

ROMANIA  
HAZARD RISK MITIGATION AND EMERGENCY PREPAREDNESS PROJECT

**GEF Project Document**

Europe and Central Asia Region  
ECSSD

<p><b>Date:</b> March 29, 2004  <b>Sector Manager:</b> Marjory-Anne Bromhead  <b>Country Director:</b> Anand K. Seth  <b>Project ID:</b> P075163  <b>Lending Instrument:</b> Specific Investment Loan (SIL)</p>	<p><b>Team Leader:</b> Christoph Pusch  <b>Sector(s):</b> Flood protection (80%), Mining and other extractive (20%)  <b>Theme(s):</b> Natural disaster management (P), Pollution management and environmental health (P), Other urban development (S), Water resource management (S), Rural services and infrastructure (S)</p>		
<p><b>Global Supplemental ID:</b> P081950  <b>Sector Manager/Director:</b> Marjory-Anne Bromhead  <b>Lending Instrument:</b> Specific Investment Loan (SIL)  <b>Focal Area:</b> I - International waters  <b>Supplement Fully Blended?</b> Yes</p>	<p><b>Team Leader:</b> Rita E. Cestti  <b>Sector(s):</b> General water, sanitation and flood protection sector (80%), Mining and other extractive (20%)  <b>Theme(s):</b> Pollution management and environmental health (P) , Water resource management (S)</p>		
<b>Project Financing Data</b>			
<p><input checked="" type="checkbox"/> <b>Loan</b>      <input type="checkbox"/> <b>Credit</b>      <input checked="" type="checkbox"/> <b>Grant</b>      <input type="checkbox"/> <b>Guarantee</b>      <input type="checkbox"/> <b>Other:</b></p> <p><b>For Loans/Credits/Others:</b>  <b>Loan Currency:</b> United States Dollar  <b>Amount (US\$m):</b> \$150.00  <b>Borrower Rationale for Choice of Loan Terms Available on File:</b> <input checked="" type="checkbox"/> <b>Yes</b>  <b>Proposed Terms (IBRD):</b> Variable-Spread Loan (VSL)  <b>Grace period (years):</b> 5                                      <b>Years to maturity:</b> 17  <b>Commitment fee:</b> 0.75%                                      <b>Front end fee (FEF) on Bank loan:</b> 1.00%  <b>Payment for FEF:</b> Borrower to Pay from Own Resources</p>			
<b>Financing Plan (US\$m):</b>			
<b>Source</b>	<b>Local</b>	<b>Foreign</b>	<b>Total</b>
BORROWER/RECIPIENT	46.41	0.25	46.66
IBRD	71.66	78.34	150.00
GLOBAL ENVIRONMENT FACILITY	2.83	4.17	7.00
<b>Total:</b>	120.90	82.76	203.66
<p><b>Co-financing for GEF Supported Activities:</b> Component D "Risk Reduction of Mining Accidents in Tisza Basin" with estimated cost of US\$15.25 million is financed by GEF, IBRD and the Borrower. Parallel program activities in support of the hazard prevention and remediation interventions are expected from the USTDA and Austrian Government.</p>			
<p><b>Borrower/Recipient:</b> GOVERNMENT OF ROMANIA  <b>Responsible agency:</b> MINISTRY OF TRANSPORT, CONSTRUCTION AND TOURISM  Address: 38 Dinicu Golescu Bvd., Sect.1, Bucharest, Romania  Contact Person: Ms. Ileana Tureanu, Secretary of State  Tel: +40-21-312-5417                                      Fax: +40-21-212-6945                                      Email:  Other Agency(ies):  Ministry of Environment and Water Management  Ministry of Administration and Interior</p>			



**P075163 Estimated Disbursements ( Bank FY/US\$m):**

<b>FY</b>	2004	2005	2006	2007	2008	2009			
<b>Annual</b>	0.53	12.33	34.56	41.78	39.83	20.97			
<b>Cumulative</b>	0.53	12.86	47.42	89.20	129.03	150.00			

**P081950 (GEF) Estimated Disbursements ( Bank FY/US\$m):**

<b>FY</b>	2004	2005	2006	2007	2008	2009			
<b>Annual</b>	0.21	3.32	2.28	0.52	0.45	0.22			
<b>Cumulative</b>	0.21	3.53	5.81	6.33	6.78	7.00			

**Project implementation period:** 2004 - 2009**Expected effectiveness date:** 07/01/2004 **Expected closing date:** 12/31/2009

## **A. Project Development Objective**

### **1. Project development objective:** (see Annex 1)

The overall objective of the project is to assist the Government of Romania in reducing the environmental, social, and economic vulnerability to natural disasters and catastrophic mining accidental spills of pollutants through: (i) strengthening the institutional and technical capacity for disaster management and emergency response through upgrading communication and information systems; (ii) implementing specific risk reduction investments for floods, landslides and earthquakes; (iii) improving the safety of selected water-retention dams; and (iv) improving on a pilot basis the management and safety of tailings dams and waste dump facilities.

### **2. Global objective:** (see Annex 1)

The project global environmental objective is to demonstrate and provide for replication for the reduction of catastrophic accidental spills of transboundary pollution loads from mine operations flowing into the Danube and Black Sea basins. In support of this objective, the project, through a proposed GEF co-financed component, will assist in piloting and replication of hazards prevention and remediation activities for improving the management and safety of tailings dams and waste dump facilities; and in catalyzing transboundary cooperation on integrated water resources management of the Tisza Basin. The successful implementation of the GEF co-financed component will serve as a model for replication for reducing mining accident risks to human and aquatic ecosystem health throughout Romania and other parts of the Tisza and Danube basins.

### **3. Key performance indicators:** (see Annex 1)

The following are expected outcomes of the activities supported by the project:

- Strengthened institutional and technical capacity for emergency management and emergency response through upgrading communication and information systems.
- Increased earthquake risk mitigation with some key, prioritized public facilities retrofitted.
- Increased level of flood protection with some high priority investments implemented.
- Improved dam safety of the selected priority structures.
- Gradual reduction in number and negative impacts of mining accidental spills of pollutants into the Tisza Basin and in the volume of toxic releases from mines.

## **B. Strategic Context**

### **1. Sector-related Country Assistance Strategy (CAS) goal supported by the project:** (see Annex 1)

**Document number:** 22180-RO **Date of latest CAS discussion:** May 22, 2001

The project supports improved national preparedness for natural disasters, one of the CAS objectives. The CAS states that the HRMEP loan would assist in Romania's efforts to mitigate the costs of damage from earthquakes, floods, toxic waste, and other natural and man-made disasters which taken together regularly plague the country. The IBRD operation, to be co-financed by a GEF grant, would support development

and implementation of an environmental monitoring and warning system, as well as priority rehabilitation investments for addressing toxic pollution from tailings dams in the Tisza River Basin.

The project is included in the CAS lending program in both low, and high case scenarios.

### **1a. Global Operational strategy/Program objective addressed by the project:**

The proposed GEF-supported component is fully consistent with the GEF's Operational Strategy in that it supports long-term protection of international waters and complies with the long-term objective of the GEF "Waterbody-Based Operational Program" (Operational Program No. 8), which is to "undertake a series of projects that involve helping groups of countries to work collaboratively with the support of implementing agencies in achieving changes in sectoral policies and activities so that trans-boundary environmental concerns degrading specific waterbodies can be resolved." The GEF-supported component is also fully consistent with two of the GEF strategic priorities on international waters, namely, catalyzing financial resource mobilization for implementation of agreed actions and reforms in Strategic Action Programs; and undertaking innovative demonstrations for reducing contaminants. In addition, the GEF-supported component is in line with the objectives of the Programmatic Approach to the Danube and Black Sea Basin, namely, that Danube and Black Sea basin countries (i) adopt and implement policy, institutional and regulatory changes to reduce point and non-point source nutrients discharges, restore nutrient sinks and prevent and remediate toxic hot spots; and (ii) gain experience in making investments in prevention and remediation of toxic "hot spots." The GEF component will: (i) enable the development of a more integrated knowledge base about transboundary impacts of mine-induced pollution in the Danube and Black Sea basin; (ii) provide capacity building to increase the opportunity for adoption of best mine waste management practices throughout the Tisza and Danube basins; (iii) pilot techniques for prevention and remediation of toxic mining hot spots; (iv) provide for lessons learned that could be replicated to other parts of the Tisza and Danube basins; (v) leverage support from the mine operators to replicate measures to manage the risks associated with tailings and waste disposal facilities; and (vi) foster transboundary cooperation.

The project also directly supports the goals of the International Convention for the Protection and Sustainable Use of the Danube River. The 1994 Danube Strategic Action Plan under the Convention on Cooperation for the Protection and Sustainable Use of the Danube River is concerned with transboundary water issues and includes provisions to protect the Black Sea and Danube Delta against pollution by nutrient and hazardous. Until recently, most of the attention on the Danube and Black Sea basins has been concentrated on reduction of nutrient loads to address the problem of eutrophication in the Black Sea. The recent mining accidents in the Tisza catchment area, however, have pointed out that additional priority should be placed to address mine-induced water pollution and mining accidents.

The 2001-2005 Joint Action Environmental Program for the Danube River Basin has identified key priorities areas including mining-induced pollution, i.e., pollution and potential accident pollution caused by waste deposit sites and mining tailing dams. The proposed GEF component will enable implementation of some of the recommendations of the Action Plan.

### **2. Main sector issues and Government strategy:**

Romania is the first country in the ECA region whose government has requested the Bank's assistance in preparation of a comprehensive hazard risk management project on an *ex-ante* basis. The usual pattern has been that the Bank is asked for the support in the aftermath of disasters. Romania can be regarded as a leader and a good example for other disaster-prone countries in the region, for adopting a strategic and pro-active approach which allows for possible reduction of vulnerability to multiple natural hazards.

The country is severely exposed to a range of natural disasters, particularly to earthquakes and floods causing economic and human losses across the country. Since 1908, 14 earthquakes of magnitude VII or greater and 8 major floods were recorded affecting almost 2 million people and causing massive economic losses. The 1977 earthquake, measuring 7.2 on the Richter scale, resulted in economic losses well in excess of US\$2 billion, while the July 1991 flood caused damages estimated at \$0.5 billion, affecting a large area of about 1,400km<sup>2</sup>, and damaged more than 12,000 buildings, 990 km of roads, 14 km of railroads, and 150 bridges. More recent floods, in 1997 and 1998, caused damages estimated at US\$310 million and US\$150 million respectively.

During the time of the highly centralized regime prior to 1989, the national government was taking full responsibility for the reconstruction work in the aftermath of disasters. The government mobilized military and other public/private resources via top-down orders to cope with the large-scale damages. All related financial consequences were carried by the state. Since then, Romania has been going through a major transition with associated re-organization of the disaster management structures. The restructuring of the institutional set-up is a part of initiatives to demilitarize and decentralize emergency management functions, motivated in part by expectations of the European Union and NATO's standards. These changes are on-going and include organizational restructuring of functions.

The organizations with a mandate to handle disaster management and response, such as the Civil Protection, Fire Brigades, and sectoral agencies, lack the necessary technical and financial capacities to respond effectively. Deficiencies in protective investments, equipment, communication systems, and limited access to up-to-date knowledge and technical schemes are just a few examples of the shortcomings which hamper emergency preparedness, mitigation and management system, and make Romania more vulnerable to consequences of natural and man-made disasters.

Vulnerability to **seismic risk** is due to Romania's geographical location on the Vrancea subduction zone, situated along the south-eastern Carpathian arc, which forms an ellipse stretching from the north east to the south west of Romanian territory, including Bucharest. Proximity to the fault and poor soils make Bucharest Europe's highest risk capital city and one of the 10 most vulnerable cities in the world. Compounding the situation is the fact that Romanian economic activities are concentrated in and around Bucharest. The vulnerability of the Romanian economy to earthquakes alone is further exemplified by the following facts:

- over 35 percent of Romanians or 65 percent of all urban population is exposed to seismic hazards from the Vrancea fault;
- 60-75 percent of fixed assets is located in seismic zones;
- 70-80 percent of GDP is produced in highly seismically prone areas;
- 45 percent of all national lifelines are in seismic areas of VII-IX intensities on the Mercalli Scale (MSK);

There have been various forecasts of future seismic activities, ranging from another earthquake within few years to forecasts anticipating catastrophic seismic activity within next few decades. Regardless of the accuracy of either estimation, it is clear from the historical record that large magnitude earthquakes occur on the Vrancea zone with considerable regularity and that a major event should be anticipated in the coming years.

The 1977 earthquake served as a catalyst for Romania to begin implementation of seismic risk reduction measures. This strategy includes the development and implementation of improved building codes and the

identification of at risk structures. The need for effective measures in this regard may be underscored by the fact that 26 percent of national housing stock was built before 1944 and is highly vulnerable to earthquakes.

The government conducted inventories of several categories of at-risk structures, i.e. privately owned buildings, schools, universities, hospitals, health care facilities, and structures of cultural or historic significance. As a result of this initial assessment, 541 residential buildings (including 341 in Bucharest), 1,100 schools, 128 university buildings, and 65 hospitals were identified as being at risk.

The Ministry of Transport, Construction and Tourism enforces building codes either through its own personnel or other experts trained and certified by the ministry. The general consensus is that the codes are effectively enforced.

**Floods** often affect Romania and there is a tendency for increased flood levels and frequency in the last decade. Between 1992-2001 there were floods every year in some parts of the country resulting in significant and human losses (123 people died due to floods in that period). The total material losses of US\$528.9 million were documented between 1997 and 2001. In 1999 losses were estimated at US\$132 million and in 2000 at US\$98.3 million. A total of 1.3 million ha and 500,000 people are at serious risk of being flooded every year. The main damage risk is presently posed by the unprotected streams and the deteriorated existing flood mitigation facilities.

The Romanian authorities have a good understanding of hazards associated with floods. Areas at risk are identified and mapped. The National Administration "Romania Waters" (Apele Romane) has a complete assessment of investment needs for the flood mitigation works to reduce the flood damage in high-risk communities. The Government has developed a comprehensive overall master plan to reduce flood and dam safety risk, implementation of which is estimated to cost about US\$1 billion over the next 10 years. Moreover, in view of the urgency of flood control works, the Government took an initiative to secure several sources of funds from the European Union and other international donors to implement critical flood defense projects. A total of over EURO 400 million have been provided to implement flood defense projects. These projects are part of the master plan to eliminate frequent flood losses in many of the North and North Western areas of the country.

The flood monitoring and forecasting systems, although well organized in regard to the structure of information flow, are technically obsolete and need to be upgraded in order to have more reliable data input for forecasting, decision support system (DSS), and for dissemination to communities. For that purpose, the Government secured international support for financing the upgrading of the existing flood monitoring and forecasting system.

Romania has 246 large and medium **dams**, and 1,260 small dams. Most of these dams were constructed in the last 50 years. The main weakness of the dam safety program in Romania is that there are still major dams that are unsafe due to either damage or uncompleted or improper construction, resulting in risk of a collapse. These dams were constructed in the 1980's when funds were scarce and many key items were not built according to the existing standards. In recognition of these risks, the Government of Romania has considerably improved the institutional and regulatory environment in the area of dam safety management, from the design, through the construction, and the operation phases. The National Commission for Dam Safety (CONSIB) was established in 1994, and at its initiation key laws defining responsibilities and procedures, standards, and norms were introduced in Romania in recent years.

Another natural hazard typical for Romania is a risk of **landslides**. In the rural environment, particularly

in mountainous areas, landslides represent a critical hazard. The total estimated area exposed to landslide hazards covers about 700,000 ha, putting at risk 50,000 households, 250,000 people, agricultural land, public and private buildings, public utility networks, and roads. The areas of the highest landslide risk are located in the South Eastern and North Eastern portions of the Carpathian Mountains. These landslides are attributed to the precipitation, slope degree, soil condition, land use and management. Realizing the magnitude of landslide hazard, the Government passed a Law 575 of October 22, 2001 (*Plan of Management of National Territory – Section V – Areas of Natural Hazard*), which provides a summary of information on landslides in Romania and identifies all communities under landslide risks. The law stipulates that all areas at serious landslide risk are set aside and should not be developed.

The Government of Romania has initiated a process of developing a financial strategy to cope with consequences of major catastrophic events, along with legal provisions for coverage of incurred liabilities. With the insurance penetration presently standing at 3-5 percent of households, \$13.9 per capita or 0.85% of GDP in 2000, most of these losses would have to be absorbed by the government (perhaps through major tax increases and borrowing), local businesses, and homeowners. Therefore, the government is considering introduction in the future of a **catastrophe insurance** program, design of which is still to be determined based on the required technical feasibility studies.

Romania also faces the risk of **water pollution from mining** accidents. The accidents at tailings dams in the Maramures region in year 2000 (e.g., Aurul mine, in January 30; and Baia Borsa mine, in March 20) have shown that there is a need for mainstreaming safety and environmental concerns into mining operations. According to available information, there are 264 small dams constructed to store mine tailings, out of which about 40 pose a severe threat to the surrounding human population and the environment. Long term environmental damages to surface waters from spill and erosion induced persistence toxins such as heavy metals are of international concern.

The Mining Sector Environmental Assessment (MSEA) conducted recently by the Government of Romania points out that the continuous release of toxic substances from mine operations is caused by the poor management, operation and maintenance of tailings dams facilities (TDFs), including inadequate monitoring and operational control of the water management systems and the retaining dam structures. Field surveys have also revealed that a large amount of the contaminated water is actually seeping through the dam body or escaping from dilapidated pipes. In addition, awareness of these problems is insufficient.

The Government of Romania is aware of the poor situation of the tailings dams facilities of closed and active mines, and is trying to address the problem. At present, state owned companies receive some funds from the State Budget to deal with TDF's problems. The Mine Sector Strategy prepared recently by the Government also recognizes the importance of addressing TDFs and calls for more financial support to this area.

As a candidate for membership in the European Union (EU), Romania is committed to adopt and implement the EU environmental directives, including the EU Water Framework Directive (WFD). The EU WFD introduces the concept of integrated management of river basins. It calls for the elaboration and implementation of river basin management plans for achieving "good water (quantity and quality) status," which shall address among other issues, point-source pollution reduction (including those of mining activities), prevention and mitigation of threats from land-based sources of pollution, chronic and accidental pollution, flood control and management, and conservation of aquatic ecosystems. At the national level, efforts are under way to amend the national legislation and harmonize it with EU directives and to prepare a management plan for the Upper Tisza Basin. At the regional level, the countries in the Tisza basin, namely Ukraine, Slovakia, Romania, Hungary, and Serbia and Montenegro have started a



dialogue on basin-wide management under the EC Tisza River Basin Project and the UNECE River Basin Sustainable Development Program. Concrete mechanisms are being identified to engage riparian countries in the development of integrated water and environment management strategies.

### **3. Sector issues to be addressed by the project and strategic choices:**

The project intends to assist the Government of Romania in reducing country's social and economic vulnerability sense through a set of **comprehensive and high priority measures** addressing a number of critical hazards characteristic for Romania. An alternative to this approach is sectoral fragmentation which would require separate projects for each type of hazard. It has been determined, based on the experience from other countries, that tackling each category of hazard in isolation from other risks is by far less efficient and effective. The project supports a comprehensive risk management approach and promotes close coordination between the responsible authorities. Such approach will help to avoid overlapping of efforts and will contribute to a cost efficient implementation of high priority measures.

The design of the project is put in a context of a **framework program**, i.e. individual components will support activities complementary to the ongoing and planned government initiatives and assistance of other donors. It is particularly well exemplified by the measures proposed under the Earthquake (component B), Flood (component C), and Mining Accident (Component D) Risk Reduction components where the proposed activities are based on the existing analyses and studies completed by the Romanian agencies, and ongoing or planned assistance from other donors, such as: European Union (Phare Program, European Investment Bank, European Bank for Reconstruction and Development), the United States (US Trade and Development Agency, US Agency for International Development, ExIm Bank), Austria, Japan (Japanese International Cooperation Agency), Germany (German Research Foundation). For instance, there is an ongoing project supported by JICA, providing Romania with know-how of modern construction and retrofitting standards. Similarly, the proposed project has been developed in close coordination with a project supported by the Austrian Government to undertake rehabilitation measures at the Novat tailings ponds in Baia Borsa. The project builds upon this cooperation by application of the up-to-date strengthening methods in the selected structures. Similarly, in case of flood protection, forecasting and dissemination, the EU programs and loans finance a number of flood defense schemes and flood forecasting for Tisza basin, while the US TDA and ExIm Bank are providing support for the country-wide forecasting system.

