. These activities had been planned before the onset of floods, and it is commendable that the Government was already focusing on DRM, but, the needs in this area are broader and will require more attention in the future. Two additional areas are worth mentioning: (i) developing a risk financing framework, which can guide the country's choices in mitigating the financial risks of disasters and (ii) clarifying and strengthening institutional mechanisms at national and local levels for coordinating disaster risk reduction, response, and recovery.

**Flood Risk Management:** Moldova's flood management system is comprised of protection dykes and dams. There are 126 dams with a storage volume of more than one million cubic meters and 3,000 dams with a storage volume less than one million cubic meters for water impoundment. Thirty-eight dams out of 126 are dams managed by the Apele Moldovei Agency for operation and maintenance. These dams are used for flood control, irrigation, recreation, energy, or other tasks, therefore, the social and economic function of these dams is very important. Unfortunately this protective system is very old and has been degraded over time due to a number of reasons, including lack of maintenance and rehabilitation. From urgent measures to repair breaches in embankments to more strategic rehabilitation and reconstruction of this system, the needs in this area are immense and strengthening the system is a vital part of the country's ability to manage flood risks. A way forward would be to focus on the short-term needs identified by this assessment, and in the medium term, focus on serious measures for strengthening flood management, starting with the finalization of a strategy on the development and management of water resources and protection against floods.

### ***Financing***

Financing needs as a result of this disaster are substantial and to do nothing would be a mistake. The PDNA estimates the cost of recovery and reconstruction at USD 75.72 million. Given the very limited capacity of the flood management system, as well as the overall DRM system in Moldova, and the possibility of increased frequency and intensity of floods, such costs could be expected to recur more frequently unless urgent efforts are made to mitigate the effects of future

disasters. Financing could come from a number of sources but the Government may request financial support from international development partners. This is because Moldova has only recently begun to recover from the severe effects of the global economic crisis, and the Government has limited resources at its disposal. Funding could also be mobilized through other modalities: borrowing from multilateral and bilateral sources, including on accelerated emergency terms; reallocation of funds under ongoing donor-supported projects and programmes; and through additional financing arrangements.

### 4.3 Recovery and Reconstruction Program

This PDNA presents a set of post-disaster activities—the recovery and reconstruction programme—to be undertaken to achieve two main goals:

- Recovery of socio-economic activities at the personal and household levels
- Reconstruction of destroyed or damaged physical assets

Financial needs for the recovery and reconstruction programme have been estimated based on the damage and loss assessment caused by the floods. These needs are expressed in a disaggregated manner through breakdowns by sector of economic activity and ownership by the public or private sectors. To ensure full recovery from the negative impact of the disaster, programme interventions and their corresponding financial needs are presented. Financial needs for reconstruction are defined on the basis of the estimated value of damage while adopting a strategy that seeks to introduce disaster-resilient standards, depending on availability of funding.

A “building back better” strategy requires relocation of selected activities to safer areas, reasonably improved design and construction standards, adequate flood-control measures and schemes. The recovery and reconstruction programme operationalizes the framework. More than one-third (39 percent) of the total recovery and reconstruction programme is for the housing sector, reflecting the urgent need to house the displaced families before the onset of winter. This is followed by support for flood management (primarily a public sector undertaking), agriculture and transport infrastructure, (public sector), and agriculture (a mix of public and private sector). Funding for close to 41 percent of the overall recovery and reconstruction programme would need to be mobilized for the activities to be carried out during the period up to December 2010.

The PDNA has also highlighted the need to develop medium- to long-term solutions to address priority policy issues. Development solutions for two of the major policy issues highlighted in the PDNA—flood control and disaster risk reduction—require concerted efforts over many years, well beyond the period covered by the PDNA. While the programme in the Table 16 focuses on short- to medium-term actions, long-term needs are discussed in the annexes. These long-term needs will be critical for building back better and deserve special attention.