The project will not finance retrofitting of privately owned apartment buildings. According to the Ministry of Transport, Construction and Tourism, out of 3,400 residential buildings that were assessed, 578 were ranked in class 1 of seismic vulnerability. Efforts to strengthen privately owned buildings are controversial. Based on expert opinion, the anticipated cost of repairing the identified buildings ranges between 60-70% of the replacement cost. A retrofitting program with such high cost would not be advisable from an economic point of view, and would provide a false incentive to private owners to transfer the cost associated with the earthquake risk to public funds. Furthermore, a retrofitting program of private residential buildings seems, at this stage, not to be socially accepted. Initial reactions to Government sponsored programs indicated that inhabitants are reluctant to vacate their properties during the retrofitting activities.

The project will concentrate on the efforts with high public benefit and priority through strengthening of selected **critical public facilities** which have a paramount role in the emergency response and preparedness system, such as: hospitals, universities and other government buildings. The earthquake risk reduction activities to be supported by the project are designed to build upon the reviews conducted by the

government. The project will support investments in structural and nonstructural mitigation measures for prioritized structures based upon the results of functional, technical and economic cost/benefit assessment of these facilities.

The structural changes underway in Romanian emergency management lead to the conclusion that there is at this point, no need for an institutional overhaul nor creation of new institutions to manage emergency response. The current emergency management organization is a result of restructuring designed to demilitarize the response system to disasters. The Civil Protection and Fire Corps which are the nation's two principal emergency management agencies, were moved in 2000 from the military department to the Ministry of Interior, then from 2002 to the Ministry of Public Administration, and as of June 2003, the Ministry of Public Administration was merged with the Ministry of Interior. Consequently, the Fire Corps and the Civil Protection Units have been subordinated to the new Ministry of Administration and Interior (MAI).

Romania has a system of ministerial Commissions for Defense Against Disasters, headed by the Central Commission at the Prime Ministry level. The system of commissions is essentially replicated at county and local levels. The project intends to strengthen the **institutional capacity** of existing entities by modernization of communication systems and information technology, enhancement of planning, and provision of training.

The project intends to develop and to institutionalize a consistent risk management approach to identify cost-effective risk reduction measures for tailings dams and waste dump facilities, so available resources can be channeled to those measures with the highest benefits.

Romania's high exposure to natural disasters, the seismic vulnerability of its housing stock and infrastructure, and the expected high economic losses from catastrophic events call for a national **catastrophe insurance mechanism** which would help to reduce the government contingent liability due to natural disasters by transferring highly concentrated catastrophe risk to the international reinsurance and capital markets. Introduction of such a catastrophe insurance program, however, must be preceded by necessary technical feasibility work to prepare Romania for launching the program. The project will support the studies based on which the Government will be able to make a sound policy judgment regarding the optimal legal and institutional design characteristics of the future insurance program.

## C. Project Description Summary

### 1. Project components (see Annex 2 for a detailed description and Annex 3 for a detailed cost breakdown):

Component	Indicative Costs (US\$M)	% of Total	Bank financing (US\$M)	% of Bank financing	GEF financing (US\$M)	% of GEF financing
Component A: Strengthening of Emergency Management and Risk Financing Capacity	10.90	5.3	8.18	5.5	0.00	0.0
Component B: Earthquake Risk Reduction	71.20	34.7	55.01	36.7	0.00	0.0
Component C: Flood and Landslide Risk Reduction	101.09	49.3	78.18	52.1	0.00	0.0
Component D: Risk Reduction of Mining Accidents in Tisza Basin	15.25	7.4	5.48	3.7	6.24	89.1
Component E: Project Management	5.21	2.5	3.15	2.1	0.76	10.9

<b>Total Project Costs</b>	203.65	99.3	150.00	100.0	7.00	100.0
<b>Front-end fee</b>	1.50	0.7	0.00	0.0	0.00	0.0
<b>Total Financing Required</b>	205.15	100.0	150.00	100.0	7.00	100.0

The project consists of the following components and activities:

**Component A: Strengthening of Emergency Management and Risk Financing Capacity (\$10.90 million)**

The objective of component A is to enhance the capacity of the Romanian authorities to better prepare for, respond to and recover from natural or man-made disasters, through modernization of information technology and communications systems, activities which would increase the planning and training efforts of all levels of government, public awareness and preparedness, and complete technical feasibility work and institutional framework for launching of the Romanian Catastrophe Insurance Program.

*Component Summary:*

- *Upgrading emergency communications at the national, regional and local level (\$3.73 million)*
- *Development of emergency management information system (\$4.20 million)*
- *Development of a Vrancea earthquake scenario (\$0.78 million)*
- *Public awareness program (\$0.41 million)*
- *Preparation of Catastrophe Insurance Program (\$1.80 million)*

**Component B: Earthquake Risk Reduction (\$71.20 million)**

The objective of component B is to assist the Government in reducing the seismic vulnerability of priority technical and social infrastructure through the retrofitting of key structures and institutional strengthening.

*Component summary:*

- *Strengthening of high priority public facilities (\$64.42 million)*
- *Design and supervision (\$5.74 million)*
- *Energy sector risk assessment (US\$ 0.41 million)*
- *Building code review (\$0.25 million)*
- *Professional training in cost-effective retrofitting methods (\$0.38 million)*

**Component C: Flood and Landslide Risk Reduction (\$101.09 million)**

The objective of component C is to reduce flood risk and vulnerability in critical areas in Romania, to improve safety of large and small dams so that these structures can function as designed, and to map and model the risk of landslides in Romania in order to reduce losses and provide for better land use planning tools.

*Component summary:*

- *Flood protection infrastructure (\$28.94 million)*
- *Danube River bank protection (\$6.81 million)*
- *Large dams safety (\$49.43 million)*

- *Small dams safety (\$15.22 million)*
- *Landslide pilot area studies and monitoring manuals (US\$0.69 million)*

#### **Component D: Risk Reduction of Mining Accidents in Tisza Basin (\$15.25 million)**

The development objective of this component is to reduce the risk of water and soil contamination and loss of human and aquatic life from catastrophic mining accidental spills of pollutants. The global environmental objective is to demonstrate and provide for replication for the reduction of catastrophic accidental spills of transboundary pollution loads from mine operations flowing into the Danube and Black Sea basins. In support of the above-mentioned development and global objectives, the project will assist in the implementation of mitigation and hazard prevention activities. Two high-risk and high-priority sites, Rosia Poieni and Baia Borsa mines, have been identified for hazard prevention interventions during the initial phase of the project. These sites require emergency action. Additional sites for intervention will be identified during project implementation. A key indicator of this component's success is the gradual reduction in number and the negative impacts of mining accidental spills of pollutants into the Tisza Basin and in the volume of toxic releases from mines downstream. The successful implementation of this component will serve as a model for replication for reducing mining accident risks to human and aquatic ecosystem health throughout Romania and other parts of the Tisza and Danube basins.

##### *Component summary:*

- *Establishment of a baseline and an environmental monitoring system (\$0.87 million)*
- *Hazard prevention and remediation interventions (\$12.58 million)*
- *Engineering and environmental guidelines for tailings and waste facilities (\$0.22 million)*
- *Regional mine spill disaster response system (\$1.21 million)*
- *Promoting transboundary cooperation on integrated water resources management for the Tisza Basin (\$0.37million)*

#### **Component E: Project Management (\$5.21 million)**

The component E will finance the costs of creation and maintenance of the Project Management Units to be established in the respective ministries responsible for the related components (see section C.4).

### **2. Key policy and institutional reforms supported by the project:**

The project will support the ongoing structural changes in emergency management in Romania - especially the creation of effective linkages and coordination between the key institutions involved in disaster management functions, both at the central and local levels. The project will contribute to this goal through enhancing the technical, as well as institutional capacity of the Government to be better prepared for natural and man-made disasters, through among others, provision of training programs to the representatives of various functions that will be involved in responding to emergencies. The training will focus on common procedures at each level of the government, including mutual aid agreements, standard methods for gathering, analyzing and communication information, and procedures for requesting, receiving and managing resources. The project will support modernization of communication and information systems to enhance the ability of various operational agencies to communicate during emergencies, and to collect, analyze, and share real-time data at the national, regional and local levels.

The GEF-funded component will support the Government to address environmental problems in the mining sector; will further advance already initiated institutional dialog on basin-wide cooperation between

Romanian organizations and those of other riparian countries; and will facilitate the development of a regional policy of cooperation in the management of tailings and waste facilities in the Tisza and Danube basins. This will strengthen recent and ongoing basin-wide initiatives directed towards integrated water resources management, e.g., ICPDR, UNDP/GEF Regional Danube Project, EC Tisza River Basin Project, UNECE Tisza River Basin Sustainable Development Project.

Other institutional changes intended to be facilitated by the project relate to the initial preparatory work for creation of the future national catastrophe insurance pool. The project will support, among others, the development of a specialized catastrophe insurance model for Romania that would be based on the country specific analysis of hazards, and vulnerabilities of assets at risk, development of institutional and legal framework for the program, as well as preparation of operational guidelines for the pool. The future creation of the catastrophe insurance program managed by a specialized structure could assist the thinly capitalized domestic insurance industry to better handle the accumulations of catastrophe risk, and will provide a needed impetus for the development of the domestic insurance market.

### **3. Benefits and target population:**

Significant public benefits deriving from the project include: a) strengthened government capacity to respond rapidly in the face of disaster; b) increased earthquake preparedness with critical public facilities retrofitted; c) reduction of risk for water pollution from mining operations; d) improved dam safety of the selected priority structures; e) developed policy and technical foundations for creation of the national insurance plan which would shift the financial burden of reconstruction from individual families and the government to international re-insurers, capital markets, and the future insurance pool. Once effective risk management measures are in place, economic and human losses will be reduced.

The project will particularly benefit the following groups of Romanian population through reducing the chances of significant loss of life and property through natural disasters: a) those living along the seismic Vrancea subduction zone, notably Bucharest's 2 million inhabitants, through increased earthquake preparedness; b) people living in communities vulnerable to the risk of floods and landslides through upgraded flood protection infrastructure and better mapping of the landslide risk areas; c) people living in the areas adjacent to unsafe large and small dams; and d) people living in proximity to operating and closed mines, particularly in Tisza basin, through reduced risk of mining accidental spills.

The Risk Reduction of Mining Accidental Spills in the Tisza Basin (component D) will also provide transboundary benefits that will include: an integrated knowledge base about transboundary impacts of mine-induced pollution in the Danube and Black Sea basins; improved understanding of mining accidental spills impacts; accelerated risk reduction of degradation of the Black Sea and Danube River through identification and implementation of a risk-based and effective remediation and prevention program for tailings dams and waste dumps facilities in the Tisza Basin; establishment of a model for replication for reducing mining accident risks to human and aquatic ecosystem health through other parts of the Tisza and Danube basins; and accelerated adoption of best tailings facilities and mine waste management practices throughout the Tisza and Danube basins.

Future implementation of the insurance program designed under the project will ensure that less advantaged groups of the Romanian population have access to a reliable catastrophe insurance mechanism. The possible creation of the insurance pool will also bring added benefits to the local insurance industry by establishing of best practices in underwriting property risks.

#### **4. Institutional and implementation arrangements:**

**Duration of the Project.** The implementation of the project is scheduled for 5.5 years, starting in mid-2004 and ending in 2009.

**Institutional Arrangements.** The project will not create new institutions but will support the existing government entities either by setting up Project Management Units (PMU) within their structures or support implementation teams within their agencies. Each involved ministry will be responsible for implementation of one project component. This implementing entities will have a full responsibility for all technical aspects of the implementation, monitoring, financial management, as well as procurement. The PMU located in the MTCT will be responsible for overall coordination and reporting including consolidation of implementation progress reports and financial management reports for the whole project.

The project components will be implemented by the following executing agencies:

- Ministry of Administration and Interior (MAI), for Component A
- Ministry of Transport, Constructions and Tourism (MTCT) for Component B
- Ministry of Environment and Water Management (MEWM) for Component C, and
- National Agency for Mineral Resources (NAMR) for Component D

Component A (Strengthening of Emergency Management and Risk Financing Capacity) will be implemented by a Project Management Unit (PMU) established within MAI structure, and staffed with professional personnel, in charge of full implementation of the component, and reporting to the Minister, or other official delegated by the Minister. The PMU will be located on the premises of the MAI or leased office space, as appropriate and available. The staff will include director, financial and procurement specialists, technical specialists in emergency management information systems and emergency management, and administrative staff.

Component B (Earthquake Risk Reduction) will be implemented by the PMU established in MTCT and reporting to the assigned State Secretary. The PMU will be in charge of full implementation of the component and will be staffed with director, financial, procurement and administrative staff, as well as specialists in structural engineering, monitoring and evaluation, and environmental protection. The MTCT will be vested with a temporary ownership of buildings to be seismically retrofitted which are owned by about thirty separate public legal entities.

Component C (Flood and Landslide Risk Reduction) will be implemented by the MEWM through its existing agency, the National Administration “Romanian Waters” (“Apele Romane”). Although the activities considered under sub-component C.2 and C.5 are currently under the authority of the MAFRD, it was agreed between the two ministries that the respective activities will be carried out by the MEWM on behalf of MAFRD and the resulting works subsequently transferred back to MAFRD.

“Apele Romane” will be responsible for implementation of component C through its staff (existing or newly recruited). Project implementation agreement between MEWM and “Apele Romane” will be signed before project effectiveness and will include clear provisions on rights and obligations of each party. MEWM, through its Department of Water Management will retain the overall responsibility of project implementation and reporting on the status of respective project sub-components. Designated technical and financial specialists of MEWM, together with a procurement specialist recruited for the first two years of implementation will form a small project monitoring team (PMT) for overview of project implementation and reporting. All MEWM and “Apele Romane” staff involved in project implementation (except for the

procurement specialist) will be financed from the budgets of these institutions. The procurement specialist will be possibly financed from the loan proceeds, upon decision of MEWM.

Component D (Risk Reduction of Mining Accidents in Tisza Basin) will be implemented by the NAMR through an existing PMU, currently in charge of implementation of a component of the Bank-financed FY99 Mine Closure and Social Mitigation Project (MCSMP). The current staff of the PMU (i.e., Project Director, Procurement Expert and Financial Manager) will be supplemented by an Accountant, Communication, Technical and Environmental specialists, as well as support staff. The PMU will also hire experts on-demand. The PMU will report directly to the President of NAMR. Through June 2005, the PMU will continue to implement activities under the MCSMP in parallel with the GEF-component under HRMEP project.

*Project Steering Committee.* A project Steering Committee consisting of Ministry of Administration and Interior (MAI), Ministry of Environment and Water Management (MEWM), Ministry of Transport, Construction and Tourism (MTCT), and National Agency for Mineral Resources (NAMR), and Ministry of Agriculture, Forestry and Rural Development (MAFRD) will be established to oversee the implementation of the project, to ensure efficient cooperation between the implementation agencies, and to resolve critical issues that may arise during implementation. The ministries will be represented by the assigned Secretaries of State. The committee will be chaired by MTCT.

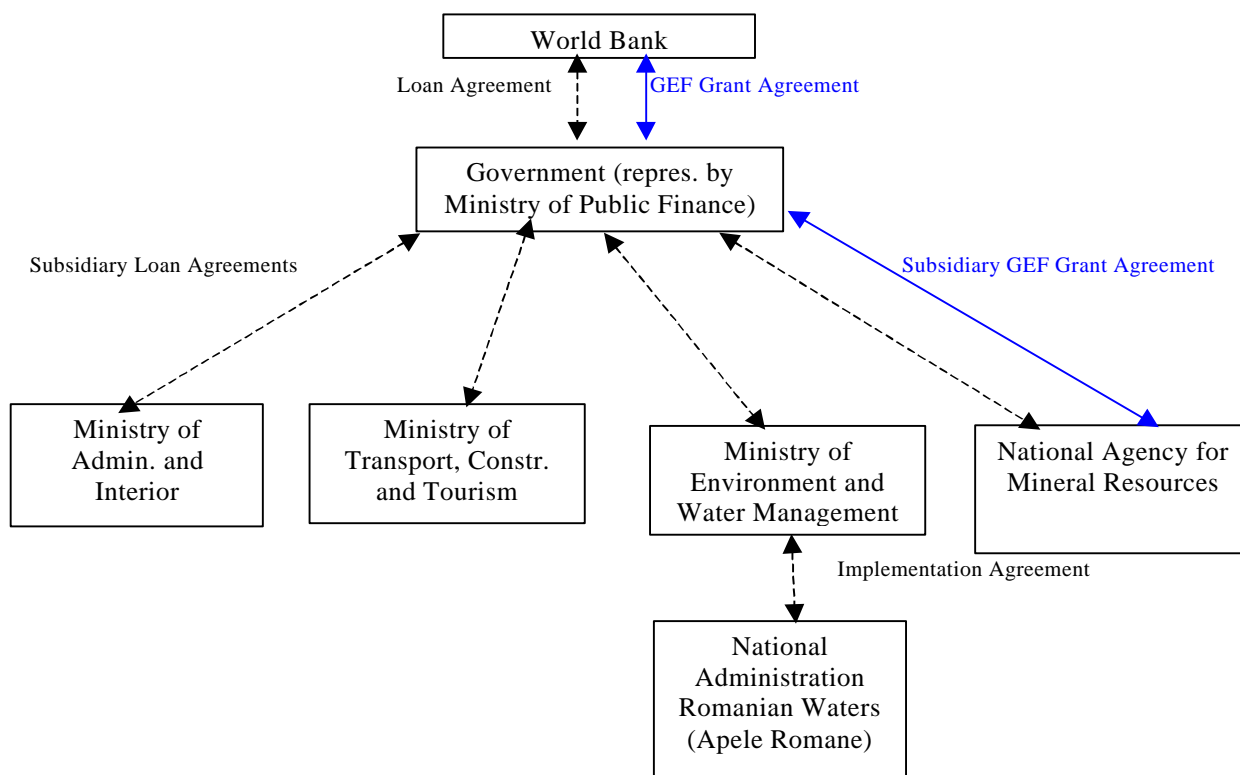
### **Financial Management**

The PMU established in the MTCT will coordinate the project's overall financial management arrangements, develop the project's financial procedures manual, produce the project's financial monitoring reports, organize the project's audit, and provide ad hoc advice to the other implementing entities as required.

A Loan Agreement will be signed by the World Bank (IBRD) and the Government of Romania represented by the Ministry of Public Finance (MPF). The MPF will also have subsidiary loan agreements with the MAI, MTCT, MEWM and NAMR. MEWM will then sign a subsidiary loan agreement (implementation agreement) with Apele Romane (National Administration Romanian Waters). In respect to component D, the GEF Grant Agreement will be signed by the World Bank on behalf of the GEF, and the Government of Romania represented by the MPF, who will also have a subsidiary grant agreement with the NAMR.

The diagram below shows the necessary legal agreements for the implementation arrangements:





### Strengths and Weaknesses

The strengths that provide a basis for reliance on the project's financial management systems include: experience of already-identified accounting staff at the implementing entities; and the tried and tested financial management systems of these institutions.

The weakness of the project financial management system and the way in which they will be addressed are presented in the table below.

<i>Significant Weaknesses</i>	<i>Mitigation Measure</i>
Lack of experience in implementing Bank-financed projects in some of the entities	Workshop to explain the project's financial management requirements and disbursement procedures
Lack of clarity regarding the project's financial management requirements and disbursement procedures	The development of a project accounting procedures manual and the conclusion of project implementation agreements
No formally appointed project financial management staff at the PMUs in the MAI, MTCT and MEWM	Formal appointment and hiring of project financial management staff at the PMUs in the MAI, MTCT and MEWM
No project-specific accounting ledgers have been established at the implementing entities	Establish project-specific accounting ledgers at all implementing entities



## D. Project Rationale

### 1. Project alternatives considered and reasons for rejection:

An alternative approach to the multi-hazard mitigation project was to design an operation focusing on a one type of natural hazard. This option has been rejected due to the fact that Romania is exposed to a range of natural hazards occurring with a certain regularity. While some, like earthquakes are less frequent than the others, e.g., floods, in a long run they both cause significant economic, and human losses. Also, the man-made disasters, such as more recent accidents causing toxic spills, highlighted the urgent need for mainstreaming environmental concerns and emergency mitigation, and preparedness. Therefore, instead of choosing between specific hazards, the government decided to take the comprehensive and multi-hazard approach. Also, a common platform for all types of emergencies is the need for effective emergency management, which the project strives to strengthen through a number of measures it will support.