<b>Table 16: Post-Disaster Needs Assessment: Summary of Short-term and Medium-term Needs</b>		
<i>(MDL million)</i>	<b>Short-term Needs (until December 31, 2010)</b>	<b>Medium-term Needs (until June 30, 2012)</b>
<b>Flood control and dam management</b>		
Construction works	10.09	101.50
Pumping of water	0.73	

Consulting services		56.40
Goods	1.67	
<i>Subtotal (MDL million)</i>	<b>12.49</b>	<b>157.90</b>
<i>Subtotal (USD million)</i>	<b>0.97</b>	<b>12.32</b>
<b>Housing</b>		
Provision of appropriate temporary shelter to exposed people	2.80	
Construction of new houses	216.20	156.50
<i>Subtotal (MDL million)</i>	<b>219.00</b>	<b>156.50</b>
<i>Subtotal (USD million)</i>	<b>17.08</b>	<b>12.21</b>
<b>Energy</b>		
Providing basic infrastructure for Cotul Morii	6.56	22.76
<i>Subtotal (MDL million)</i>	<b>6.56</b>	22.76
<i>Subtotal (USD million)</i>	<b>0.51</b>	1.78
<b>Transport</b>		
National roads	8.92	8.92
Local roads	6.90	1.29
Village streets	2.40	
Prut-to-Cahul section (railroad)		35.91
<i>Subtotal (MDL million)</i>	<b>18.22</b>	<b>46.13</b>
<i>Subtotal (USD million)</i>	<b>1.42</b>	<b>3.60</b>
<b>Water and Sanitation</b>		
Cleaning and disinfecting water sources	0.66	
Rebuilding and restoring shallow wells	0.60	
Rebuilding and repairing deep wells	3.48	
Construction of water supply system for the new site.		8.00
Construction of sewerage system and waste water treatment facility for the new site		4.00
Rebuilding damaged private toilets (improved toilet facilities) for dwellings in affected communities	2.00	
<i>Subtotal (MDL million)</i>	<b>6.74</b>	<b>12.00</b>
<i>Subtotal (USD million)</i>	<b>0.53</b>	<b>0.94</b>
<b>Agriculture</b>		
Crops	11.54	57.18
Land rehabilitation	19.06	
Livestock	23.74	21.54
Irrigation/Drainage	6.97	14.65
<i>Subtotal (MDL million)</i>	<b>61.31</b>	<b>93.37</b>
<i>Subtotal (USD million)</i>	<b>4.56</b>	<b>6.79</b>
<b>Livelihoods</b>		
Policy review, coordination, and strategy development	1.93	
Capacity building		11.80
Humanitarian and financial support and income generating activities	7.00	4.70
<i>Subtotal (MDL million)</i>	<b>8.93</b>	<b>16.50</b>
<i>Subtotal (USD million)</i>	<b>0.70</b>	<b>1.29</b>
<b>Social</b>		
Education	26.32	12.60
Health	21.98	8.66
Social Protection	11.31	2.67
<i>Subtotal (MDL million)</i>	<b>59.61</b>	<b>23.93</b>

<i>Subtotal (USD million)</i>	<b>4.65</b>	<b>1.87</b>
<b>Environment</b>		
Field survey for assessing the status of forest resources; prepare and implement a recovery action plan	0.07	12.74
Assess the impact of flooding on fish resources; prepare and implement a recovery action plan	0.07	2.75
Assessment of the floodplain protected areas and incorporate environmental protection requirements into recovery plans, including capacity building activities	0.07	
<i>Subtotal (MDL million)</i>	<b>0.20</b>	<b>15.49</b>
<i>Subtotal (USD million)</i>	<b>0.02</b>	<b>1.21</b>
<b>Disaster Risk Management</b>		
Hydrometeorological forecasting, data sharing, and early	0.38	1.28
Coordination of disaster mitigation, preparedness, and response	3.00	50.00
Financing disaster losses, reconstruction, recovery, and risk transfer	0.00	1.20
<i>Subtotal (MDL million)</i>	<b>3.38</b>	<b>52.48</b>
<i>Subtotal (USD million)</i>	<b>0.26</b>	<b>4.09</b>
<b>TOTAL (in MDL million)</b>	396.43	597.05
		<b>993.48</b>
<b>TOTAL (in USD million)</b>	30.92	46.57
		<b>77.49</b>

Note: Financial needs are addressed in this table; other activities that may not have a financial implication are included in the annexes.

#### 4.4 The Way Forward

The recovery and reconstruction programme proposed by the PDNA does not constitute a full plan. That would require further analytical work and programme preparation work to refine sectoral needs and priorities, elaborate implementation arrangements and complete and refine estimates of costs. Part of such a plan would also include identification of already programmed activities that would contribute to the programme presented here. In this section, the PDNA team presents to the Government some broad principles that can guide the implementation of any plan that might emerge as a result of this exercise. In addition, the PDNA team offers recommendations on the implementation arrangements, including for monitoring and oversight of future works. The suggestions that follow draw on lessons learned from recovery and reconstruction programmes in other countries.

#### Principles and Arrangements for Implementation

A set of guiding principles could govern implementation of the recovery and reconstruction programme. The purpose of these principles is to enhance the effectiveness of recovery and reconstruction efforts, increase transparency and accountability, and ensure that resources are translated into results on the ground. The principles seek to guide a reconstruction programme that will build back stronger and more resilient communities.

#### *A transparent recovery and reconstruction programme*

It is important that there is clear communication with flood victims regarding the recovery and reconstruction programme. For example, the PDNA team understands that the flood victims are aware of the fact that the Government will re-house them, but the lack of information on how, when, etc., creates stress and anxiety. Since district-level offices also seem to lack the necessary

information, the affected communities are experiencing an information gap. The Government should initiate a proactive service of regular information sharing across the affected areas, relating news on housing and other aspects of coping with the disaster, such as financial awards, compensation for lost housing and crops, etc.

### ***People-centred, and equitable approaches***

Community-based, participatory approaches that engage local communities in decision-making, implementation, and monitoring of activities could be adopted to increase the quality and speed of reconstruction, align projects with real needs, and lower the risk of misuse of funds. The Government intends to resettle people, such as with residents of Cotul Morii village, to higher ground to avoid further risk of flood. Land purchase, preparation, and construction, take some time and are normally combined with a structured process of consultation and information sharing. The Government needs to consider developing a strategy for the relocation process; a top-down approach could prove counterproductive. Although disasters increase the vulnerability of all, groups who are already disadvantaged may need special assistance and protection. Particular priority should be given to the poor, marginalized female-headed households, children, orphans, elderly, and people with disabilities.

### ***Reduction of future risks***

With floods and other disasters a regular occurrence in Moldova, a disaster risk management strategy that takes into consideration all likely significant hazards is needed so that the impact of future disasters is reduced. Such a strategy could include not only hard investments associated with flood management or early-warning forecasting but also legal, policy, and institutional measures that can be implemented over time to develop disaster-resilient communities in the country.

To reduce the risk of further human loss and physical damage in the future, any such strategy should also review the options for transferring the financial risks associated with natural disasters, reconsideration of spatial planning, and urban development strategies.

### ***Coordination and monitoring***

In advance of the work to be conducted by the Lazar Commission, the Government will need to take effective measures to implement the short-term recovery programme as well as to lay the foundation of the medium-term recovery and reconstruction programme. To ensure there is effective delivery of the different activities of the recovery and reconstruction programme, it would be useful for the Government to evolve a mechanism for coordinating the work of the various ministries and agencies that will participate in this programme. Furthermore, it will be important to closely monitor the implementation of the programme. This is important for both accountability as well as timely delivery of essential services to the affected population, especially with winter on the horizon.

# Section V. Reducing Risks

## 5.1 Introduction

Moldova is highly vulnerable to natural disasters caused by hydrometeorological phenomena (hail storms, early frost onset, droughts, and floods) landslides<sup>12</sup> and seismic hazards (earthquakes). This vulnerability is due to a combination of geographical factors and inappropriate land use practices. The impact of natural hazards on Moldova's poor rural populations can be particularly severe because of the current high levels of poverty, the susceptibility of its agriculture, as well as the limited capacity for disaster response and hazard mitigation measures. Climate variability may be responsible for repeated severe weather patterns. Consequently adaptation to short-term climate variability and extreme events is a basis for reducing vulnerability to long-term climate change. Climate risk management seeks to promote the achievement of sustainable development goals by helping to manage society's vulnerability associated with both short-term climate variability and long-term climate change.