Development of separate operations based on the type of disaster was determined as inefficient as it can lead to overlapping activities and lack of coordination. As explained in section B.3, the Bank team took a comprehensive framework approach based on the experience gained in other similar operations through providing complementary activities to the assistance being offered by other donors. The Romanian government fully endorses this comprehensive approach which ensures coordination among various programs.

The alternative of having one or a number of operations focusing on a type of disaster was also rejected based on the international practice which indicates that coordinated disaster management brings better results than the uni-sectoral approach.

### 2. Major related projects financed by the Bank and/or other development agencies (completed, ongoing and planned).

Sector Issue	Project	Latest Supervision (PSR) Ratings (Bank-financed projects only)	
		Implementation Progress (IP)	Development Objective (DO)
<b>Bank-financed</b>			
Environmental Liabilities	Romania - Programmatic Adjustment Loan (PAL)		
Mine Closure in Socially and Environmentally Sustainable Manner	Romania - Mine Closure and Social Mitigation Project	S	S
Educational Infrastructure	Romania - School Rehabilitation Project	HS	HS
Health Sector Infrastructure	Romania - Health Sector Rehabilitation Project	S	S
Post-disaster Recovery, Risk Mitigation, and Management	Turkey - Marmara Earthquake Emergency Reconstruction Project	S	S
Post-disaster Recovery, Risk Mitigation, and Management	Turkey - Emergency Flood and Earthquake Recovery Project	S	S
Post-disaster Recovery, Risk Mitigation, and Management	Algeria - Ain Temouchent Emergency Earthquake Recovery Project	S	S

Post-disaster Recovery, Risk Mitigation, and Management	Poland - Flood Project	S	S
Post-earthquake reconstruction	Romania - Post Earthquake Construction Project		
Post-flood reconstruction and recovery	Romania - Flood Recovery Project		
<b>Other development agencies</b>			
UNDP	UNDP/GEF Danube Regional Project		
UNDP	Environment Emergency Rehabilitation Coordination Project and Emergency Preparedness Project		
UNDP	Mining "Hot Spots" project		
UNDP	Emergency Assistance		
EU	PHARE Cross Border Cooperation Romania - Hungary		
EU	PHARE Cross Border Cooperation Romania - Bulgaria		
EU	PHARE Catch-up Facility		
EU	ISPA (Instrument for Structural Policies for Pre-Accession)		
EU	LIFE Nature and Environment		
USAID	Destructive Water Abatement and Control Project		
UNEP	Risk Assessment, Environmental Impact Assessment for Accidental Spills		
ICPDR (International Commission for the Protection of the Danube)	Identification of Pollution Sources		
Italian Government (Ministry of Environment) jointly with WHO	Rapid Environmental and Health Impact Assessment for Tisza		
Europe Center for Environment and Health			
WWF (World Wide Fund)	Spill impact Assessment		

IP/DO Ratings: HS (Highly Satisfactory), S (Satisfactory), U (Unsatisfactory), HU (Highly Unsatisfactory)

### **3. Lessons learned and reflected in the project design:**

The Bank's previous experience with post-disaster assistance to a number of countries worldwide has shown the need for a more pro-active approach, and the importance of mitigation activities, intended to reduce the impact of future disasters and to decrease a burden on state budget usually resulting from such event. The project introduces the hazard risk management instruments as main project activities. Bank operations in the past were mostly designed as a response to disasters, with a main objective to contribute to reconstruction and recovery efforts. E.g., the Bank had three post-disaster operations in Romania following floods in 1975 and earthquake in 1977. Two complementary flood recovery projects financed procurement of industrial assets (mostly equipment and spare parts) damaged by the floods, provided support to affected farms, and small portion of the loan financed installation of flood warning system (\$2.8 million). The Post-Eartquake Construction project financed imports of special machinery and spare parts for the construction industry.

The World Bank is promoting a proactive and strategic approach for managing natural hazards in the ECA region. It is premised on the fact that disaster prone countries should not be caught by surprise. Disasters happen, and technological, social, organizational and financial remedies exist. Targeted assistance should be provided in high risk areas before a disaster occurs. The institutional, technical, and financial capacity for risk mitigation and emergency preparedness should be upgraded gradually. In addition, hazard risk management needs to be mainstreamed into the national, regional, and local economic development process.

The underlying principle of the strategic framework is that both loss of life and economic impact of disasters can be reduced by advance planning and investment, that it is cost effective to do so, and that this is a government responsibility.

The HRMEP fully applies this approach by concentrating its support around the conceptual framework for hazard risk management in ECA, which is based on the following five main pillars:

- Risk Assessment
- Emergency Preparedness
- Investments in Risk Mitigation
- Institutional Capacity Building
- Catastrophic Risk Financing

Implementation of other disaster-related projects proves that the design should be to the extend possible decentralized and take into account local implementation capacity. The proposed project implementation structure relies on existing structures and takes into account Romania's capacity as demonstrated in other Bank projects. The capacity of the Romanian institutions was also demonstrated during the project preparation as the government developed the project contents and documentation with its own human and material sources.

### **4. Indications of borrower and recipient commitment and ownership:**

The Government of Romania has a very strong commitment to the project's objectives. The risks are widely recognized by both the scientific community, and the authorities. Notable is the amount of work completed by a number institutions in conceptualizing emergency management issues, and the level of scientific and technical knowledge available in Romania.

The commitment of the government to the project is particularly well exemplified by the process of prioritization and selection of investments to be supported from the loan. The involved ministries worked

together in collecting and analyzing the existing data, preparing the necessary reports, and meeting at series of workshops to discuss the presented proposals. Moreover, the governmental institutions invested their own limited resources in preparation of feasibility studies, designs, and other documents, such as environmental management plans, social assessment, etc. to prepare the project.

There have been many valuable efforts to enhance institutional capacity of the Government, academia and private sector in the field. The governmental organizations have made substantial steps in setting up an institutional framework for coping with disasters by creating central, sectoral, and local level commissions with a mandate to coordinate response to the emergencies.

Current Romanian building codes are based on lessons learned from major earthquakes, especially the 1977 event. Enforcement of these codes seems to be efficient and does not pose a problem that would have to be immediately addressed. The existing stock of public and private-owned buildings in Bucharest has been evaluated and the government allocated funds for a loan program to support retrofitting of 123 privately owned apartment buildings in Bucharest.

Authorities at both central and local levels demonstrate remarkable initiative when seeking international assistance, e.g., from the European Investment Bank (EIB), US ExIm Bank, US Trade and Development Agency (TDA), UNDP, EU PHARE, Japan International Cooperation Agency (JICA), Austrian Government and the German Research Foundation. Romania has also entered into several cooperative agreements with countries in the region, including Moldova, Bulgaria, Hungary, and Serbia and Montenegro resulting in programs for exchange of information, and mutual assistance in the area of disaster response and mitigation.

Lastly, the project was prepared with full participation and endorsement of the government, in terms of the conceptual framework, activities to be supported, implementation structure, cost estimates and allocations, as well as the project time table.

## **5. Value added of Bank and Global support in this project:**

Lack of financial resources in Romania do not allow for implementation of necessary activities. The Bank's expertise and financial assistance can leverage already undertaken as well as newly proposed initiatives, and serve as a stimulating factor for other resources from international financial institutions and bilateral donors.

The Bank accumulated significant experience in designing disaster management projects with a strong focus put on disaster mitigation and emergency preparedness. The HRMEP team had previously delivered comprehensive disaster-related projects, such as: Poland Flood Project (1997), Turkey Flood and Earthquake Recovery Project (1998), Turkey Marmara Earthquake Emergency Reconstruction Project (1999), and the Algeria Ain Temouchent Earthquake Emergency Recovery Project (2000). The proposed project also draws from the worldwide experience of internationally recognized experts in this area.

There are many related projects, either completed or currently under way, of other donors and the Bank can have a leading role by taking a more holistic approach and consolidating risk mitigation and emergency preparedness efforts. The Bank is in a unique position among donors to retain an overall view and has the ability to focus on policy, institutional capacity building, and the economic and social aspects of disaster management measures.

In relation to the Risk Reduction of Mining Accidents in the Tisza Basin (component D), the Bank has

assisted the Government of Romania formulate a Mining Sector Strategy, including the conduction of an Environmental Assessment of the Mining, which highlights the safety of tailings facilities as one of the highest environmental priorities for Romania. The main issue to address the safety of tailings facilities involves financing. The proposed GEF-supported component would develop a comprehensive and cost-effective approach to reduce the risk of tailings facilities so as to ensure limited financial resources are used in the most efficient manner. The Bank is in a unique position to help the Government of Romania synthesize experiences and lessons learned from this project, which could then be replicated in the proposed FY05 Second Mine Closure and Social Mitigation Project, and assist the Government in implementation of the new Mining Sector Strategy.

In addition, the Bank/GEF has built experience over the past decade involving numerous water-related projects in the Black Sea and Danube River basin. The Bank/GEF can facilitate the sharing of experience and lessons learned basin-wide in the formulation and implementation of programs for improving the management and safety of tailings facilities.

## **E. Summary Project Analysis** (Detailed assessments are in the project file, see Annex 8)

### **1. Economic (see Annex 4):**

- Cost benefit      NPV=US\$ million; ERR = % (see Annex 4)
- Cost effectiveness
- Incremental Cost
- Other (specify)

The project emphasis on risk mitigation and preparedness is based on the experience of other countries and associated research which demonstrates that the losses from catastrophic events can be substantially reduced when mitigation techniques and technologies are applied. Evaluating natural hazard mitigation is a complex and difficult undertaking which is influenced by several variables. First, natural disasters affect all segments of the communities they strike, including individuals, businesses, and public services as fire brigades, police, utilities, and schools. Second, while some of the direct and indirect costs of disaster damage are measurable, some of the costs are nonfinancial and difficult to quantify in monetary terms (e.g., human losses, social and psychological effects). Third, many of the impacts of such events produce "ripple effects" throughout the community, thus increasing variables to be considered. Generally, the benefits from the mitigation investments are the savings in losses that would otherwise have occurred, while costs to be considered in economic analysis are simply costs of mitigation investments.

Because of inherent difficulties in empirically measuring all the disaster impacts, the project uses a set of methods to evaluate net benefit or loss associated with the proposed measures. I.e., evaluation of flood risk reduction activities was performed by analyzing probabilistic estimates of flood damages with and without the project and calculating the IRR for the mitigation investments, as well as Benefit/Cost ratios. The initial analysis indicates that the average IRR for flood defense and dams safety projects is 26%, while the average B/C ratio is 2.2 (see Annex 4). In this context, it should be mentioned that in the course of the project preparation, a focused training was provided to the Romanian specialists on the economic analysis of the flood protection investments. The training was supported by the Bank-Netherlands Water Partnership Program.

The prioritization of facilities to be strengthened under the Earthquake Risk Reduction (component B), within each of the categories was agreed collaboratively: each ministry, being a legal owner of the facilities

proposed for seismic retrofitting, was requested to participate with key staff, including sector experts (e.g. education, hospitals, etc.), emergency response experts, economists and structural (earthquake) engineers. The criteria for the ranking of facilities was based on the following considerations: *Functional*—criticality to response and recovery operations; *Social*—life-safety and higher risk for the population; *Economic*—cost effectiveness or cost-benefit analysis; *Technical*—feasibility and appropriateness of the retrofit measures. At the implementation stage, the determination on the most cost-effective methods of retrofitting will be made on an individual basis.

Component A (Strengthening and Upgrading the Emergency Response Capacity) has to be analyzed based on the cost-effectiveness method. The improvement of response capacity has at its core a range of tangible outcomes, including avoided loss of life, property and livelihood. The realization of these benefits, however, is contingent on the situations in which response capacity comes into play, and it is not possible to identify comprehensively all the scenarios that might arise with and without the project. Moreover, the investments, such as the disaster management information system will be designed in such a way that can support the day-to-day operations of the relevant institutions. Therefore, applying a cost-efficiency approach to evaluating choices for improving the provision of emergency services and information is a reasonable choice.

An **incremental cost analysis** was undertaken for the component D (Risk Reduction of Mining Accidents in Tisza Basin) to be financed by the GEF grant, and is presented in Annex 11. The analysis estimates that the difference in cost between the Baseline Scenario and the proposed GEF Alternative is US\$18.53 million. Of this amount, it is expected that US\$3.84 million would be contribution from the Government of Romania, US\$5.64 million from IBRD loan, US\$0.26 million from the Austrian Government, US\$1.01 million from USTDA and US\$0.44 from NAMR and mine operators. An incremental cost of US\$7.35 million will be incurred to achieve global benefits through the improved management and safety of tailings facilities.

## **2. Financial (see Annex 4 and Annex 5):**

NPV=US\$ million; FRR = % (see Annex 4)

### **Fiscal Impact:**

The investments in mitigation and emergency preparedness measures will have positive long-term effects on the central and local budgets by reducing losses and damage to public and private assets occurring as result of the catastrophic events and will decrease budgetary expenditure, which often are not fully accounted for in the budget planning process and have to be accommodated from other categories in an *ad hoc* manner. The project will contribute to fiscal savings by reducing the costs of reacting to disasters when they do occur.

The committed Government contribution to the project is on average 23% which will mainly cover the applicable taxes. This contribution in many cases, depending on the type of the intervention, will be shared between the central and local governments. The demands upon the Borrower's fiscal resources will vary over the years of project implementation, as indicated in Annex 5.

## **3. Technical:**

The project will support modern technology and equipment in such areas as: emergency response; communications and information management systems networks; retrofitting; flood mitigation works; dam rehabilitation; water pollution monitoring; and innovative prevention and remediation measures for mining tailings and waste dams.

The Earthquake Risk Reduction component will assist the Romanian engineering community in application of the modern performance-based structural designs for seismic retrofitting to satisfy defined design criteria for earthquake loads, which will meet or exceed the current requirements of the Building Code of Romania. In general, it was observed that throughout Romania recent structural retrofitting work applies conventional methods conservatively, resulting often in over-design, in unnecessarily high material consumption and with sometimes inappropriate architectural impacts. Through the project, the Government wishes to introduce newer structural retrofit methods that are in use in other parts of the world. The project therefore, includes an assessment of each facility to determine the most cost-effective method of retrofitting, considering state-of-the-art methods such as base isolation, ductile vs. shear-wall designs, etc. In addition, component B will provide a training and accreditation program that is aimed to improve the capacity of the design community and their clients to better understand and apply the concepts of risk management and cost-benefit analysis in their designs.

In the area of flood risk mitigation, the Romanian institutions and experts have remarkable knowledge and experience. During project preparation, the feasibility studies for the flood defense works (component C), and available designs were developed by local experts, and later reviewed by international consultants. The technical approaches to the flood protection methods were fully endorsed by the Bank consultants, who acknowledged viability of the proposed engineering methods. While the technical capacity for the flood prevention work exists in Romania, the country lacks the financial resources to implement the planned projects. Bank financial support accompanied by an independent review and supervision will be provided under the project.

In regard to disaster management, Romanian ministries have operational responsibilities for specific hazards, including monitoring, data collection and information analysis. For example, because of recurrent floods in Romania, there is an advanced system for flood detection and warning, but this system is not integrated into a comprehensive emergency management information system. Moreover, Civil Protection, which is responsible for coordination of government actions during major emergencies, is not directly linked to this system, and has minimal capabilities to manage the information provided to them by other ministries, county and local governments. Because of this limited capability, effective use of resources is reduced. Project component A (Strengthening and Upgrading Emergency Response Capacity) will support development of a coordinated IT-based disaster information management system to collect, analyze and share real-time data among emergency management agencies and key public officials at the national, regional and local levels. The system will standardize the collection of data, facilitate its analysis at each level, connect and integrate data sources and provide timely, accurate and coordinated information to decision makers and operational agencies during natural or man-made crises.

With regard to the activities planned under the GEF co-financed Component D, the two sites selected for the first phase of project implementation were identified as high-risk and high-priority sites by the Government of Romania and were visited by the Bank preparation team. Pre-feasibility studies commissioned by the two mine operators were reviewed by Bank consultants, which identified the most important environmental and geo-technical problems. The studies proposed several measures to reduce the risk for catastrophic releases of pollutant loads into the Danube and Black Sea basin, and were endorsed by Bank consultants from Austrian and UK. The urgency of selecting the tailings dams facilities and waste dumps associated with Baia Borsa and Rosia Poiani mines was confirmed by the Bank. Both sites pose



major risks of failures with significant consequences to international waterways. The results of a comprehensive risk assessment supported by field surveys and investigations will be used as the basis to select the most cost-effective measures in the two proposed sites so as to ensure that available financial resources are used in the most efficient manner. During project implementation, additional tailings facility sites presenting the highest risk will be selected for remediation and prevention works. Feasibility studies conducted according to best international practice will be soon be available as the basis for engineering design. Feasibility studies and detailed designs, which will replicate the findings of the two pilot sites, will be done in the course of project implementation. Detailed operation, maintenance and surveillance manuals for all rehabilitated tailings facilities will be developed and put in place during project implementation. Engineering and environmental guidelines for tailings and waste facilities that incorporate the principle of “design for closure” and addresses seismic strength, resistance to flood events, capacity to collect runoff water, etc. will be developed during project implementation.

The design of Component D (Risk Reduction of Mining Accidents) benefited from suggestions and recommendations that emerged from a regional workshop on the management and safety of tailings facilities in October 2003 that took place in Romania. Regulators, mine operators, local and international experts provided very useful suggestions, including technical aspects, which were incorporated in project design. In addition, this component is in line with the recommendations of the Scientific Technical Advisor Panel (STAP) review. Annex 12 provides full detailed on the STAP review.

#### **4. Institutional:**

##### **4.1 Executing agencies:**

**Ministry of Transport, Constructions and Tourism (MTCT).** The Ministry will host the PMU for component B (Earthquake Risk Reduction) and will be responsible for consolidation of financial and implementation reports from the other three PMUs. The MTCT has had a leading role in project initiation and formulation, has technically capable staff, and experience with retrofitting investments financed by the Government. Moreover, the ministry played a crucial coordinating role during project preparation. In carrying out the preparatory activities under component B, the MTCT has been working closely with all relevant ministries and agencies responsible for respective categories of public facilities, and these tasks will be further extended during project implementation. The ministry is one of the two implementing institutions, along with NAMR, of the GEF PDF-B preparatory grant, gaining in this way some experience with the Bank procurement and financial procedures. It is planned that the PMU will be additionally trained in Bank procurement and financial management, and assisted by consultants, in particular, in the first years of the project implementation.

**Ministry of Administration and Interior (MAI).** The Ministry will be responsible for implementation of component A of the project (Strengthening of Emergency Management and Risk Financing Capacity). The selection of the MAI for this role results from the ministry’s key role in the country’s disaster and emergency management function, and general responsibility for the Civil Protection and the General Directorate for Fire Fighting. The Ministry, as of June 2003, was merged with the Ministry of Administration, which was already familiar with Bank requirements and procedures due to its central role in another Bank-financed project, the Rural Development Project (P057960), now under implementation. The project will additionally provide initial training and assistance for the implementing unit.

**Ministry of Environment and Water Management (MEWM).** The MEWM will execute all activities related to the Flood and Landslide Risk Reduction (component C). The ministry’s mandate includes flood protection of urban and rural localities located along most internal rivers of Romania and for



implementation of measures mitigating the risk of floods throughout the country. MEWM was assigned to implement under the project also the activities related to Danube River bank protection and landslide risk mitigation, which are under the statutory authority of the Ministry of Agriculture, Forestry and Rural Development (MAFRD) but have been delegated to MEWM. These responsibilities will be executed through a specialized entity - the National Administration "Romanian Waters" ("Apele Romane").

The National Administration "Romanian Waters" ("Apele Romane") has the following main responsibilities: management of the national water resources, protection against floods and draughts; monitoring of water quantity and quality. It has 11 river basin branches and local offices. Within the scope of the project, the Apele Romane will carry out the activities financed under component C under overall overview of the MEWM. The agency has particularly well skilled technical staff with experience in implementation of investment projects financed by international donors such as: European Union (PHARE), European Investment Bank, USAID, Council of Europe Development Bank, etc.