*Risk Profile.* In addition to more severe exposure to meteorological hazards, climate variability is expected to have dramatic impacts upon Moldova's economy and environment. According to the available models, surface water resources will diminish by 16-20 percent in the 2020s. Taking into account groundwater supplies, severe water stress will set in after 2030, particularly in the south of the country. Wheat and corn yields may diminish significantly (wheat by 25 percent of the 1960-1990 baseline in 2010-2039), which will reduce food security. Aridization and lower water availability will shift spatial distribution of flora and fauna species and have a negative impact upon aquatic ecosystems such as wetlands. Desertification and accompanying land degradation will become more widespread.

In 2008 and 2010, the country was affected by intense and destructive floods, resulting in economic shocks due to damage and losses observed in various sectors - particularly agriculture and infrastructure. The 2007 drought caused estimated losses of about USD 1.0 billion; the 2008 floods cost the country about USD 120 million.

An important underlying hazard is water logging (saturation of the soil by groundwater sufficient to prevent or hinder agriculture) of urban or rural floodplain areas, occurring at locations where the floodplains lie behind river embankments or dykes and where land drainage installations are deficient.<sup>13</sup> Subsurface flooding is estimated to be a risk to 80 percent of the country's 1,532 settlements and 125,000 buildings. Preliminary qualitative data from this PDNA indicates that damage and losses on the housing and land use and the agriculture subsectors caused by water and flood hazards could be substantially reduced if risk reduction through structural and non-

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<sup>12</sup> In Moldova, landslides threaten 43.7 percent of settlements, and they are increasing every year. Landslides are mainly linked to subsidence from large construction works and widespread deforestation, rather than heavy rainfall events. They are relatively slow moving and not a major contributor to morbidity or mortality. Most damages are related to local displacement, which may result from damage to buildings and other assets, and loss of cropland. Average annual losses from them amount to US\$1.3 million. (V.A. Osinok, A.P. Sudarev, and E.N. Sheremet (Gosudarstvenoe Agentsvo po Geologii Respubliki Moldova "AGeoM"), 2006, *Monitoring opasnykh geologicheskikh protsessov na territorii Moldovy*)

<sup>13</sup> Adapted from World Bank (WB) and Food and Agriculture Organization of the United Nations (FAO) 2006. A Hazardous Existence: Managing Natural Livelihood Threats in Rural Moldova. Chisinau, June 2006.

structural measures were applied in advance of the flood season, securing the safety of the existing aging flood control system.

Archival analysis indicated that during 1984-2006, Moldova's average annual economic losses due to natural disasters were about USD 61 million or 2.13 percent of national GDP.<sup>14</sup> Historic records reveal significant earthquake damage. For example, in 1940 Chisinau experienced a magnitude 7.3 earthquake (out of maximum of M=9); while the 1986 Vrancea earthquake caused estimated losses equivalent to USD 500 million.<sup>15</sup> In 2009, estimated per capita GDP was USD 1,514, making it the poorest country in Europe. The 2009 UNDP Human Development Report ranks Moldova 117 out of 182 countries with a human development index (HDI) score of 0.720—lower than the regional average for CIS and Eastern Europe. The most vulnerable economic sector is agriculture. The agricultural and agro-processing sectors account for about 30 percent of the country's GDP. These sectors generate about 60 percent of export earnings and provide employment for over 40 percent of the labour force. Thus, recovery from these disaster shocks can be increasingly difficult considering that the economy is recovering from a recession and the global financial crisis has undermined the main sources of earlier economic growth: remittances, private consumption, exports, and private investment. Reducing Moldova's vulnerability to extreme weather events and natural hazards, and mitigating subsequent losses due to disasters, are a priority for the country economic development.

## **5.2 Institutional Framework for Disaster Risk Management (DRM)**

The legal and institutional framework for DRM is mostly oriented toward emergency response, rather than preventing risks and hazards. Institutions in natural hazard mitigation in Moldova can be roughly divided into coordinating emergency commissions, early warning and prognosis bodies, line ministries, and disaster management bodies. None receive adequate budgetary allocations. Although an adequate legal and regulatory framework is in place, there is a need to improve coordination and contingency planning. Capacity building is necessary at every level of the disaster management structure.

The national disaster management system in Moldova is regulated by the Law on Civil Protection and the Law on Defence against Fires and includes the CPESS of the Ministry of Internal Affairs of the Republic of Moldova as the main implementing institution. The Government Commission for Emergency Situations (defined under the Law on Civil Protection, No. 271 of 9 November 1994) functions as a national multisectoral body responsible for policy development and planning for crisis preparedness, mitigation, and response. Disaster prevention, response, relief, and recovery are key functions within the mandate of the CPESS, which has been part of the Ministry of Internal Affairs since 2004. 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 CPESS. 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

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<sup>14</sup> 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).

<sup>15</sup> 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 CPESS.

are notified immediately and meet to evaluate the level of threat to the population, economy, and infrastructure, and to agree on the response. The emergency commissions and CPESS 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 with sector plans, for example, for flood protection. CPESS-coordinated emergency response exercises are carried out on average every five years. Moldova signed several agreements with countries in the region, such as Ukraine, Russia, and 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.

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 research and development; (v) air quality measurements and services; (vi) water quality measurements and services; and (vii) commercial services. Apele Moldovei manages the flood control system, which is comprised of a total length of 960 km, of which 720 km are under the agency. Most of the dams and dykes were deteriorated by floods and outflows throughout the operation period. These key risk management issues, related to dam safety and vulnerability of exposed population and assets, have been discussed in the Infrastructure section.

### **5.3 Needs for Disaster Risk Management**

The South Eastern Europe Disaster Risk Mitigation and Adaptation Programme (SEEDRMAP), based on the priorities for action of the Hyogo Framework of Action, specifies three focus areas that are specified in this report: (i) hydrometeorological forecasting, data sharing, and early warning; (ii) coordination of disaster mitigation, preparedness, and response; and (iii) financing disaster losses, reconstruction and recovery, and risk transfer (disaster insurance). The PDNA indicates that all three areas have unmet needs, some areas more than others. Consultations were undertaken by the PDNA/DRR team with national and local authorities and selected groups of affected population. A desk review of available documentation was also carried out.

Overall, disaster risk management is practiced under a reactive approach: there is a focus on emergency response and not on reducing the hazard risk and vulnerability of the exposed population. Proactive approaches of risk management, emphasizing preparedness and use of risk reduction principles need to be given a higher priority by government authorities in terms of applicability at national and local levels. A draft of a National Strategy for Natural Hazard Mitigation, 2008-2015, which had an implicit climate risk management focus, was developed with the support of the World Bank, however, it was not approved due to budget constraints for finalization and implementation. Coordination bodies (such as the National Commission of Emergency Situations) are ad hoc in nature, and although there is an institutional architecture for preparedness and response, linkages among the relevant institutions for risk assessment are not cohesive. Key principles of risk management are not mainstreamed into policies and legislations aimed to integrating prevention and mitigation actions into development planning. There is also a lack of capacity at the local level among district emergency commissions, local public administrations, civil society organizations, and communities for preparedness and response, as well as planning for and undertaking prevention and mitigation actions. Space technology and

use of real time satellite images is not at all utilized to guide spatial analysis and decision making, or it is underutilized. The following needs by areas are identified:

### **(I) Hydrometeorological forecasting, data sharing, and early warning**

The State Hydrometeorological Service (SHS) 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 either will need to be replaced completely or damaged sensors and instruments replaced. A World Bank-financed project will support some of the needs related to capital investments required by the SHS. However, to promote service delivery with the objective of meeting the needs of different sectors of the Moldovan economy, the SHS could benefit from sustained technical assistance and training activities. There are several unmet needs on the strengthening of the early warning system (EWS), like satellite images in real time for improved regional forecasting for severe weather and, at national and local level, appropriate dissemination of information that is user friendly and adapted to local culture.

### **(II) Coordination of disaster mitigation (including institutional capacity), preparedness, and response.**

The following categories with overall needs were identified:

#### ***Coordination of Disaster Mitigation***

It is critical to clarify and strengthen institutional mechanisms for coordinating disaster risk reduction, response, and recovery in the country. There are a number of ministries and government agencies responsible for different parts of the overall DRM procedures and operations in the country. Promotion of dialogue on disaster issues and better response needs to be organized, and contingency plans established before the disaster strikes. A national platform<sup>16</sup> of disaster risk management is suggested to shift focus from emergency management to risk reduction related to all hazards. At the national level in flow of information from central government to the rayons (districts) and communities, there is lack of overall information exchange and knowledge transfer among disaster-related agencies in non-disaster times, which is necessary as part of continuous disaster preparedness (CPESS).