#### 4.2 Project management:

The project will not create new institutions but rather support existing government entities by setting up within their structures the PMUs which will draw upon the current institutional capacities, and by provision of technical assistance, training, and consulting services which will enhance the technical capabilities for implementation of the project. The PMU located in the MTCT will be responsible for consolidation of financial and progress reports for the project.

Component C will be implemented by the MEWM through the Apele Romane, and the project staff will be covered by its budget. The implementation units located in three other governmental agencies, MTCT, MAI, NAMR, will be staffed with highly qualified staff selected in accordance with Bank procedures.

#### 4.3 Procurement issues:

The procurement capacity assessment was conducted by Bank Senior Procurement Specialist. The findings and recommendations of the assessment are included in the report, in Annex 6A and summarized below.

The PMUs located in the respective institutions will be responsible for procurement of works, goods, and services for the relevant project activities, from preparation of the TOR, advertising, setting up the evaluation committees, selection of the providers, processing signing of the contracts, monitoring, payments to the contractors, among others. Three PMUs will have a Procurement Specialists and, if needed, a Procurement Assistants. The procurement activities for component C will be carried out by the MEWM through the staff of Apele Romane. The MEWM will be strengthened by employment of the Procurement Advisor under the project. The PMUs will be responsible for obtaining no-objections from the Bank, where prior approval is required.

This arrangement for the procurement function will ensure effective performance and building of capacity in the Borrower's agencies. Procurement training will be provided under the project to the PMUs' and Borrower agencies' staff.

Consulting services, goods and works financed or co-financed by the Bank will be procured in accordance with the Bank's procurement guidelines.

#### 4.4 Financial management issues:

The financial management arrangements will need to be strengthened prior to Board presentation in accordance with the action plan presented later in this PAD.

In respect to the WB projects implemented by NAMR, the Borrower is in compliance with its audit covenants.

The formats of the FMRs and financial reports have been developed, agreed at negotiations and are included in the minutes of negotiations and in the project's accounting procedures manual.

The first Country Financial Accountability Assessment (CFAA) for Romania was finalized in December 2003 and concluded that the overall fiduciary risk associated with the public financial management and financial accountability arrangements of the Romanian government administration is considered to be moderate, with the systems for accounting, financial reporting and internal control representing the areas with the higher risks and budgeting, cash management and external audit and Parliamentary oversight representing the lower risks.

The implications of the CFAA for the project are addressed by the following actions:

- A detailed review of the systems was performed for each implementing entity;
- Each implementing entity will have a distinct project-specific accounting ledger;
- Project accounting staff has been nominated for each implementing entity;
- Internal control and accounting procedures manual was developed for the project;
- The format of the FMRs and financial reports were agreed with all implementing entities;
- Workshop to explain the project's financial management requirements and disbursement procedures was carried out on 03/25/2004;
- Regular training events for the project's accounting staff will be provided over the project life;
- The PMU within MTCT will be in charge of the reporting and auditing coordination;
- Project financial statements and financial statements of the National Administration Romanian Waters (Apele Romane) will be annually audited by an independent auditor.

## **5. Environmental:** Environmental Category: B (Partial Assessment)

### **5.1 Summarize the steps undertaken for environmental assessment and EMP preparation (including consultation and disclosure) and the significant issues and their treatment emerging from this analysis.**

The envisaged investments are limited to modernizing communication and information systems (component A), to retrofitting of existing critical public facilities (component B), rehabilitation and upgrading of flood protection infrastructure, including investments in improving dam safety (component C), hazards prevention and remediation works and other non-structural measures to improve management and safety of mine tailings dams and waste dams (component D). No new structures are envisaged under the project.

Overall, the environmental impact of the project will be positive by reducing Romania's vulnerability to floods and earthquakes, and by addressing both acute and chronic environmental degradation from mining activities, which all cause substantial damage to the natural and man-made environment. Additionally, component D will include measures that should result in a significant reduction of pollution risk to both the Danube River and the Black Sea, which are international waters of worldwide significance.

The EMPs was prepared for project components B, C and D. For component B (Earthquake Risk Reduction), a pool of buildings that meet agreed criteria was established during project preparation.

During implementation, the final selection of candidate buildings will be made, followed by the design and actual retrofitting. Although the exact buildings to be strengthened will not be identified until implementation, the range of potential environmental impacts was assessed and a generic EMP has been developed based on potential impacts of the planned interventions. The EMP includes the Environmental Guidelines for activities under components B and D, which will be part of the Project Implementation Plan (PIP).

The detailed environmental assessment and public consultations for all investments under component C (Flood and Landslide Risk Reduction) were carried out. The proposed investments consist mostly of rehabilitation of the existing flood defense schemes and dams, and will have no negative impact on the environment. The assessment concluded that none of investments are located in environmentally sensitive or protected areas. Also, no protected species that could be affected by the investments were identified. All minor impacts that are limited to the period of construction works were identified and the measures to mitigate them were elaborated in the generic EMP. During project design other sub-project specific environmental issues may be identified. If this occurs, the design Contractor will revise the EMP accordingly.

For component D which is funded by GEF (Risk Reduction of Mining Accidents in Tisza Basin), details of the physical measures and interventions to reduce the risk of catastrophic mining accidents and continuing release of contaminants from tailings facilities will be established as part of the engineering design. On the basis of available pre-feasibility studies, it is anticipated, that implementation of physical measures will have no significant impact on the surrounding environment. Most disruption will be localized and of short duration, since most of the construction works will be done at mining company property and on the site of existing tailings dams and waste dumps facilities. During project preparation, a framework EMP was developed by the Romanian counterpart. This framework EMP takes into account possible environmental impacts, mitigation measures and monitoring activities.

## 5.2 What are the main features of the EMP and are they adequate?

The component-specific parts of the EMP prepared by the Romanian counterparts were reviewed and found acceptable by the Bank. The EMP identifies investment-specific potential environmental impact, includes mitigation plans (measures to be taken to control potential impacts and responsible party), monitoring plans (parameters to be monitored, responsible party, timing, and tools for monitoring), regulatory framework for environmental protection, and institutional arrangements for environmental management. The EMP comprises the mitigation plan, monitoring plan and institutional arrangements which specifies the identified issues, mitigation measures, and responsible institutions. Detailed EMP for project component C include minutes of the consultation meetings.

## 5.3 For Category A and B projects, timeline and status of EA:

Date of receipt of final draft: November 24, 2003

## 5.4 How have stakeholders been consulted at the stage of (a) environmental screening and (b) draft EA report on the environmental impacts and proposed environment management plan? Describe mechanisms of consultation that were used and which groups were consulted?

Public consultations for the flood protection and dam safety investments were conducted in May-June 2003. Prior to the meetings, the draft EMP and specific technical information on the investments were disclosed in Romanian at publicly accessible places, such as libraries, city halls, etc. People living in the project areas, as well as NGOs were invited to the meetings through the local radio announcements and

press advertisements. Minutes of all meetings were prepared and attached to the EMP. The planned investments did not raise any objections nor controversies. In fact, the projects are keenly supported by the population living under the risk of floods.

Consultations for the seismic retrofitting investments will be conducted in the implementation phase, when the facilities are finally selected out of the prioritized pool of public buildings. The consultation process will be initiated once designs are ready and detailed methods of specific retrofitting works are known. At that stage, the environmental permits will be required by the Romanian regulations for the investments .

For the pilot prevention and remediation intervention program under component D (Risk Reduction of Mining Accidents in Tisza Basin), once the technical measures are known, the feasibility studies and detailed designs and environmental assessments will be completed, the public consultation meetings will take place, and will be monitored by the PMU. In accordance with the Romanian legal requirements, environmental permits will also have to be obtained at that time.

The framework EMP for the project was disclosed in public places prior to the project appraisal and no objections were expressed.

#### 5.5 What mechanisms have been established to monitor and evaluate the impact of the project on the environment? Do the indicators reflect the objectives and results of the EMP?

Monitoring data will be collected by the PMU offices, supervision consultants, and regional offices of the Apele Romane Water Directorates (for the flood prevention projects) from the project districts. The gathered information will then be reported monthly to the PMU. Results of the data analysis will be used to verify effectiveness of mitigation measures, and if required, to revise/modify the mitigation plan. In addition, the activities supported by the component C will have an Environmental Advisory Group which will consist of foreign experts and will be funded by the project. The PMU Environmental Specialist hired under the project will prepare quarterly environmental reports for the implementing agencies' and World Bank's review.

The EMPs specify mitigating measures for all significant environmental issues, and the main environmental parameters to be monitored during the implementation. Generally speaking, these are the following: dust and noise at the construction site, collection and disposal of solid wastes, recycling of the excavated material, construction material transportation and supply, vegetation at the sites; and for the flood protection works additional monitoring parameters are: changes in river course and river bed, river discharge, structural status of refurbished dam or dyke, water pH and temperature, TDS, sediments, dissolved oxygen, etc.

## 6. Social:

### 6.1 Summarize key social issues relevant to the project objectives, and specify the project's social development outcomes.

Social outcomes of the project are expected to be positive. One of the key social development outcomes will be a decreased vulnerability of the population at risk to natural disasters and water pollution accidents from mining activities, which will be achieved by strengthening the institutional and technical capacity for disaster management and emergency response; risk reduction measures for floods, and earthquakes; improved safety of selected dams; preparation of a framework for the national disaster insurance system; and mitigation of environmental impacts of accidental spills and release of hazardous materials in the Danube River and Black Sea Basins.

The Social Assessment conducted by the Romanian counterparts during the project preparation concentrated particularly on the flood mitigation and dam safety investments. The Social Assessment included a site-specific stakeholder analysis. Its findings indicate that the investments will have a very positive social impact and will considerably improve the living conditions of the people settled in the areas affected by floods or endangered by the unsafe dams. The assessment shows that the lack of the adequate flood protection facilities has led to social problems resulting from disruption in the people's lives and material losses, particularly severe for poor people who cannot afford to move to safer areas. The authorities have been urged for many years to improve the situation and undertake the much needed measures. However, the local financial means for building or rehabilitation of the necessary facilities have been so limited that works have been delayed for decades.

In particular, the social impact of the project can be categorized as follows:

- Improved earthquake, flood, and landslide protection, reducing potential damage of public and private buildings, as well as agricultural land,
- Reduced risk of dam breakage,
- Increased production of electricity from the rehabilitated dams,
- Improvement of water supply, the quantity and quality of drinking water, industrial water use and for irrigation,
- Increased attractiveness of the project areas to business, including tourism,
- Subsequent employment opportunities,
- Reduced Danube River bank erosion causing damage to agricultural land;
- Assurance of operation of public facilities located in the seismically vulnerable areas;
- Reduced risk of water pollution from mining operations in Tisza basin.

The Social Assessment confirmed that it is not anticipated that the project will have any adverse social impact. There will be no need for resettlement, nor private land acquisition. During the implementation phase, social monitoring and consultation will be an integral part of review of the ongoing activities.

## 6.2 Participatory Approach: How are key stakeholders participating in the project?

Many of the proposed flood mitigation investments have been developed during a period of several years and in most of the cases, public meetings and discussions were already carried out before the Bank project preparation. The meetings were attended by local authorities, designers, representatives of the local branches of Apele Romane, SNIF, other ministries, and water, gas, power companies, and the local population directly affected by the investments.

During project preparation, another round of public meetings was held in May - June 2003, to discuss alterations in the designs made during the planning phase and to provide the affected population and the involved economic players with a clear understanding regarding the timing of the construction and the expected results of the project on their communities, with the possibility to share views and propose changes. In the course of the meetings all of the proposed flood mitigation and dam safety investments were endorsed by the local population and authorities.

In the case of other project components, there have been a series of meetings with key institutional stakeholders, including, central and local offices of the relevant ministries (MEWM, Apele Romane, MAFRD, NAMR, SNIF, MTCT, MAI, MOH, MOCC, Ministry of Economy and Commerce, local municipalities). These stakeholders were consulted and their views were incorporated into the selection of

priority investments. The public consultation meetings will be carried out for components B and D once the specific investments are selected in the beginning of the implementation phase.

The identified stakeholders relevant to GEF-supported component objectives are the following: mining operators; local communities; international and local NGOs (e.g., WWF); environmental, mineral resources, and civil protection agencies; the International Commission for the Protection of the Danube River (ICPDR); and the European Commission and donors with interest to co-finance project activities. The table below summarizes a preliminary Public Participation Involvement plan, which will be finalized prior to project implementation.

<b>Stakeholder</b>	<b>Identification / Preparation</b>	<b>Implementation</b>	<b>O&amp;M/Monitoring</b>
Mining operators	IS/CON/COL	IS/CON/COL	IS/CON/COL
Local communities	IS/CON	IS/CON	IS/CON
NGOs	IS/CON	IS/COL	IS/COL
Environmental, mineral resources, and civil protection agencies	IS/CON/COL	IS/CON/COL	IS/CON/COL
ICPDR	IS/CON	IS/CON/COL	IS/CON
EC and other donors	IS/CON	IS/CON/COL	IS/CON/COL

**Legend:** IS=Information sharing; CON=Consultation; COL=Collaboration; O&M=Operation and Maintenance

### 6.3 How does the project involve consultations or collaboration with NGOs or other civil society organizations?

NGOs were invited to all public consultations meetings carried out during project preparation and none of them expressed concerns related to the proposed investments. At the implementation stage, the involvement of NGOs will be considered particularly in the project activities related to the emergency preparedness public awareness programs. NGOs may be involved in the design and implementation of locally based disaster awareness programs to educate communities at high risk about effective measures that can be taken prior, during, and after an emergency.

### 6.4 What institutional arrangements have been provided to ensure the project achieves its social development outcomes?

The PMU budgets provide for periodical monitoring and evaluation, including social reviews. The monitoring and evaluation system will ensure that the project elements can be adjusted in order to achieve its social development goals.

### 6.5 How will the project monitor performance in terms of social development outcomes?

The social development outcomes will be monitored as part of the M&E activities envisaged under the project. In order to strengthen social monitoring and ensure that the social outcomes are achieved, the PMUs will hire a Monitoring and Evaluation Specialist, with a social science background, who will be responsible review of these aspect of the project. The Social Scientist's activities will include: preparation of the M&E reports, visits to the project sites, conducting interviews with the stakeholders, and proposing additional studies, if needed.



The component-specific performance indicators will include the social considerations as an integral part of the overall outcomes. In addition, the periodical surveys, focus groups, interviews with the affected population will be conducted in the project areas by the PMUs and independent consultants.

## 7. Safeguard Policies:

### 7.1 Are any of the following safeguard policies triggered by the project?

Policy	Triggered
Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Natural Habitats (OP 4.04, BP 4.04, GP 4.04)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Forestry (OP 4.36, GP 4.36)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Pest Management (OP 4.09)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Cultural Property (OPN 11.03)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Indigenous Peoples (OD 4.20)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Involuntary Resettlement (OP/BP 4.12)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Safety of Dams (OP 4.37, BP 4.37)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Projects in International Waters (OP 7.50, BP 7.50, GP 7.50)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Projects in Disputed Areas (OP 7.60, BP 7.60, GP 7.60)*	<input type="radio"/> Yes <input checked="" type="radio"/> No

### 7.2 Describe provisions made by the project to ensure compliance with applicable safeguard policies.

#### Environmental Assessment

The Environmental Assessment in accordance with requirements pertinent to category B projects was conducted by the Borrower and reviewed by the Bank team. The Loan and GEF grant agreements include covenants calling for the implementation of the prepared Environmental Management Plans for components B, C, and D. The Bank will monitor the adherence to the EMP as part of its supervision activities.

#### Cultural Property

Under component B (Earthquake Risk Reduction), some of the facilities identified for seismic retrofitting are classified by the Romanian authorities as historical monuments. The project will assist the GOR in the preservation of these cultural heritage structures which at the same time have essential public functions (e.g., city halls, universities, etc). The EMP prepared by the MTCT for this component includes provisions for preservation of the all architectural and cultural qualities of these structures along with a system for monitoring the retrofitting works to ensure compliance with Romanian laws on the preservation of cultural property.

The Romanian regulations are very clear on the required actions and will be enforced throughout the lifetime of the project. This includes a system of permits provided by the Ministry of Culture and Creeds (MCC) and ensuring that designs and works are subject to expert review and supervision by certified specialists in the field of historical buildings preservation. A Law #422 of 2001 governs the protection of historic monuments, setting forth institutional roles and responsibilities. The Ministry's Directorate of Historic Monuments must approve all technical documentation for buildings that are officially listed, and can call specialists as members of a Consultative Board, as needed. Designers, contractors and site supervision engineers working on an investment project that involves an historic monument must be pre-certified and listed by the MCC. 125 designers are listed in Romania for this purpose. For the project, MCC and MTCT have appointed a working group to enable timely review and discussion of project investments in order to avoid bureaucratic delays in the approval process. Moreover, during the implementation stage, the already existing technical designs will be reviewed by consultants and modern methodologies and technologies that preserve cultural features of the facilities will be used for

strengthening.

#### Projects in International Waters

The project will, among other activities, support improvement of flood protection schemes in Romania, some of which are located at international waterways. The Bank's safeguard policy concerning Projects on International Waterways O.P. 7.50 therefore applies.

Based on technical assessment carried out by the Bank team's consultant, none of the project activities would adversely change the quality and quantity of river water flows in the riparian countries and all of them fall within the exemption to the notification requirement under paragraph 7(a) of OP 7.50. However, bilateral agreements with Ukraine, as well as with Serbia and Montenegro contain provisions requiring notification. Although a formal bilateral agreement has not been signed yet between Romania and Moldova, a practice of mutual notification about planned works on hydraulic structures located on the transboundary waters is established. Therefore, the Romanian Government sent on November 13, 2003 the relevant notifications to the Government of Moldova, the Government of Ukraine, and the Government of Serbia and Montenegro with the information on the three investments planned under the project, and requested their clearance. The approach is consistent with paragraph 5 of the OP 7.50.

Authorities of Moldova, Ukraine, as well Serbia and Montenegro have sent positive responses to the Romanian authorities with regard to the proposed activities.

#### Safety of Dams

The Romanian Government and technical agencies recognize that although dams and their associated reservoirs have enormous economic benefits, they also induce risk to the population situated downstream which could be affected by the uncontrolled spillage of water from the reservoir in a case of dam failure or technical accidents. The Romanian authorities are also aware that the most important factor in lowering this risk is maintenance of dam safety levels at least within the limits imposed by the technical and legislative regulations in force. Furthermore, the safety of a dam must be ensured at all stages of dam existence, namely: design, construction, and operation. In order to fulfill these requirements the Government has defined safety management measures as:

- for dams under design stage: ensuring that the norms/standards and regulations in force as regards safety are strictly adhered to;
- for dams under construction: the quality conditions stipulated by the standards and by the technical specifications are adhered to and checked for quality control;
- for dams being under operation: the continuous assessment of the safety through extensive monitoring of the dam and its associated structures.

In Romania, the dam owner has ultimate responsibility for all aspects of dam safety. If the dam fails to meet the safety requirements, safety improvements shall be carried out as appropriate, including construction works, nonstructural measures, improvement of the operation and surveillance of the dam, and the provision of emergency preparedness. All the actions taken by the dam owner in order to make the dam safe and to protect people are included in a safety program. The main goals of the program are to minimize probability of the loss of life, to minimize the probable economic losses, and to reduce probability of failure to a practically irreducible level.

The first two goals can be achieved through preventive actions. If a dam incident is found developing towards failure, and the failure would endanger human life or cause significant property damage, it is an imperative to promptly alert public and safety officials responsible for evacuating residents who would be



affected.

As far as the third goal is concerned, effective measures that reduce the probability of failure of the dam are specifically defined for the three main stages: design, construction and operation. Adequate norms and guidelines, based on experience are required to provide a safe design, appropriate for the site conditions. Observing the technical specifications and relying on a strict quality control system are the means for safe dam construction. Finally, the provision of an adequate monitoring system will protect the dam from a catastrophic failure.

The system for safety of dams established in Romania is in detail described in the "Dam Safety Assessment Report" available in the project files. The table below summarizes main findings of that report.

<b>Dam Safety Safeguard Requirement</b>	<b>Romanian System</b>	<b>Compliance with Bank Safeguards</b>
<i>Appointment of POE for design and construction quality assurance</i>	National Dam Safety Commission (CONSIB) is the consulting arm of the government and uses considerable number of highly skilled dam experts, on behalf of the Government for all dam design, construction and rehabilitation to ensure safety by the use of design, construction and impoundment permits.	<b>Satisfactory.</b> Adequate laws, regulations and standards are in place. The qualifications of national members for the panel are adequate and panel members are independent. International experts will be recruited to strengthen the panel with particular reference to tailings dams and risk analysis.
<i>Monitoring Instrumentation part of design</i>	Monitoring instrumentation is part of the design of all dams.	<b>Satisfactory.</b> The design requirements, standards and norms are adequate.
<i>Preparation of EPP (Emergency Preparedness Plan)</i>	EPPs are prepared as required by the law and have to be approved by Government.	The standards and norms for preparation of the EPP are <b>adequately defined</b> in the regulations. The EPPs for the dam investments were reviewed and found to be in compliance with OP4.37.
<i>Preparation of O&amp;M plan before completion of project</i>	O&M plans and EPPs are prepared and approved by Government.	The O&M plans for each dam investment were reviewed, and the staffing and budgetary allocations were found <b>satisfactory.</b>
<i>Dam safety surveillance and inspections after dam is completed</i>	The Romanian legislation requires three levels of surveillance system.	In all dams proposed for rehabilitation, the instrumentation system will be rehabilitated. Surveillance needs substantial improvement in the case of tailings dams.

<i>Implementation of O &amp; M and EPP</i>	Romanian law requires implementation of EPP and O&M plans.	<b>Satisfactory.</b> Implementation of the upgraded O&M plans and EPPs are incorporated in the loan and GEF grant agreements as legal covenants.
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During appraisal of the project, Bank team reviewed the Dam Safety Plans for each large dam financed under the project. The plan consisted of i) plan for construction Supervision and Quality Assurance, ii) instrumentation plan, iii) operation and maintenance plan, and iv) and emergency preparedness plan.

The dam safety plans were assessed as satisfactory. During project implementation the following measures will be taken:

- a) All dams have a construction supervision plans which require the appointment of a qualified independent engineering supervisor whose work is reviewed and evaluated by the State Inspection for Quality of Works at critical stages of the project. Acceptance of the final works is by the National Dam Safety Commission who issue a license for impoundment and operation.
- b) In all dams proposed for rehabilitation, the instrumentation system will be rehabilitated and new instruments will be placed as required for safe monitoring of the structure. The instrumentation plan is reviewed by the CONSIB to ensure that adequate monitoring can be performed. Monthly monitoring reports (consolidated daily data) are sent Territorial Apele Romane Offices for review, are consolidated as annual monitoring reports and are reviewed by the Monitoring Commissions for safety of the dams.
- c) All the dams have an operations maintenance plans which is generally reasonably comprehensive. They cover all regular operation and emergency requirements. The plans also have detailed Emergency Preparedness Measures. However, all plans may need to be upgraded with the rehabilitation of the dams.
- d) All dams supported under the project have an EPP as required by the law. Presently, all the dams have inundation maps in the event of failure. Present warning system consist of sirens (90% of the downstream sites) and electronic communications to local government. The warning systems are presently run by the dam operators and local government. Local governments are required to make all preparations each year for any possible hazard in the wet season and spring when there is high flow in the rivers. Almost all existing equipment will be upgraded or newly established with support of the project.

Dam safety specialists, with proven international experience, will be recruited, under terms of reference satisfactory to the World Bank, to supplement the Panel of Experts. Also international specialists will be hired to strengthen the tailings dams and waste facilities review.

#### Involuntary Resettlement

No involuntary physical displacement or relocation of people and their properties will be necessary in order to implement the investments planned under the project.

## **F. Sustainability and Risks**

### **1. Sustainability:**

The key factor critical for sustainability of the project benefits is an understanding and commitment on the part of Romanian authorities, both at central and local levels, to the need for introduction of measures included in the HRMEP project. In fact, most of the project-supported measures were demanded and predefined by the Romanian counterparts. Borrower commitment to the project was clearly demonstrated during the preparation phase, when the counterpart agencies were developing necessary feasibility studies and other required assessments carried out at the Government's expense. Maintenance and operation project investments, in the case of the retrofitted structures, will be ensured by the public entities who are the legal owners of the buildings to be seismically strengthened. For the flood protection investments, budgetary sources will cover the maintenance and operation costs. In both cases, the risk of lack of post-project support is low. Realization of the risks involved if the recommended activities are not implemented and sustained, constitutes the strongest incentive for the executing institutions and other stakeholders to promptly initiate the outlined activities and to continue their support and sustain the benefits deriving from the project.

Capacity building in the area of risk mitigation and emergency preparedness is a critical part of the project, targeting governmental entities, public institutions and local communities. By the end of the project, these stakeholders will be able to implement the necessary measures and further replicate internationally endorsed practices. Material support provided by the project in the form of infrastructure, retrofitted key public buildings, modernized communication, etc. will be in place to make effective use of the acquired skills. The existing level of scientific and technical expertise in Romania provides assurance that benefits of the project are not only sustained but even further advanced in the future.

One of the key factors for the long-term sustainability of the benefits of the GEF-supported component is the commitment of the Romanian authorities to implement the activities included under the project. Since the project is being prepared at the request of the Romanian Government, and Romanian counterparts at the central and local levels are involved in its preparation, it is very likely that their support will continue to sustain the benefits derived from the project, namely the reduction of the vulnerability to water pollution accidents from mining activities. Romania is also committed at the international level to clean up and protect the Danube and Black Sea basins, and efforts are being made to integrate interventions that addresses transboundary water pollution with efforts that help Romania to meet EU environmental directives. Thus, it is very likely that the project benefits will be further advanced in the future. Capacity building in the area of public awareness and preparedness for emergencies from the mining industry at the local level is also a critical element of the project. Local stakeholders will demand adoption of environmentally sound tailings management practices at the end of the project.

Capacity building and capacity enhancement at the level of the mine operators and local environmental authorities in the area of environmental monitoring is another critical element of the project. If the project is successful in achieving this goal, environmental monitoring should continue with no external support once the project is over. Commitment will be sought from the Government to provide the necessary funding to operate and maintain the monitoring system on the long-term. There is some assurance that budget resources will be made available to operate and maintain the system since Romania is moving forward with EU accession and the country needs to demonstrate compliance with EU environmental requirements.

#### **1a. Replicability:**

The GEF-supported Component D will help demonstrate and provide for replication of the reduction of

catastrophic accidental spills of transboundary pollution loads from mine operations flowing into the Danube River and Black Sea basins. A second World Bank Mining Closure and Social Mitigation Project (under preparation and scheduled for FY05) will be the vehicle for replication of prevention and remediation works for improving the management and safety of tailings dams and waste dumps in other critical mine sites located through out Romania. Funds under this new project will be earmarked for this purpose. The successful implementation of Component D will serve as a model for replication for reducing mining accident risks to human and aquatic ecosystem health throughout Romania and other parts of the Tisza and Danube basins.

**2. Critical Risks** (reflecting the failure of critical assumptions found in the fourth column of Annex 1):

<b>Risk</b>	<b>Risk Rating</b>	<b>Risk Mitigation Measure</b>
<p><b>From Outputs to Objective</b></p> <p>Organizational changes in the government adversely affect emergency response system.</p> <p>Results of the component D activities are not replicated throughout the Romanian portion of the Tisza basin and other parts of the country</p>	<p>M</p> <p>M</p>	<p>The project includes measures which will strengthen the response system capacity. The project design does not require institutional changes and builds on existing structures.</p> <p>Romania has undertaken significant international commitments and EU accession conditions will require Romania to comply with EU environmental directives and introduce necessary measures for improving the performance of the mining sector. The Bank will continue a dialogue at the regional level on the benefits of risk reduction of catastrophic mining accidental spills on the Danube and Black Sea basins.</p>
<p><b>From Components to Outputs</b></p> <p>Counterpart funds are not available in a timely manner</p> <p>Implementation structure is not put in place with a capable staff</p>	<p>M</p> <p>M</p>	<p>The Loan/Grant Agreements will include appropriate stipulations requiring timely provision of counterparts funds.</p> <p>The Bank team will closely supervise the project implementation, particularly at its early stage, and the TA to the PMUs' staff will be provided. During the project preparation, the line ministries provided qualified and skilled teams to work on the required tasks.</p>
<b>Overall Risk Rating</b>	M	

Risk Rating - H (High Risk), S (Substantial Risk), M (Modest Risk), N(Negligible or Low Risk)

**3. Possible Controversial Aspects:**

None.

## **G. Main Conditions**

### **1. Effectiveness Condition**

### **2. Other [classify according to covenant types used in the Legal Agreements.]**

#### **Project Management**

- During project implementation, the Government would maintain the PMUs within the MAI, MTCT, and NAMR with staffing and resources that are adequate for effectively implementing the project and that are acceptable to the Bank. MEWM shall ensure that “Apele Romane” has adequate staffing and resources required for implementation of their respective parts of the project.
- The Government shall maintain a Project Steering Committee comprising representatives of MAI, MTCT, MEWM, MAFRD and NAMR at the level of Secretary of State, which shall be responsible for overseeing project implementation and coordination between project executing agencies. The Steering Committee is chaired by MTCT.
- The Borrower through implementing agencies shall take all necessary measures to implement the project in accordance with a Project Implementation Plan (PIP), and shall not amend, suspend, abrogate, repeal or waive any provisions of the PIP without prior approval of the Bank.
- The mid-term review of the project will be carried out in February 2007.

#### **Dam Safety**

- The Borrower through MEWM will assign and maintain an independent Dam Safety Panel within CONSIB. The Panel of Experts (PoE) will undertake periodic reviews of the designs and technical specifications, and advise on dam safety related issues during implementation. The updated dam safety reports will be submitted to the Bank for review and comments.
- For each dam, the Borrower through MEWM, will prepare, one year prior to completion of rehabilitation works, a program for operation and maintenance (O&M), and a surveillance plan by a group of independence experts satisfactory to the Bank.
- For each dam, the Borrower through MEWM, will prepare, one year prior to completion of rehabilitation works, an updated Emergency Preparedness Plan (EPP) satisfactory to the Bank.

#### **Environmental Management Plan**

- The Borrower shall ensure that all measures necessary for carrying out the provisions of EMP shall be undertaken in a timely manner.

#### **Financial Management Conditions and Covenants**

##### Financial Covenants

- Each of the project implementing entities will maintain a financial management system acceptable to

the Bank. The project's financial statements, withdrawal applications and Special Accounts will be audited by independent auditors acceptable to the Bank and on terms of reference acceptable to the Bank. National Administration Romanian Waters (Apele Romane) financial statements will be audited by independent auditors acceptable to the Bank and on terms of reference acceptable to the Bank. The annual audited statements and audit reports will be provided to the Bank within six months of the end of each fiscal year.

### **Disbursement**

- In relation to sub-components C.2 – Danube River Bank Protection, and C.5 – Landslide Pilot Area Studies and Development of Monitoring Manuals, the first disbursement will be made only upon submission to the Bank of an official letter from the Government of Borrower that the Ministry of Environment and Water Management has been assigned as an agency responsible for implementation of the said sub-components of the Project.

### **H. Readiness for Implementation**

- 1. a) The engineering design documents for the first year's activities are complete and ready for the start of project implementation.
- 1. b) Not applicable.
- 2. The procurement documents for the first year's activities are complete and ready for the start of project implementation.
- 3. The Project Implementation Plan has been appraised and found to be realistic and of satisfactory quality.
- 4. The following items are lacking and are discussed under loan conditions (Section G):

### **I. Compliance with Bank Policies**

- 1. This project complies with all applicable Bank policies.
- 2. The following exceptions to Bank policies are recommended for approval. The project complies with all other applicable Bank policies.

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Christoph Pusch  
**Team Leader**

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Marjory-Anne Bromhead  
**Sector Manager**

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Anand K. Seth  
**Country Director**

## Annex 1: Project Design Summary

### ROMANIA: HAZARD RISK MITIGATION AND EMERGENCY PREPAREDNESS PROJECT

Hierarchy of Objectives	Key Performance Indicators	Data Collection Strategy	Critical Assumptions
<p><b>Sector-related CAS Goal:</b> Improved national preparedness for natural disasters.</p>	<p><b>Sector Indicators:</b> Improved hazard mitigation and emergency preparedness.</p>	<p><b>Sector/ country reports:</b> Country reports (Country Economic Memorandum Retrospective, CAS Updates, EU reports).</p>	<p><b>(from Goal to Bank Mission)</b> Romania maintains its commitment to reduce natural hazards risks and to bring up the emergency preparedness to the EU and international standards.</p>
<p><b>GEF Operational Program:</b> International Waters Operational Program No. 8, Waterbody Based Operational Program: Improve water quality of the Danube and Black Sea Basin.</p>	<p><b>Outcome / Impact Indicators:</b> Improved safety of mine tailings facilities. Increased adoption of best mine waste management practices throughout the Tisza and Danube basins. Integrated knowledge base about transboundary impacts of mine-induced pollution in the Danube and Black Sea basin. Increased transboundary cooperation for integrated water resources management.</p>	<p>Annual Reports of the International Commission for the Protection of the Danube River (ICPDR). Danube Accident and Emergency Warning System maintained by ICPDR. Danube and Black Sea water quality monitoring reports prepared by ICPDR and the Black Sea Commission.</p>	<p>Romania maintains its commitment to GEF and international community in adopting measures to reduce pollution to Danube and Black Sea.</p>
<p><b>Project Development Objective:</b> The overall objective of the project is to assist the Government of Romania in reducing the environmental, social, and economic vulnerability to earthquakes and floods, and demonstrate approaches to risk reduction of catastrophic mining accidental spills of pollutants.</p>	<p><b>Outcome / Impact Indicators:</b></p> <ul style="list-style-type: none"> <li>● Strengthened institutional and technical capacity for emergency management and emergency response through upgrading communication and information systems.</li> <li>● Increased earthquake risk mitigation with some key, prioritized public facilities retrofitted.</li> <li>● Increased level of flood protection with some</li> </ul>	<p><b>Project reports:</b> Project Supervision Reports. Project mid-term review. Monitoring activities of the implementing line ministries and agencies.</p>	<p><b>(from Objective to Goal)</b> Government sustains its commitment to the project objectives and continues to give an appropriate attention to disaster mitigation and management.</p>

<p><b>Global Objective:</b></p> <p>Demonstrate and provide a model for replication for the reduction of catastrophic accidental spills of transboundary pollution loads from mine operations flowing into the Danube and Black Sea.</p>	<p>high priority investments implemented.</p> <ul style="list-style-type: none"> <li>● Improved dam safety of the selected priority structures.</li> <li>● Gradual reduction in number and negative impacts of mining accidental spills of pollutants into the Tisza Basin and in the volume of toxic releases from mines into the Danube River.</li> <li>● Improved factors of safety in tailings facilities and increased standards in risk awareness and emergency preparedness.</li> </ul>		
<p><b>Output from each Component:</b></p> <p>A. Improved emergency preparedness and management system; completed groundwork for subsequent public policy decisions in the area of financial risk transfer.</p> <p>B. Improved earthquake risk mitigation measures.</p>	<p><b>Output Indicators:</b></p> <ul style="list-style-type: none"> <li>● Modernized communication and information management systems are designed, procured, and implemented with a daily use, national coverage, and sufficiently staffed.</li> <li>● Conceptual and legal framework for the catastrophe financial risk transfer is formulated and disseminated to key policy makers.</li> <li>● More than 80 high-priority public facilities are retrofitted to a level which allows for functioning after an earthquake of up to 7.5 magnitude.</li> </ul>	<p><b>Project reports:</b></p> <p>Progress reports provided by MAI. Supervision mission reports. Bank project evaluation (ICR)</p> <p>Progress reports provided by MTCT. Supervision mission reports based on independent expert reports. Bank project evaluation (ICR)</p>	<p><b>(from Outputs to Objective)</b></p> <p>Organizational changes in the government do not adversely affect emergency response system in the country.</p> <p>Political commitment and dedication of sufficient technical capacity of the Romanian government is maintained.</p> <p>Institutional framework, including the legal arrangements for ownership and responsibility for public buildings retrofitting is maintained.</p>



<p>C. Improved risk mitigation measures related to floods and dam safety.</p>	<ul style="list-style-type: none"> <li>● Nine flood mitigation schemes are upgraded or rehabilitated.</li> <li>● Three critical Danube River areas are rehabilitated.</li> <li>● Eight selected large and five small dams are rehabilitated.</li> <li>● Landslide risks are mapped and used for land management and planning.</li> </ul>	<p>MEWM progress reports Supervision mission reports Bank project evaluation (ICR)</p>	<p>Government maintains already demonstrated commitment and capacity to implement the measures supported by the project.</p>
<p>D. Hazards prevention and mitigation measures implemented in the Tisza Basin to reduce risk of mining accidental spills of pollutants as well as emergency preparedness and effective environmental monitoring capacity established and transboundary collaboration on water resources management is strengthened.</p>	<ul style="list-style-type: none"> <li>● At least three highly dangerous tailings management facilities are rehabilitated and immediate/emergency safety measures are identified and implemented in the remaining high-risk tailings facilities in the Tisza basin.</li> <li>● Funding for replication of activities supported under the project are leveraged from public (and private) sectors.</li> <li>● Risk assessment procedures are adopted to identify priority actions in critical mines.</li> <li>● Environmental monitoring system of the Tisza basin designed, procured and implemented.</li> <li>● Environmental and engineering guidelines for tailings dams and waste facilities are developed and adopted.</li> <li>● Regional emergency preparedness and response system related to mining accidents is established and implemented.</li> <li>● Regional Task Force to review failure mode and</li> </ul>	<p>ICPDR reports. NAMR progress reports. Supervision mission reports. Bank project evaluation (ICR)</p>	<p>Sustained interest in replicating the results throughout the country and the region.</p>

E. Project management	<p>impacts analysis is established.</p> <ul style="list-style-type: none"> <li>• Regional meetings/workshop on water resources management are documented.</li> <li>• A proposal for a regional water resources project for the Tisza Basin is drafted.</li> <li>• Cost-effective, efficient and innovative methods for improving the management and safety of tailings facilities as well as other lessons are identified and disseminated throughout Romania and the Danube Basin.</li> <li>• Timely, cost efficient and technically sound implementation of the project.</li> </ul>	Project progress reports Supervision mission reports Bank project evaluation (ICR)	Administrative and political obstacles do not interfere in implementation of the project.
<p><b>Project Components / Sub-components:</b></p> <p>Component A: Strengthening of Emergency Response and Risk Financing Capacity</p> <p>Component B: Earthquake Risk Reduction</p> <p>Component C: Flood and Landslide Risk Reduction</p> <p>Component D: Risk Reduction of Mining Accidents in Tisza Basin</p> <p>Component E: Project Management</p>	<p><b>Inputs: (budget for each component)</b></p> <p>\$10.9 million</p> <p>\$71.2 million</p> <p>\$101.1 million</p> <p>\$15.25 million</p> <p>\$5.2 million</p>	<p><b>Project reports:</b></p> <p>For all components: Quarterly progress reports Quarterly disbursement reports Supervision mission reports Annual audit reports</p>	<p><b>(from Components to Outputs)</b></p> <p>Counterpart funds are available in a timely manner</p> <p>Implementation structure is put in place with a capable staff</p>

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## Annex 2: Detailed Project Description

### ROMANIA: HAZARD RISK MITIGATION AND EMERGENCY PREPAREDNESS PROJECT

#### By Component:

#### Project Component A - Strengthening of Emergency Management and Risk Financing Capacity - US\$10.91 million

**Objective.** The objective of this component is to enhance the capacity of the Romanian authorities to better prepare for, respond to and recover from natural or man-made disasters, through modernization of information technology and communications systems, activities which would increase the planning and training efforts of all levels of government, public awareness and preparedness, and complete technical feasibility work and institutional framework for launching of the Romanian Catastrophe Insurance Program.

**Background.** *Strong Commitment to Emergency Preparedness.* The Government of Romania is strongly committed and determined in pursuing the objective of preparing Romania for a range of natural and industrial disasters and hazards facing this country. Particularly notable is the work completed by a number of institutions in conceptualizing emergency management issues, and the level of scientific and technical knowledge available in Romania. There have been many valuable efforts to enhance institutional capacity of the Government, academic and private sectors in this field. The governmental organizations have made substantial steps in setting up an institutional framework for coping with disasters by creating central, sectoral, and local level commissions with a mandate to coordinate response to the emergencies.