#### ***Strengthen Institutional and Organizational Capacity***

- Establish a national platform in DRM;
- Review policies and procedures to clarify institutional and regulatory framework for disaster risk reduction;
- Develop a national disaster risk reduction strategy;
- Improve institutional capacities for enforcement of approved legislations and standards;
- Update flood emergencies procedures of the monitoring system of flood control system, and provide equipment for emergency responders of the Apele Moldova and CPESS agencies;

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<sup>16</sup> ISDR definition: A National Platform for DRR can be defined as a nationally owned and led forum or committee of multi-stakeholders. It serves as an advocate of DRR at different levels and provides coordination, analysis, and advice on areas of priority requiring concerted action through a coordinated and participatory process. A National Platform for DRR should be the coordination mechanism for mainstreaming DRR into development policies, planning, and programmes in line with the implementation of the HFA. It should aim to contribute to the establishment and the development of a comprehensive national DRR system, as appropriate to each country.

- Develop critical capability to coordinate analysis of hazard maps within the National Risk Assessment because some threats are linked, e.g., floods, earthquakes, and erosion enhancing the landslide risk. Develop capacity to coordinate with the UNDP's planned National Disaster Observatory's database capability and GIS platform.

### ***Mitigation and Preparedness***

Local-level risk management (LLRM): LLRM is a process that includes locations beyond the boundaries of a municipality or community. Activities developed are defined in space by similar natural and physical environment, similar hazard and risk exposure, or common experience of disasters and common concerns in recovery from the hazard. The flood hazard determines the approach used, as opposed to community-based disaster risk management (CBDRM). Local knowledge about vulnerabilities, hazards, and traditional coping capacities is needed to assess the actual disaster risk and to identify feasible interventions for prevention, mitigation, preparedness, and recovery. At the community level, information of what to do before the flood season, during, and after needs to be transferred and disseminated using various media types with information about flood effects, prevention, and protection measures undertaken at both individual or community level. Introduction of floods preparedness in local schools is critical and is a cross-cutting issue with education. Moreover, there is a need to promote regional and inter-district exchanges in flood control techniques in order to draw upon the large body of knowledge and experience of the last decade in post-disaster recovery and development to facilitate learning among key stakeholders at local level. Twenty-five communities located in high-risk areas of flooding plan to implement the LLRM.

There is also a need to quantify the accumulated damage and losses of middle-scale disasters. National statistics record the socio-economic impact of large-scale disasters and miss the impact of others. For example, the devastating drought of 2000 was not captured in the national statistics. CPSS data underestimates the extent and severity of natural hazard impact on rural communities and also the combined effects of several middle-size disasters on the population. A disaster database (e.g., UNDP DesInventar) could be a major tool to register middle-size disasters and their economic consequences.

Local-level risk management can assist communities in the following ways:

- Strengthen operational competence and update knowledge and equipment of existing local-level DRM committees;
- Implement community-based DRM planning, information management, and local risk assessment for better flood response;
- Introduce DRM advocacy and awareness materials in schools.

Land-use planning for disaster preparedness: There is an absence of land-use planning to take into account vulnerability to natural disasters. Furthermore, there is a lack of public awareness on construction of buildings for a reduced risk of flooding. The floods of 1994 were very destructive, and these negative experiences may not have been incorporated as lessons learned in risk-reduction measures. There is also limited awareness about good construction practices for flood-proof buildings from other regions and/or countries, which could be incorporated usefully into building standards in Moldova.

Land-use planning offers the following advantages for disaster preparedness:

- Integrate hazard mapping of various natural disasters including flood, landslide, erosion and earthquake;
- Identify areas and communities that are vulnerable to natural disasters and integrate the findings into spatial planning to mitigate risks of natural disasters;
- Promote capacity building and public awareness on disaster risk reduction through public consultation and sensitization (cross-cut with LLRM);
- Develop flood-proof construction guidelines based on the Moldovan context (living standards, income, etc.)