*Institutional Changes in Disaster Management.* The Romanian Civil Protection and the Military Fire Corps – the nation’s two principal emergency management agencies – have their origins in post-World War II programs to protect the population against attack. In 1978 Civil Protection became responsible for activities related to mitigation, preparedness and relief after large-scale disasters and until 1989 these activities were organized under the Romanian military department. Since 1989 the laws, orders and regulations related to Civil Protection and the Fire Corps have been modified frequently to detail the structure of Civil Protection and define the national strategy for emergency management at the national, county and local levels. In 2000, the Ministry of Interior assumed overall administrative management of both Civil Protection and the Fire Corps. In 2001, the Government altered the structure of Civil Protection and the Fire Corps by moving both functions under the Ministry of Public Administration (MPA) which had the overall mandate to decentralize governmental functions nationwide. Another restructuring took place in June 2003 when the Ministry of Public Administration was merged with the Ministry of Interior. Consequently, the Fire Corps and the Civil Defense Units have been subordinated to the new Ministry of Administration and Interior (MAI). Furthermore, a new Governmental Ordinance (#63) was issued which legally established the Inspectorate for Emergency Management under the structure of the MAI. It stipulates that the new inspectorate will consist of both the Fire Brigade and the Civil Protection Units.

At the national level, sectoral ministries have the lead responsibility for specific hazards. The Prime Minister is the head of the Central Commission for Defense Against Disasters. This commission is activated only during event of major national importance. Each ministry designates an internal commission to develop plans and provide expert services in their functional area; Civil Protection is responsible for the overall coordination of government actions. There are 42 counties in Romania, and the system of commissions is essentially replicated at this level. The county Prefect (Governor) heads the commission responsible for coordination. There are also 3 Fire Fighting Brigades in the larger counties and 38 units in the remaining counties composed, like the civil protection organization, of a combination of professionals

and volunteers. At the local level similar commissions are authorized, under the leadership of the Mayor, who is an elected official.

The changes enacted in recent years envision a fundamental alteration to the Romanian emergency management system. The new structure is designed to further separate Civil Protection and the Fire Corps from their historic roots in the overall military organization. Current plans estimate that the transformation process will be completed by 2006. The successful implementation of the structural changes, and strengthening of the emergency management function, especially given Romania's seismic risk and the pressing needs to upgrade the operational capacity of the organizations and personnel involved, underscore the importance of providing focused support to the government's overall efforts in this area, through training, planning efforts, strengthening of technical capacity, and upgrading the communication and disaster management information systems.

*Resource Limitations.* Current emergency response systems are antiquated and heavily dependent upon telephonic and fax systems that have historically proven vulnerable at the time of catastrophic events. Linkages between critical functions, especially fire, police and the hospitals are tenuous. The equipment available to Romanian emergency management, at every level, is outdated and there is little redundancy in any of the systems. There is almost no ability to process information electronically, identify overall impacts from major events and develop rapid priorities for emergency response

*Lack of Financial Risk Transfer Mechanism.* Romania's high exposure to natural disasters, seismic vulnerability of its housing stock and infrastructure, and the expected high economic losses from catastrophic events call for a national insurance mechanism which would reduce the government contingent liability due to natural disasters by transferring highly concentrated catastrophe risk to the international reinsurance and capital markets. The Government is currently considering introduction of the catastrophe insurance program however, launching of such a mechanism must be preceded by necessary technical feasibility work to allow the Government for making informed policy and legal decisions on the substance of the future program.

### **Component Description:**

The activities to be supported through this component are designed to enhance and support the current efforts by the Government of Romania to upgrade the emergency management system and to enhance operational effectiveness of the agencies and organizations responsible for preparing for and responding to major emergencies, as well as to assist the GOR in completion of the technical work and institutional upgrading necessary for launching the comprehensive Romanian Catastrophe Insurance Program. The following are the component activities to be supported by the project.

### **Sub-component A.1 Upgrading Emergency Communications at the National, Regional and Local Levels (US\$ 3.73 million)**

The objective of this sub-component is to enhance the functionality, interoperability and coverage of the voice communications capability of emergency management agencies (e.g. civil protection, fire corps, emergency medical organizations) and personnel in Romania.

*Feasibility Study and Design Analysis.* The component will support development of the feasibility study and design analysis for the upgrading of emergency communications at the national, regional and local levels. The work will be carried out in coordination with Romanian officials assigned by the Ministry of Administration and Interior. The study should focus on VSAT equipment, GPS, docking terminals and the

latest technologies for Tetra radio systems which are the most common types of equipment used today by the emergency management community. The focus will be given to the provision of emergency communication in the rural areas, where the lack of coverage by mobile systems constitutes particularly acute problem. In addition, attention needs to be given to the compatibility with existing or complimentary communications equipment.

*Modernization of Communication System.* Following completion of a feasibility study and systems design analysis, the project will support the modernization of the radio, mobile and wireless communications capabilities in Romania. Particular emphasis should be given to expanding the geographic coverage of the emergency communications network, developing an acceptable level of redundancy in the system, and enhancing the ability of the various emergency management functional agencies to communicate with each other during emergencies.

### **Sub-component A.2 Development of Emergency Management Information System (US\$ 4.20 million)**

The objective of this sub-component is to develop a coordinated information management system to collect, analyze and share real-time data among emergency management agencies and key public officials at the national, regional and local levels. The system should standardize the collection of data, facilitate its analysis at each level, connect and integrate data sources and provide timely, accurate and coordinated information to decision makers and operational agencies during natural or man-made crises.

Currently, Romanian ministries have operational responsibilities for specific hazards, including monitoring, data collection and information analysis. For example, because of recurrent floods in Romania, there is an advanced system for flood detection and warning, but this system is not integrated into a comprehensive emergency management information system. Moreover, Civil Protection, which is responsible for the overall coordination of government actions during major emergencies, is not directly linked to this system and has minimal capabilities to manage the information that may be provided to them from other ministries as well as county and local governments. Because of this limited capability, effective use of resources is reduced.

*Feasibility and System Design Study.* The project will support a feasibility and system design study that will form the basis for implementation of a modern emergency management information system. The study should focus on the needs of the users and promote information sharing between ministries and the county and local levels. The information system to be developed would need to include the following characteristics: 1) be responsive to needs of users and provide a communication network between civil protection at the national, county, and local level; 2) allow for two way processing of information and communications; 3) support daily operations of the organization, not just emergency situations; and 4) integrate existing legacy systems. It should be emphasized that the new system should serve day-to-day operations of the various institutions, so that this substantial investment in the IT equipment is not only deployed during catastrophic events but can also improve the core functions of the organizations.

There are several existing systems that need to be reviewed and evaluated for incorporation into the feasibility study for design of a new comprehensive system. Among the systems to be reviewed are sensors and monitoring networks, Fire Brigade alert and notification systems, dam monitoring systems, building inventory data base systems (particularly in Bucharest), GIS and other mapping or data systems that are identified as currently operating throughout the government. The review should present the problems of integrating the systems and make recommendations as to which systems to include and the rationale behind their recommendations.

Prior to conducting the study, and upon launching of the project, the Government should establish a User Working Group comprising potential users and organizations that will be part of the emergency response system. The User Working Group will be organized and coordinated by MAI, and should also include representatives of Ministries of Health; Agriculture, Forestry and Rural Development; Environment and Water Management; Transport, Construction and Tourism; Communications and Information Technologies; Civil Protection; Fire Brigades; and representatives of risk-prone counties and municipalities. The group will provide advice and develop recommendations on what functions the system should support, and agree on the final Terms Reference for the feasibility study.

*Establishment of IT-based Emergency Management Information System.* Following completion of the feasibility/design study, the project will support the acquisition of an emergency management information system to be deployed at the national, county and municipal levels.

During the implementation stage, the User Working Group will provide feed-back on the system design, will assist in monitoring and evaluation of the system's functioning, and if necessary, recommend adjustments.

### **Sub-component A.3 Development of a Vrancea Earthquake Scenario (US\$ 0.78 Million)**

The objective of this component is to develop a reliable earthquake scenario that will model potential damages to the human and built environment from the maximum probable earthquake along the Vrancea fault. This scenario will provide the basis for updating emergency plans and procedures, as well as developing and conducting training and exercise programs for agencies and personnel to identify shortfalls and needs.

While there has been substantial effort by the Ministry of Transport, Construction and Tourism in coordination with other line ministries, and the Romanian civil engineering community, to identify structures at risk throughout the nation, there remains considerable uncertainty regarding the overall impact that a major earthquake in the Vrancea seismic zone might cause. For example, because in 1977 there was little damage to the lifelines in Bucharest, there is a general assumption that the next major earthquake will have a similar effect. Two factors call this assumption into question. First, the next event may produce significantly stronger ground motions than were seen in 1977. Secondly, the infrastructure is now a quarter-century older, there has been little investment in its upgrade and maintenance during this time, and it is clear that there has been deterioration of some of its features.

*Vrancea Earthquake Scenario.* To assist the development of realistic emergency response plans and to guide initial damage assessments, the project will support development of a detailed earthquake scenario for the Vrancea seismic region. To ensure consistency, the development of this scenario should be coordinated closely with the data gathering activities to be carried out through Component B. The scenario will include but not be limited to information concerning:

- Hospitals and medical facilities
- Emergency operations centers
- Schools, universities
- Communications systems
- Fire and police centers
- Transportation systems
- Power systems

- Natural gas, petroleum, energy systems
- Water and waste water systems
- Nuclear plants
- Hazardous materials facilities

The model must have the capacity to compute potential damages to residential, commercial, and industrial buildings, essential facilities and lifelines and potential fatality and casualty requirements for response planning purposes.

*Training and Exercising of Response Personnel.* Following completion of this scenario, the sub-component will support the work of the Ministry of Administration and Interior and the Civil Protection to revise emergency plans to reflect the findings in the scenario and to carry out a series of training programs and exercises to enhance the operational effectiveness of the public safety agencies.

As a critical part of the training, this sub-component will support the design of a series of exercises to be conducted at the national, county, and local levels to test coordination, response and readiness and then identify corrective measures. At a minimum, one national exercise involving the city of Bucharest and two regional and local exercises should be executed. Each exercise should involve multiple jurisdictions to test coordination, response and readiness capabilities between county, national and local entities, and compatibility of operations and communications. The universe of people to be involved in these exercises should include, at minimum, all of the specialized regional teams, emergency medical personnel, senior civil protection personnel and selected regional and local leadership.

These exercises will provide a solid measurement of the effectiveness of the training and identify response needs. They should be monitored and evaluated by independent observers. Prior to the exercise, independent consultants should develop objective evaluation criteria to be used in monitoring the exercises. After each exercise a report should be completed that documents the results of the exercise and includes recommendations for corrective actions. In addition, a Five Year Plan and schedule for an annual exercise program that would systematically test all elements of readiness and response throughout Romania should be developed under the leadership of Civil Protection.

#### **Sub-component A.4 Public Awareness Program (US\$ 0.41 million)**

The objective of this component is to educate and to mobilize the general public to enhance individual preparedness and self-sufficiency during emergencies. Evidence from earthquakes and other natural disasters throughout the world clearly demonstrates the importance of having a knowledgeable public, often acting in emergencies as "first responders", and who understand actions to take before, during and after an emergency.

The awareness of the public regarding appropriate measures to take before, during and after a major disaster, particularly an earthquake, is a critical element of any emergency management system. Trained first responders can make a critical difference in reducing the loss of life in the immediate aftermath of an earthquake. This sub-component will support developing a national campaign that educates the populace about their risks, particularly the earthquake risk. The design of the campaign will include risk reduction messages and tips for all hazard situations. It will concentrate on a family preparedness approach with safety tips for the immediate post disaster period and information on dealing with post-disaster trauma. This campaign is intended to be multimedia and supported through various mediums including television, radio, print and other advertising media. In addition to the national campaign, there will be also program



on disaster preparedness and prevention designed for selected high risk localities prone to specific hazards typical for their location. At the sub-national level, the programs will be coordinated through the Governors and will also target county and local officials.

### **Sub-component A.5 Preparation of Catastrophe Insurance Program (US\$ 1.80 million)**

The objective of the insurance component is to complete the minimum technical feasibility work for the preparation of the launch of the Romanian Catastrophe Insurance Program (RCIP). Upon completing the studies and activities outlined below, the GOR would be able to make a sound policy judgment regarding the optimal legal and institutional design characteristics of the future insurance program, and to prepare a plan which would be credible to the reinsurance market. If successful, the completion of this work may also result in the preparation of a stand-alone World Bank lending operation in support of the RCIP's operation, or the Government will be in position to obtain the support from other international financial institutions in order to launch the Program.

In order to ensure adequate participation of all relevant government agencies and ministries and of the private insurance market in the design and the subsequent implementation of the future program, the establishment of an inter-ministerial Steering Committee on Disaster Insurance is recommended. It should include the representatives from the Ministry of Administration and Interior, the Ministry of Public Finance, the Insurance Regulator, the Central Bank, the Ministry of Transport, Construction and Tourism, a Parliament Budget and Revenue Committee and the representatives of existing insurance associations. The Steering Committee would become the main policy setting body of the program chaired by the Minister of Ministry of Administration and Interior – the ministry designated by the GOR to handle the preparation of the Romanian Catastrophe Insurance Pool and the implementation of component A.

The main functions of the Committee would include (i) developing national policies and legislation regarding the catastrophe insurance; (ii) sponsoring relevant legislation and ensuring implementation of the proposed policies and legislation and technical activities developed under the component; and (iii) general oversight of the program. It is envisaged that upon the creation of the Romanian Catastrophe Insurance Pool, the members of the Committee would also become its Board Members.

The activities supported by sub-component A.5 aim to build the technical capacity within the government in the area of catastrophe risk management. This could be achieved by creating the Technical Working Group consisting of government and industry technical experts. These experts should represent different stakeholders participating in the Steering Committee. The main purpose of the Group would be to oversee the activities to be financed and implemented under this sub-component. The Technical Working Group shall report to the Steering Committee on all matters related to the project.

The project sub-component will provide support to the following key studies and other services provided by consultants:

*Integrated Disaster Risk Management Study.* The study will quantify the overall earthquake exposure and vulnerability of Romania to the risk of quakes and floods. It will then estimate economic losses and the government's fiscal exposure to the risk of natural disasters. The study involves the development of specialized catastrophe insurance model for Romania, that would be based on the country specific analysis of hazards, and vulnerabilities of assets at risk. The models would be built using the available country data on frequency and severity of earthquakes and floods across the country. The models are expected to be used by the RCIP upon the completion of the work.

Upon completion of the country risk exposure, the study will generate GIS based risk hazard maps for both risks. Based on hazard maps and the analysis of vulnerabilities for major building classes, the study would then develop actuarial estimates of risk in each area and would produce the indicative rating tables that later on can be used by the RCIP for setting up the premium rates.

*Development of Institutional and Legal Framework.* The work will result in the comprehensive design of the RCIP institutional and legal structure. It will lay out the management structure, the composition of the Board, staffing requirements, and the role of insurance sector and the government in the operation of the scheme. Also, in the preparation of the launch of the RCIP, a legal framework guiding the main aspects of its operations will be developed.

*Training and Study Tours.* Training activities and study tours would be conducted to introduce the Romanian policy makers and insurance professionals to the modern risk transfer technology and experience available in other countries. Seminars and workshops on the key topics of the pool's design will be organized in the country as well.

*Resident Catastrophe Insurance Advisor and Development of Policy Terms and Conditions.* For the duration of the insurance component, expected to be completed within two years, an international insurance advisor would be retained to advise the GOR on the institutional and technical options and trade-offs involved in the design of the insurance program. The advisor will actively participate in the day-to-day supervision of consultants' work, and in assisting the government and the insurance sector with the preparation of the program.

Moreover, the international expert will develop standard insurance policy forms for flood and earthquake coverage. The work will require a collaboration between the industry and the insurance supervisor.

*Development of Asset Allocation Guidelines, Operational Guidelines, and Risk Management Guidelines for RCIP.* The activity will result in the production of asset allocation guidelines that would be used by RCIP in its day to day asset management operations, in a set of model operational guidelines, and will produce a hand book of risk management guidelines, with a major emphasis placed on managing risks on the liability side of the RCIP's balance sheet.

## **Project Component B - Earthquake Risk Reduction - US\$71.20 million**

**Objective.** The objective of this sub-component is to assist the Government in reducing the seismic vulnerability of high priority technical and social infrastructure through the retrofitting of key structures and through institutional strengthening.

**Background.** *Risk Overview* Romania, including many of its largest cities, is among European countries the most vulnerable to seismic risks. This vulnerability to is due to its geographical location on the Vrancea subduction zone, situated along the south-eastern Carpathian arc, which forms an ellipse stretching from the north east to the south west of the country's territory, and includes Bucharest. Proximity to the fault and poor soils make Bucharest Europe's highest risk capital city and one of the 10 most vulnerable cities in the world. The Vrancea zone can generate high magnitude earthquakes of up to Richter magnitude 8.0. The primary source of earthquakes in the zone is an area of over 2,100 km<sup>2</sup> but the seismic activity can be felt 200-300 km from the epicenter, thus affecting about half of Romania's territory. Since 1908, 14 earthquakes of magnitude 7.0 or greater have affected almost 2 million people, causing massive economic losses. The 1977 earthquake measured 7.2 on the Richter scale and resulted in 1,424 fatalities in Bucharest

and 154 in other areas of the nation, over 11,000 injuries, and approximately USD 2 billion in direct losses. 33,000 housing units were destroyed or seriously damaged, leaving some 200,000 residents homeless. About 400 schools were destroyed and 2,000 seriously damaged; 11 hospitals were destroyed and 448 hospitals and health care clinics were damaged.

There have been various forecasts of future seismic activities in Romania, ranging from another earthquake within a few years to forecasts anticipating catastrophic seismic activity within the next few decades. Regardless of the accuracy of either estimation, it is clear from the historical record that large magnitude earthquakes occur on the Vrancea zone with considerable regularity and that a major event should be anticipated in the coming years.

Compounding the situation is the concentration of Romania's economic activities in and around Bucharest. The vulnerability of the Romanian economy to earthquakes alone is further exemplified by the following facts:

- over 35 percent of all Romanians, and 65 percent of the urban population, is exposed to seismic hazards from the Vrancea fault;
- 60-75 percent of fixed assets is located in seismic zones;
- 70-80 percent of GDP is produced in highly seismically prone areas;
- 45 percent of all national lifelines are in seismic areas of VII-IX intensities on the Mercalli Scale (MSK);
- 26 percent of national housing stock was built before 1944 and is therefore highly vulnerable to earthquakes.

*Government Actions.* The Government of Romania and the country's professional/technical community is aware of the serious risk and has taken a number of important steps to address the nation's principal seismic risk in the Vrancea earthquake zone. This includes an inventory of at-risk structures, establishing priorities for the retrofit of pre-code, privately owned buildings in Bucharest, allocating funds and establishing a loan program to support their retrofit, and the development and implementation of improved building codes. Further, the Government has provided funding for the strengthening of schools (with additional funding from the World Bank), hospitals, bridges, communication facilities, university buildings and other structures. Many projects have been completed and others are under implementation, but budget resources are too limited to continue this work to the extent needed. Partnerships include on-going cooperation with international institutions including JICA, the Japan International Cooperative Agency, and GTZ, the German National Research Foundation, to support technical assistance in these areas.

*Inventory of at-risk structures.* Under Government directives, the Ministry of Transport, Construction and Tourism, the Ministry of Health, the Ministry of Education and Research, and the Ministry of Administration and Interior have inventoried potentially hazardous buildings. These include hospitals, schools, university structures, residential structures and structures of cultural or historic significance throughout the nation, but with particular emphasis on Bucharest, the area of the largest concentration of risk. The surveys have provided an invaluable initial database for considering alternatives for investments in seismic risk reduction through structural strengthening by retrofitting and have served as a foundation for the prioritization work done collaboratively during preparation by Government and the Bank team.

### **Component Description:**

The earthquake risk reduction activities to be supported through this project are designed to build upon and enhance the Government's ongoing efforts by focusing on critical public facilities—namely hospitals, universities, communications facilities, government buildings and lifelines—through targeted investment and technical assistance program comprising the following sub-components:

**Sub-component B.1 Retrofitting of High Priority Public Facilities (US\$ 64.42 million).**

This subcomponent will focus on the structural and non-structural strengthening of critical public facilities and lifelines—those that have a paramount role in the emergency response and preparedness system, and those that are essential for the country's social functioning.

In the early stages of project preparation, a workshop was conducted in Bucharest on the prioritization and selection of high priority buildings for seismic risk mitigation. Representatives of the governmental agencies responsible for the essential facilities participated, including the ministries of Transport Construction and Tourism (MTCT)—as lead ministry, Education, Health, Administration and Interior, Water and Environment, and Culture; as well as the Fire Services, Civil Protection, the Romanian Water Association (Apele Romane); the Bank team also participated.

The objective of the workshop was to present a methodology to be used for (a) identifying facilities that are critical for Romania in terms of emergency recovery and life safety, (b) selecting the facilities to be funded for strengthening, and (c) establishing a transparent process to assess the investment from social, technical and economic perspectives. The types of public facilities to be considered eligible for seismic strengthening through project financing were discussed and agreed, and are categorized as follows:

- Category A: Emergency and Disaster Response Facilities
  - Fire stations; command stations
  - Disaster control and response centers
  - Ambulance centers
  
- Category B: Emergency Health Facilities
  - Emergency hospitals
  - Other health facilities selected on the basis of response needs and life-safety risk.
  
- Category C: Educational Facilities
  - Higher education facilities (Universities, etc.)
  - Child Protection Centers (Orphanages)
  
- Category D: Communications facilities
  - Buildings and certain equipment and lines
  
- Category E: Essential Public Buildings
  - Facilities that are essential for the administrative functioning of communities at risk after disaster

The prioritization of facilities to be strengthened, within each of the above categories was agreed and each ministry was asked to participate with key staff, including sector experts (e.g. education, hospitals, etc.), emergency response experts, economists and structural (earthquake) engineers. The criteria for the ranking

of facilities was based on the following considerations: *Functional*—criticality to response and recovery operations; *Social*—life-safety and higher risk for the population; *Economic*—cost effectiveness or cost-benefit analysis; *Technical*—feasibility and appropriateness of the retrofit measures.

After several iterations, all of the selected facilities were inspected in the field by a multi-disciplinary team under MTCT guidance to ensure that the selection criteria were being met to the fullest extent possible. This produced a list containing 300 structures, which had to be further refined and cut by the concerned ministries in cooperation with MTCT. The result was a ranked list of facilities for each of the four operational categories that was presented to the Bank team for review in January, 2003.

A series of working sessions were then held between the Bank and Romanian counterparts with the objective of jointly reviewing the presented priority lists in order to identify projects that can be financed in the initial phase of project implementation. Review criteria included: a) functional importance with regard to emergency response, b) relevance in terms of life safety, c) readiness for implementation including availability of technical reports and engineering designs, d) retrofitting costs below 60% of replacement cost. The teams reviewed each proposed building in a process that led to further refinement of the lists and identification of additional information to be provided and discussions on the potential use of new technologies for cost-savings. General guidelines for the allocation of funds between the sub-categories was also agreed. Finally during the September pre-appraisal mission, all available technical documentation was reviewed, and the list was further refined and updated. This process enabled the Bank team to provide full support to the final lists and as a result between 3 – 14 facilities per sub-category were selected as high priority investments. The list of facilities is available in project files and will be expected to be incorporated in a subsidiary loan agreement between the Ministry of Public Finance and MTCT.

Through the selection process, over 84 key structures have been identified to be retrofitted under this sub-component. Work will be implemented under the supervision of independent consultants, as outlined in component B.2. The retrofitting of the structures will be carried out according to performance-based structural designs to satisfy defined design criteria for earthquake loads, meeting or exceeding the current requirements of the Building Code of Romania. In general, it was observed that throughout Romania recent structural retrofitting work applies conventional methods conservatively, resulting potentially in unnecessarily high material consumption and with sometimes inappropriate architectural impacts. Government wishes to introduce newer structural retrofit methods that are in use in other parts of the world. The project will therefore include an assessment of each facility to determine the most cost-effective method of retrofitting, considering state-of-the-art methods such as ductile vs. shear-wall designs, seismic isolation, etc. In this context, sub-component B.5 (see below) will provide a training and accreditation program that is aimed to assist the design community and their clients in better understanding and applying the concepts of risk management and cost-benefit analysis in their designs. Sub-component B.2 will also provide for the design of seismic isolation systems by arranging collaboration between Romanian engineers and an international research group or firm specialized in such systems, for seismic isolation pilots that are to be included among the selected facilities.

### **Sub-component B.2 Design and Supervision (US\$ 5.74 million)**

This sub-component will finance: a) the structural design of the strengthening schemes for about 60 buildings or objects that have not yet been designed, including non-structural elements, and b) the review of designs for about 23 objects for which designs are already completed by international structural engineering consultant. In addition, the latter will include the supervision of construction for all 84 objects in the program, to assure compliance with the engineering designs. The cost is estimated at up to 10% of the budget for this component, which is reasonable for retrofit projects that will typically involve several

alternative design approaches and cost-benefit analyses in order to arrive at the most appropriate designs. Architectural consulting services will also be required during the entire study and design process for all facilities, particularly for historic buildings, which will require retrofit designs that do not affect significantly architectural features that must be preserved. Construction supervision services will involve continuous monitoring of the construction to assure compliance with the structural retrofit engineering design and adequate quality. No modification will be made to the designs without the approval of the PMU.

As noted above, 84 facilities have been identified for retro-fitting through a collaborative process involving a range of government agencies, the MCTC and the Bank. Each object requires a detailed Feasibility Study with owner-agency approval before engineering design can begin. Under Romanian regulations, the Feasibility Study must recommend a range of approaches and cost estimates, sufficiently developed to enable the owner to make an informed decision on proceeding with the investment. As of Appraisal, Feasibility Studies for 64 of the listed objects had been completed, with six additional studies expected within about a month. Of these 64, designs for 23 objects have been completed. All objects with completed Feasibility Studies are subject to Inter-Ministerial Committee (IMC) approval.

The design review work and supervision will be tendered to attract international expertise and will require experience in modern seismic engineering techniques and cost-benefit analysis. Terms of reference will call for collaboration with Romanian firms, and in order to further enhance knowledge transfer and increase the capacity of Romanian engineering firms, it will be coordinated with the training sub-component (B.5).

As a first step in the implementation of this component, the 23 designs that are ready will be subject to technical review by the international consultant structural engineering services to be funded under project technical assistance. These objects will be in the first set of construction contracts to be tendered as soon as the loan is effective. For the remaining objects, the consultant structural engineering services will review their Feasibility Studies, and will prepare the required performance-based structural designs in collaboration with Romanian designers. In all cases, several options will be considered for each retrofit in order to optimize the use of resources and minimize impacts.

Three buildings will be selected from the pool of 60 buildings without designs for the application of seismic isolation designs (or other appropriate innovative seismic mitigation methods) in a pilot activity. Design of seismic isolation or other appropriate method will be carried out separately from the seminars, based on pilot buildings proposed as suitable for this method by the MCTC's technical advisory committee. Design engineers from Romania will work directly with an international research and design group or firm that specializes in the design of seismic mitigation systems to develop the designs. The outcome will be complete technical designs and a core of Romanian engineers who can execute such designs on their own.

### **Sub-component B.3 Energy Sector Risk Assessment (US\$ 0.41 million).**

While considerable effort has been expended to make an inventory and assess buildings in the Vrancea earthquake zone, there is no comparable assessment for critical facilities and equipment in the country's energy sector including production and distribution facilities and systems. The function of energy production, transport and distribution systems is essential after a disaster, and the power and gas and oil systems in Romania are vulnerable to seismic disruption.

The project will support a comprehensive risk and vulnerability assessment of electricity, gas and oil lifelines facilities located in the Vrancea earthquake zone—*Energy Production and Distribution Risk Assessment Study*. In the electricity field, the study will assess the vulnerability of power generation

facilities (in hydro and thermo stations), major substations, main transmission lines and other critical facilities. In the gas field, production and distribution facilities, including regulation facilities for transit and import uses and compression stations will be the main focus. In the oil industry, priority will be given to the assessment of the vulnerability of refineries, storage tanks and pumping stations, including the development of cost-effective mitigation priorities and strategies. This assessment should be also integrated into the overall regional earthquake scenario included in Component A of the project and the investment in mitigation priorities. The study will lay the foundation for follow-up work on a detailed cost-benefit analysis of investments needed to address vulnerability of critical facilities, including prioritization of investment projects, providing opportunities for other donors' contributions to reducing the vulnerability of this critical sector for the Romanian economy.

#### **Sub-component B.4 Building Code Review (US\$ 0.25 million).**

The Romanian code is appropriate from the point of view of conventional structural requirements, and provides for adequate strengthening for seismic forces. However, the code is not flexible for different approaches according to different types of structures, and does not give clear guidance for seismic retro-fitting. This leads engineers to err on the side of caution and produce very conservative and costly designs. The code does not encourage the application of modern approaches to seismic force mitigation. A code revision working group consisting of several professional committees assigned to different chapters is currently in the process of revising the code for new buildings, with the aim of bringing the code more into line with international practice, and harmonizing the format with that of the European Union. The project will assist this process, with a focus on updating the code to reflect recent developments in methods and technology, and addressing the strengthening of existing structures.

The project will support a detailed Building Code Review, focusing on applicable earthquake design requirements. The project will support the development of a separate chapter on the seismic retro-fitting of existing buildings, which has been scheduled to be drafted as a part of the current code revision process. The result of the review will be a series of recommendations for changes for the next version of the code, work which will be continuing during the early stages of project implementation. A study of procedures and practices for code enforcement, as related to earthquakes, will be included. It is expected that this activity will be implemented in cooperation with a related project financed by JICA (Japanese International Cooperation Agency). The Code Review will be integrated with the Professional Training described below, as a related component to support the ongoing code revision process underway in Romania.

In developing both training and code review components, MTCT convened a steering committee (SC) under the leadership of the General Director of the Technical Directorate (GDTD), with members of the professional, academic and engineering communities. The Code Review component will be implemented in parallel with the training component (subcomponent B.5) and be based partially on feedback from the training component, where hands-on design under different codes will be undertaken. MCTC is including the Code Review in its annual code revision agenda for 2004.

With regard to code enforcement, The Ministry of Transport, Construction and Tourism enforces building codes either through its own personnel or other experts trained and certified by the ministry. The general consensus is that the enforcement of codes is effective and substantially free of inconsistencies.

### **Sub-component B.5 Professional Training in Cost-effective Retrofitting Methods (US\$ 0.38 million).**

A review of recent retrofitting work in Romania shows a tendency to conservative design, resulting in high material consumption and associated costs, as well as inappropriate architectural impacts. A need was identified during project preparation to expose and train the Romanian design community and its clients to concepts of risk management and cost-benefit analysis in the design of strengthening and mitigation interventions. More cost-effective designs would meet risk management criteria while at the same time save resources and enable more structures to be retrofitted. The outcome of this activity will support the project's retrofitting investment activity, as well as the on-going Government program for seismic strengthening of private buildings.

The training component will introduce up-to-date earthquake engineering concepts to Romania, building on the already well-developed professionalism of its engineering community, and will be integrated with the Code Review sub-component described above. A certification process for participants will be officially recognized by academic institutions and by Government. Course content has been agreed in principle. The training will be university-based, and a distance learning module will be implemented for sustainability. The program of training sessions will provide at least three seminars of five to seven days each, for 30 to 40 participants in each session. The participants will be structural engineers who design and strengthen buildings for earthquake resistance, as well as representatives from the academic community, architects, and engineers from various government agencies. The following will be invited to attend:

- Approximately 40 design companies and 70 contracting companies qualified in retrofitting design in Bucharest and the 16 counties of the Vrancea seismic area.;
- Registered and licensed technical experts, design supervisor engineers, and site supervisor engineers.
- Municipal and county office construction inspectorates for Bucharest and 16 county offices covering the Vrancea seismic area; as well as the local authorities (county head offices, city halls);
- Central authorities (8 ministries).

The training component will be developed in collaboration with a recognized international professional engineering association. The steering committee has defined the structure, content, criteria, logistics and estimated cost of the training component, and drafted the required Terms of Reference. Seminar content will cover (a) alternative strategies for seismic design, including the techniques of base isolation, energy absorption and damping systems, modern strengthening techniques, etc., (b) new materials for strengthening, (c) introduction to the development and use of performance based criteria, (d) actual design examples of strengthening schemes to be used later in the project for buildings in Romania (as discussed in the following paragraph), (e) the development and use of Probable Maximum Loss estimates, (f) lessons from recent destructive earthquakes that are applicable to Romania, (g) current international developments in building codes.

Up to 5 buildings for which designs have not yet been undertaken will be analyzed and conceptually designed by the seminar instructors in order to demonstrate the different physical impacts and cost savings that can be accomplished using alternative techniques and design approaches. The buildings could include a hospital or emergency center building, a large public building such as a City Hall and a registered historic building.

The seminars will be conducted in Bucharest and at least one other location in Romania, and will be conducted as soon as practical after funding is approved. The language of instruction will be English with



simultaneous translation in Romanian. A nominal fee is envisaged for private sector participants, and a certificate will be given to trainees upon successful completion of the course.

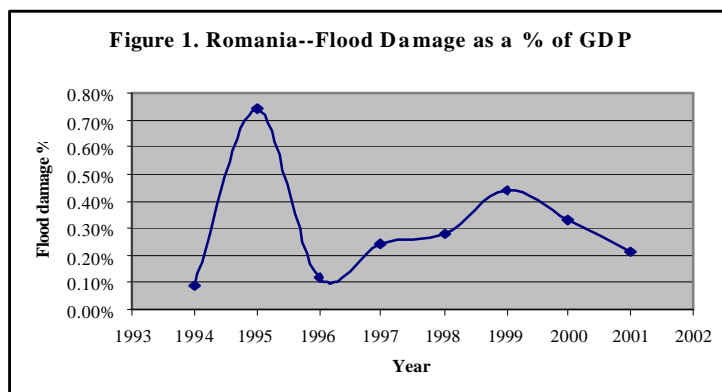
Three foreign earthquake engineers with extensive design experience and up to three Romanian instructors will conduct the training. The international instructors will be in charge of the design of one of the buildings that will be used for examples. Each will conduct approximately one third of the seminar. The training will be phased to be coordinated with the work of the internationally-procured design services in order to provide the opportunity to deepen the training experience with additional practical activities in the design process. Copies of all presentation material will be prepared for distribution at the seminars. Notes and videos taken during the seminars will be used to develop a Distance Learning Module for later use by the structural and earthquake engineering community of Romania.

### Project Component C - Flood and Landslide Risk Reduction - US\$ 101.09 million

**Objective.** The objectives of the component are the following: a) to reduce flood risk and vulnerability which severely curtail development in critical areas in Romania, b) to improve safety of selected large and small dams so that these structures can function as designed, and c) to map and model the risk of landslides in Romania in order to reduce losses and provide for better land planning tools.

**Background. Risk Overview.** Floods constitute the key natural hazard in Romania. They often affect Romania and there is a tendency for increased flood levels and frequency in the last decade. In the 1990's, between 1992 and 2001 there were floods every year in some parts of the country resulting in significant human losses and material losses. Most of these losses are borne by the rural sector in townships, villages, and communes which affect the poorest groups of people. The average annual losses account for 0.3-0.7% of the total GDP and over 2% of the rural sector GDP. The total losses due to floods during 1991-2002 were about US\$1,323 million, of which US\$583 million during 1997-2002. A total of 1.3 million ha and 500,000 people are at serious risk of being flooded every year in 16 out of the total 42 counties. In the last 5 years it has been observed that the number of townships and villages seriously affected by floods has increased from 300 to over 800. Every year for the last 6 years flood damage has exceeded over \$120 million, and in some years over \$200 million. These are direct asset losses and do not account for all the economic losses.

Figure 1 shows the flood vulnerability between 1994-2001 as a function of GDP. The losses are significant and translate into 4 to 5% of the GDP growth in real terms.



Though flooding is a natural phenomenon, man-made developments have increased flood vulnerability substantially. Most of these vulnerabilities have been created by developments in the flood plains, especially those river basins that have not been protected. In addition, much of the man-made vulnerability

is due to poor safety of dams constructed in the past. Some of the dams have failed or do not have the capacity to be operated properly so flood vulnerability has increased substantially.

*Flood Defense for Internal Rivers.* In general, the water regime of the Romanian rivers is characterized by high flows during February through May and low flows during the rest of the year. Repeated and intense floods constitute one of the characteristics of the hydrologic system. The highest frequency of floods is observed during the March-June period, while the least frequency is during January and August till September. From 1991-2002 the total flood damage was \$1.32 billion, and there seems to be a slight increase in flood damage over the years, although there are anomalies for 1991 and 1995 when flood damage exceeded \$200 million.

Despite substantial capital investment carried out in this area, there is still a large area without any flood mitigation works, about 11,000 km<sup>2</sup> (1.1 million ha) being still unprotected.

*Flood Defense along Danube River.* Floods along Danube River frequently occur in spring, as a result of snow melting in its tributaries' basins, located mainly on upstream and mid-stream sectors (Germany, Austria, Czech Republic, Hungary and Serbia). Floods can also occur during other seasons as a result of heavy rainfalls in Europe or in Romania overlapping with high levels of the Danube. To protect side areas from floods, embankment works started in 1925 and continued, at variable pace, until late 1970s', reaching protection of about 50,000 ha in 1940s' and over 430,000 ha in 1989, through a total length of embankments of 1,136 km. Due to these works, stable agriculture farming, agro-processing activities, trade and industrial activities could be developed.

In the last decade, the aggressiveness of the Danube River increased mainly due to combined effects of low sediment transport (stopped by various dams on its own course and tributaries), increased naval traffic, changes in daily flow (due to power generation), and changes in river bed morphology. As a result, bank erosions became more active, reducing the width of the safety band (bank-dike area) and endangering the safety of embankment works. The Danube dikes are being seriously threatened by the erosion of the riverbanks, which makes many cities and towns vulnerable to floods. Failure of these dikes could result in flooding of large areas and affecting hundreds of thousands of people, many towns and cities and resulting in damages of hundreds of millions US\$.

*Large Dam Safety.* Romania has 246 large dams (according to common definitions), including both permanent and temporary storage reservoirs. Most of these dams belong to the main two dam holders in Romania, namely the Company of Hydroelectricity (Hidroelectrica S.A.) that administrates the facilities having as main purpose the production of electricity, and the National Administration - "Romania Waters" (Apele Romane) that is responsible for storage reservoirs for flood protection and water supply. "Apele Romane" owns 144 of the large dams, out of which 55 dams are unsafe and on a priority list of the National Commission for dam Safety (CONSIB) as subject to special monitoring. It is estimated that the economic losses as a result of failure of the dams could range from \$300 to \$400 million and would cause loss of many human lives. The safety of the major dams is fairly established, but there is still a number of dams that are not completely safe due to uncompleted or improper design and construction resulting in abnormal seepage, large and growing displacements, faulty hydraulic equipment, etc.

*Small Dams Safety.* There are about 1,260 small, local dams, the condition of which is not very well known. These dams are administered by organizations such as National Forest Administration (NFA); SNIF (National Company "Land Reclamation"); fishing companies; the local public administration (rural); or local companies, which represent the largest share. Those dams are mostly earthfill dams with small heights producing small storage reservoirs. These dams and the storage reservoirs can generate serious problems at the local level. Most of the dams have execution faults. The execution of smaller units

(farming and fishing ponds of the former farming cooperatives) was carried out without technical documentation or water management authorizations. The downstream riverbeds are not regulated or, due to inappropriate operation, are strongly eroded and have a low riverbed. The storage reservoirs except some of those administered by NFA and the PISCICOLA fishing associations, lack sufficient personnel, response system, maintenance and repairing plans, etc. At most of these facilities, the high waters spillways are either undersized or completely missing making the floods routing impossible. Due to the lack of the works for high waters routing, many of these dams were damaged or destroyed during floods.

Landslides. Romania has 987 administrative units (34 municipalities, 78 small towns, 875 communes) that are under the risk of landslides. Most of the localities fall in the high risk category (32 % of municipalities, 37 % of small towns and 59 % of the communes). At the beginning of 2001, according to the MAFRD data, 702,000 hectares of the total area of Romania was affected by landslides. The magnitude of individual landslide event ranges from a couple of hectares to 585 hectares (Lunca landslide in Vasluiet watershed). Landslides bring damage to housing, public buildings, roads, other infrastructure, as well as cause disruption of economic activities. The risk is mostly concentrated in seven watersheds: Upper Barlad (88,700 ha), Vasluiet (45,464 ha), Racova (48,534 ha), Crasna (25,942 ha), Tutova (62,164 ha), Middle Barlad (117,541 ha) and Prut (151,235 ha).