### **(III) Financing disaster losses, reconstruction and recovery, and risk transfer**

The growing frequency and severity of weather-related events is likely to translate into increased financial vulnerability for many households in South Eastern Europe (SEE) countries, including Moldova. Due to weather extremes it is already clear that households are likely to experience more frequent and potentially severe damage to housing, as well as loss of employment income due to business interruption. Given the current very low level of disaster insurance penetration in SEE countries (of the order of 1-3 percent), natural hazards are likely to take a considerable additional financial toll on the population of the region with the rural poor as the most vulnerable.<sup>17</sup>

#### ***Risk Transfer***

The insurance sector in Moldova is growing slowly when compared to Western European countries. In 2008, the 33 registered insurance companies generated gross written premiums of EUR 54.4 million,<sup>18</sup> an increase of 24.5 percent compared to 2007. Because of a low participation rate of the population in the insurance market, the public sector is the provider of ex post risk transfer that provides the financial means to the population affected by hydrometeorological hazards. Risk transfer shifts the burden of disaster damage and losses to another party, for example, the insurance companies. Risk transfer is one important element of disaster management; however, the Moldovan mechanism currently in place to transfer the risk of natural hazards is very limited. Problems are focused on the public sector's inability to finance disaster losses, and the private insurance industry—the basis of risk transfer—that does not work well for natural disasters. Most of the damage created by natural disasters rests on individuals. Physical and indirect losses resulting from earthquakes are partially compensated by the Government withdrawing from exceptional funds. The national disaster fund in the country is represented by the Moldova reserve fund and agencies' reserve funds in the amount of USD 2.3 million with an annual appropriation of budgetary replenishments in addition to accessing local disaster funding of 2 percent of local budgets.

The latest Agricultural Strategy for Moldova<sup>19</sup> envisages a special mechanism for dealing with the risks involved in the agricultural sector. This mechanism consists of a Natural Disaster Intervention Fund, which would allow for partial compensation for the loss owing to natural

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<sup>17</sup> Gurenko, Eugene N. and Wael Zakout (2008) *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. World Bank and ISDR.

<sup>18</sup> UNDP, 2009/2010 National Human Development Report, page 128.

<sup>19</sup> *Development of Agriculture and Food Sector Strategy, 2006-2015*, Government of Moldova, March 2006 (Draft), page 19.

disasters both climate induced (droughts, hail, frost, etc.) and market-driven (sudden increase in the price of gas, diesel fuel, lubricants, etc.). The insurance sector in Moldova is poorly developed, especially in rural areas, and there is a lack of insurance awareness among farmers. Moldasig is the only insurance company involved in crop insurance and then only since 2006. Financial capacity to manage major national systemic risks, such as drought, is beyond the capacity of the insurance sector in Moldova and would be dependent on international reinsurance. Such reinsurance is unlikely to be available to support a traditional individual-farmer multi-peril crop insurance programme (MPCI) and is more likely to be feasible for an index programme and for conventional crop hail insurance.<sup>20</sup>

In Moldova, there is neither risk assessment nor quantified data (e.g., frequency of heavy rain and/or hail aligned with standardized protocols) and adequate parameters to serve as the basis for reliable calculations of cost for potential insurance by different type of hazards that result in disasters.

The following measures can assist in developing a capacity for risk transfer:

- Risk zoning and risk maps as the basis for a effective risk transfer;
- Develop, as part of the national disaster risk management strategy, a risk financing framework that will help the Government think through its options for managing risks, arising out of disasters of varying probabilities and severities.

Estimates for short- and medium-term needs in DRM are outlined in Table 17.

**Table 17. Needs for Disaster Risk Management (in MDL)**

	<b>Short-term Needs (until December 31, 2010)</b>	<b>Medium-term Needs (until June 30, 2012)</b>
<b>Disaster Risk Reduction</b>		
Hydrometeorological forecasting, data sharing, and early warning	384,600	1,282,000
Coordination of disaster mitigation, preparedness, and response	3,000,000	50,000,000
Financing disaster losses, reconstruction, recovery, and risk transfer	-	1,200,000
	<b>3,384,600</b>	<b>52,482,000</b>

<sup>20</sup> Adapted from: A Hazardous Existence: Managing Natural Livelihood Threats in Rural Moldova; World Bank (2007).