The landslides are triggered by natural and man-made causes. Natural causes are generally due to rainfall, snow thaw, and earthquakes. Man-made causes are: bank erosion and excavations at the toe of hill, overloading of hill slopes by construction of buildings or roads, causing slide of slopes when it becomes saturated with rain water. Proper planning and prevention of deforestation above slopes can substantially reduce the landslides.

**Government Actions.** The Government of Romania is aware of the serious risks posed by the floods and landslides, and has taken many effective steps to address them.

Flood Defense on Internal Rivers. With the support of the technical community, all areas of internal river risk were identified and many studies have been undertaken. Apele Romane has also identified all the high risk river basins and high risk rivers and river sections, and areas which are vulnerable to annual damage. The Government has not only planned to take risk reduction measures but, based on the detailed studies, it has developed a comprehensive overall master plan to reduce flood and dam safety risk. This master plan for river basins has been estimated to cost about US\$1 billion over the next 10 years.

The Government, with the Apele Romane as the executing agency, has also taken an initiative in view of the urgency of flood control to obtain several sources of funds from the European Union and other international donors to implement critical flood defense projects. A total of EURO 400 million has been obtained to implement flood defense projects. These projects are part of the above mentioned master-plan to eliminate frequent flood losses in many of the North and North Western areas of the country.

Flood Defense along Danube River. Taking into account the increasing vulnerability to floods and following bank erosion and potential collapse of embankments, the Ministry of Agriculture, Forestry and Rural Development through SNIF, has commissioned in 1993-1994 a master plan for capital investments in protection of the Danube River flood plain, including detailed inventory of all dykes and protected areas (polders). The study was subsequently used for preparing an investment strategy, based on prioritization of interventions according to a set of economic criteria. The total investment program is estimated to cost about US\$60 million. The overall priority program was approved by MAFRD, detailed projects were prepared, and construction works started for securing the safety of first priority areas having the highest risk and best economic return of rehabilitation investment.

*Landslide Risk Reduction.* Realizing the magnitude of landslide hazard, the Government passed a Law 575 of October 22, 2001 (*Plan of Management of National Territory – Section V – Areas of Natural Hazard*), which provides a summary information on landslides in Romania and clearly identifies all communities under landslide risks. The law stipulates that all areas at serious landslide risk are set aside and should not be developed. However, the maps included in the legislation only indicate communes but not the specific areas with risk of landslide located within given community. Therefore, the land planners and decision makers need more detailed digital maps and models to determine under what conditions the landslides may occur.

### **Component Description:**

The activities to be supported by this project component are designed to reduce flood and landslide risks of the most vulnerable rural and urban communities. These project components were selected after careful prioritization using specific criteria based on economic and social losses, environmental impact, and safety of structures.

### **Sub-component C.1 Flood Protection Infrastructure (\$28.94 million)**

This component will provide support to rehabilitation and upgrading of flood protection works in areas with high flood vulnerability. This will also include improvement of flow conditions. It will focus on the flood defenses of internal rivers. There are 9 sub-projects included under the project located on the following rivers: a) Tarna, b) Tarnava, c) Cibin, d) Prut, e) Balint, d) Teleorman, e) Valsan, f) Slanic, g) Babadag. Most of these projects are located in rural areas. Project selection was based on the vulnerability of the areas to floods and the damages that have been measured in the past. The schemes fall in the categories of very highly vulnerable or high vulnerable to floods counties.

The flood defense sub-projects consist of riverbank protection, riverbed control (necessary due to deep scouring which makes the riverbanks unstable), and repairs or reconstruction of dikes damaged by previous floods. In more detail, the project will finance the following categories of capital investment:

- Rebuilding and repairs of dikes in those locations where they broke down (breaches) because of previous floods
- Increasing height of dikes in the areas where the tops of dikes are below provisioned flow level or where the 50 cm construction safety freeboard does not exist
- Building of new dikes in the discontinuity areas (where dikes are not completed) or polder dykes to protect certain communities
- Extension of dikes in the fixing areas due to increasing top height according to provisioned flow plus freeboard level
- Quarry clay protection of existing dikes as to stop water infiltration during high flow periods
- Bank protection in areas with active erosion or in the sectors where the bank - dike area is very narrow or it does not exist and the dike is endangered by bank erosion
- Underground discharges for water delivery outside confined areas
- Construction of low dykes (where appropriate) or walls of 1-2 m where dykes are not possible
- Improving river bed condition and improve flow regime

The required works for each location were identified in the feasibility studies. Selection of the sub-project locations was conducted based on a prioritization process carried out by the MAFRD through Apele Romane. The prioritization process included a set of criteria, such as inclusion of the proposed sub-project

in the MAFRD master plan, current safety of existing flood protection works, population at risk, value of damages avoided through the sub-project, and stage of designs preparation.

### **Sub-component C.2 Danube River Bank Protection (US\$ 6.81 million)**

The sub-component will finance rehabilitation of existing flood protection structures along the Danube River, in three sections where the flood vulnerability is very high and the existing dykes are endangered by the aggressiveness of the river. The selected sections are located on the downstream sector of Danube River; three of them are part of the overall embankment of Borcea Island, on Borcea Branch, as identified below:

- a) Borcea Island – Bentu Section
- b) Borcea Island - Bordusani Section
- c) Borcea Island - Facaeni Section

The main works to be carried out will consist of riverbank protection with the use of revetments and underwater riprap protection. The three schemes have been selected based on the critical nature of the bank erosion on the Danube River. The protection works will stop the erosion of the riverbank and high river flow towards the dikes and thereby ensure their safety. The locations were selected from a group of first priority locations, ranked following a prioritization process (as above) based on a set of criteria including: intensity of Danube bank erosion; safe operation of dikes for maximum protection provided to respective polders; value of damages avoided inside embanked areas (damages estimated in case of dykes collapse); total capital investment cost; and ratio of investment to avoided damage.

### **Sub-component C.3 Large Dams Safety (US\$49.43 million).**

There are 8 large dams which are regarded as unsafe and need immediate rehabilitation so that their safety and operation is restored. These are: a) Dridu, b) Varsolt, c) Berdu, d) Poiana Uzului, e) Maneciu, f) Lesu, g) Valea de Pesti, and h) Siriu. Due to the Romanian dam safety requirements the water levels are kept well below the normal operating level and most of economic functions (irrigation, water supply, hydropower generation or flood control) of the reservoir are never fully performed.

In case of all these dams, there have been identified leakages through the dams or through the embankments. The outlet structures, irrigation and power tunnels have corroded, are unsafe, and need to be replaced. Many of the spillways are under-sized for the check floods. Many of these structures were constructed at a time when funds were very scarce, and therefore, the proper construction procedures were not followed. For example, the tests on foundation grouting were never completed because of lack of funding. Typical rehabilitation works to be undertaken will be as follows:

- Works at dam foundation and grouting
- Dam upstream/downstream slope reshaping
- Spillway repair/rehabilitation works to secure safe operation
- Reservoir banks protection in the areas with strong erosions
- Replacing/rehabilitation of the existing drainage system
- Realignment of roads
- Execution of drillings for discharging the water from galleries
- Reservoir anti-erosion stabilization by development of forest belt around the reservoir
- Rehabilitation of the monitoring system, provision of new equipment
- Rehabilitating the warning system for emergency situations

Detailed works for each dam were included in the feasibility studies. It should be noted that all dams will be fitted with proper monitoring equipment: piezometers, inclinometers, deflection measuring devices, settlement monitoring monument gauges, etc., so that future safety can be continuously monitored and corrective actions can be taken to ensure long term safety of the dams.

*Dam Safety Panel.* The project will also support the Dam Safety Panel (both local, and foreign consultants) for a period of 5 years. The actions and provisions to ensure compliance with Bank dam safety policies are outlined in section E.7 of the PAD.

*Upgrading of Monitoring Equipment And Software.* In addition, the project will finance upgrading of Apele Romane's software and equipment for the purpose of alerting the monitoring group in case any threshold parameters of the intensely monitored dams are violated.

*Environmental Advisory Group.* The activities supported by component C will have an environmental advisory group in addition to the local environment supervisor who will implement the Environmental Management Plan. The environmental advisory group will consist of foreign experts and will be funded by the Project.

#### **Sub-component C.4 Small Dams Safety (US\$15.22 million).**

There are several small dams that have been identified as critical and in need of immediate rehabilitation to ensure their safety. These are: a) Bozovici, b) Sanmihaiul, c) Catamarasti, d) Buftea, and e) Pucioasa. Many of these dams have a high probability of failure. The typical works that need to be undertaken are the following:

- Refurbishment of gates, water intakes
- Removal of sediments and cleaning of closing structures (gates)
- Repair / rehabilitation of spillways
- Repairs of drainage works
- Sediment retention works upstream of the reservoir, to reduce further siltation
- Repairs/replacement of equipment
- Rehabilitation of the monitoring system and early warning systems

The small dams will be equipped with a scaled down version of monitoring equipment to ensure that safety of the structures can always be gauged, and corrective actions can be taken if there are any deficiencies in the design or the construction.

The CONSIB has reviewed all the dams proposed under this project and a special panel consisting of 6 members have been appointed to ensure that the requirements of Bank Safeguards on Dam Safety are fulfilled. The Panel of Experts includes the following specialists: geotechnical expert, geologists, dam structures expert, construction engineer, hydraulic engineer, and hydrologists.

#### **Sub-component C.5 Landslide Pilot Area Studies and Development of Standardized Monitoring Manuals (US\$0.69 million)**

The landslide risk reduction activities will support development of a standardized monitoring program based on pilot studies. This program will be used to monitor key local sites which have high risk for

landslides. The project will support development planning by the local authorities, and will allow for better informed mitigation and emergency preparedness activities in the communities at risk.

*Pilot Landslide Monitoring.* The activity is designed for two pilot areas, for which the GIS maps will be developed and will include information on morphology, hydrogeology, land use, soil type, soil strength, etc. It will allow for collection of the long-term data for the model refinement. The two pilot areas will be used to gauge ground movement and ground water pressure per second. Slope movement will be recorded with instruments which detect stretching and shortening of the ground. Ground vibrations caused by slide movement will be monitored by geophones put within the slide. Ground water conditions within the slides will be monitored with sensors, and rain gauges will record precipitation.

*Development of Models to Predict Landslides.* Based on the data collected in the first phase of the sub-component implementation, the landslide risk forecasting models, under different conditions of soil, land slopes, land cover, and rainfall will be developed and tested. The model will require the use of finite element or finite difference visco-elastic models for slope failure. In order to expand the knowledge in Romania on landslide forecasting, an integral part of the activity will be international training for the key Romanian researchers.

*Development of Manual for Monitoring of Landslides for Critical Areas and Development of Emergency Preparedness Systems.* Based on the pilot area studies, a manual will be developed which will describe in detail the requirements for monitoring of critical landslide areas. The manual should cover the following:

- Mapping requirements in GIS format for eight or more key layers of information: morphology, hydrology, hydrogeology, geology, depth of soil to bed rock, land use, soil type, soil strength, etc;
- Developing an optimal grid to locate key monitoring equipment which will define in detail the landslide area and its movements;
- Key equipment and sensor needs to monitor ground stretching, shortening, vibrations, groundwater levels, rainfall, surface runoff, soil moisture levels, etc.
- Data logging devices for key monitored data and transmission of data to centralized data collection computers;
- Developing key representative parameters for input to models;
- Use of finite element or finite difference using visco-elastic methods of predicting ground creep or ground movement and the ultimate slide;
- Development of warning systems and emergency preparedness program for major landslides. The emergency preparedness system will define areas to relocate affected people where they can be provided with food, shelter, sanitation, public health, transportation, etc., as required.

**Project Component D: Risk Reduction of Mining Accidents in Tisza Basin - US\$15.25 million  
(US\$6.24 million GEF, US\$5.48 million IBRD, US\$3.53 million GOR)**

**Objective.** The development objective of this component is to reduce the risk of water and soil contamination and loss of human and aquatic life from catastrophic mining accidental spills of pollutants. The global environmental objective is to demonstrate and provide for replication for the reduction of catastrophic accidental spills of transboundary pollution loads from mine operations flowing into the

Danube and Black Sea basins. In support of the above-mentioned development and global objectives, the project will assist in the piloting and replication of hazard prevention and remediation activities for improving the management and safety of tailings dams and waste dumps facilities; and in catalyzing transboundary cooperation on integrated water resources management in the Tisza basin . Two high-risk and high-priority sites, Rosia Poieni and Baia Borsa mines, have been identified for hazard prevention interventions during the initial phase of the project. These sites require emergency action. Additional sites are expected to be identified during project implementation. A key indicator of this component's success is the gradual reduction in the number and the negative impacts of mining accidental spills of pollutants into the Tisza Basin. The successful implementation of this component will serve as a model for replication for reducing mining accident risks to human and aquatic ecosystem health throughout Romania and other parts of the Tisza and Danube basins.

The design of this component has benefited from a review of international experience; previous and ongoing work undertaken by ICPDR, the Austrian Ministry for Foreign Affairs, and the United Nations Environmental Program as part of the Awareness and Preparedness for Emergencies at Local Level (APELL) Program; and from suggestions and recommendations that emerged from a Regional Workshop on the Management and Safety of Tailings Facilities, which took place between October 8 and 10, 2003 in Romania. The review of international experience will continue during project implementation. The project will also foster synergies with other ongoing programs in the Tisza basin, e.g., prevention of industrial hazards project supported by the French Government, the risk mitigation project at Novat dam supported by the Austrian Government, among others.

**Background.** *The Tisza River and Water Resources Management.* The Tisza River with about 970 kilometer (km) in length is the largest tributary to the Danube. From its total length about 160 km lies in the Ukraine and Romania border, about 650 km in Hungary, and 150 km in Serbia and Montenegro. Its catchment area of 0.157 million square kilometers is distributed as follows: about 46% of the catchment area lays in Romania, 29% in Hungary, 9.7% in Slovakia, 8.1% in Ukraine, and 6.6% in Serbia and Montenegro. The volume of flow of the Tisza River passes across international boundaries. In order to ensure the long-term protection of the river ecosystem, transboundary co-operation on integrated management of the Tisza River Basin is required.

Romania as a candidate for membership of the European Union is committed to adopt and implement the EU environmental directives, including the EU framework directive for water management. The EU Water Framework directive introduces the concept of management of river basin as an integrated approach and calls for the elaboration and implementation of a river basin management plan for achieving "good water (quantity and quality) status," which shall address among other issues, point-source pollution reduction (including those of mining activities), prevention and mitigation of threats from land-based sources of pollution, chronic and accidental pollution, flood control and management, and conservation of aquatic ecosystems. At the national level, efforts are under way to amend the national legislation and harmonize it with EU directives and to prepare management plan for the Upper Tisza Basin. At the regional level, the countries in the Tisza basin, namely Ukraine, Slovakia, Romania, Hungary and Serbia and Montenegro have just started dialogue on basin-wide management under the EC Tisza River Basin Project Tisza and the UNECE River Basin Sustainable Development Program.

*Romanian Mining Sector.* The Romanian mining sector has a long tradition and is important to the country and has a good future in terms of reserves and potential exploitation. Currently the sector faces difficult challenges in relation to economic, social and environmental requirements. Total direct employment in the mining industry is about 10%, and is higher than in any other European Union country. Long-term impacts on the environment and human health have occurred as a result of diffuse pollution from sites



subject to mining activities over centuries. The Government has launched a restructuring of its mining industry, and efforts are underway to close uneconomic mines and address environmental liabilities. This undertaking is supported by the FY99 Mine Closure and Social Mitigation Project (MCSMP). Privatization of the sector is also part of this restructuring, which poses additional environmental challenges related to environmental liabilities from past mining operations. A follow-up Bank-supported project scheduled for FY05 will assist the Government in addressing the social and environmental issues associated with the further restructuring of the mining sector including improving the safety of tailings dams of closed-mines.

The Government is committed to improve the environmental performance of the mining sector, and has recently completed a comprehensive Mining Sector Environmental Assessment (MSEA), which provides a baseline evaluation of the state-owned and private mines throughout the country. The MSEA identifies the main environmental issues arising from ongoing mining activities, and priority areas for future environmental remediation/mitigation efforts. The MSEA has identified that a large number of operating mining sites require urgent environmental rehabilitation of their tailings and waste storage facilities to avoid catastrophic and continued releases of highly persistent toxins, thus reducing the risk of mining accidents with long-term environmental consequences.

*Accidental Pollution Threats.* According to available information, there are 264 facilities constructed to store mine tailings throughout Romania, out of which about 40 pose a severe threat to the surrounding human population and the environment. A recent inventory in the Tisza Basin has identified 17 tailing facilities as potential risk spots. Romania has a large number of abandoned tailing storage facilities and mine waste rock dumps, which are also sources of contamination. As proven by the two accidents in northwestern Romania in 2000, Aurul S.A. Mine and Baia Borsa Mine, the failure of tailings storage facilities can have serious and devastating consequences. These tailing disposal facilities accidents heightened concern in the international community, primarily those bordering the receiving surface waters, that tailing facilities represent a major risk to the environment, both in the short- and long-term. According to field investigations, the two reported accidents could have been avoided if adequate quality assurance and technology were used in the design of water management (in particular, flood handling components) of the facilities, proper forecasting system linked to existing rainfall and snow pack gauge stations, continuous monitoring system, and a proper emergency preparedness and response procedures by the companies and local authorities were in place.

Several actions were taken at the Aural mine to reduce the risk of catastrophic accidents. The closed-circuit water management system at the Aural mine was upgraded and adjusted to higher load cases after the 2000 accident. In addition, the tailings dam was repaired, additional capacity for cyanide containing process water was created, erosion control and stabilization measures of the dam body were increased. The freeboard of the dam increased significantly to allow for extreme climate events. The tailings facility is in compliance with international best practice. At present, the use of cyanide is not banned in Romania. While use of cyanide continues at the Aural mine, environmental matters are respected, emissions are kept within acceptable limits, and the site is regularly inspected by the environmental authorities.

Factors contributing to high mining accidental water pollution risk in Romania in general, and the Tisza Basin in particular, are as follows:

*Poor management of tailings dams and waste facilities.* The risks present at tailings dams facilities are several, but the most important are: breach of dam structure and discharge of tailings, slope instability of waste dumps, poor water management and seepage of contaminated water into surface and groundwater,

dust emission from dry tailing surface by wind and deposited into water bodies, soil erosion associated with wind and rain water, hazardous chemicals, acid mine drainage and heavy metal contamination. Tailings dams facilities present the greatest threat from a sudden failure as experienced in the overtopping failures at the Baia Mare and Baia Borsa mines in 2000. Instable waste dumps located upstream of the tailings facilities also contribute to the risk of failure.

*Limited investment on environmental improvement in the mining sector.* The Romanian mining sector has a legacy of extensive environmental degradation. There is a growing awareness of these problems but little effective action to solve and prevent them. All environmental agencies and natural resource management agencies considered mine tailings and mine-related wastes as the number one environmental contamination threat. However, due to economic constraints, environmental-related investments by the mining companies in Romania are limited. Many mining wastewater treatment facilities are in poor condition and are working with a minimum of efficiency. Under present conditions, large volumes of polluted wastewater are discharged directly into the environment. The recently prepared Mine Sector Strategy however recognizes the importance of addressing tailings dams facilities and calls for more financial support.

*Insufficient knowledge about the extent and risk of mining-induced pollution and lack of reliable information.* Baseline conditions in the surface waters and receiving waters in the Tisza catchment region are limited. The nature and extent of potential risk associated with mine-induced pollution can not be assessed with current data. This limits progress on establishing risk based cleanup levels and on evaluating the performance of mine and dam tailings water quality improvement projects as well as success of emergency response actions. In addition, there is a significant lack of reliable information about past design assumptions as well as construction conditions.

*Limited institutional capacity to implement and enforce regulatory instruments and standards.* The continuation and exacerbation of mining accidents is not caused by the lack of regulatory instruments or standards, or by the absence of institutional organization. They are mainly due to a lack of implementation and enforcement of the current regime. Both human and financial resources are scarce; awareness and understanding of complex environmental factors (including weather) in the mining sector is limited, and agencies that support and regulate tailings facilities lack specific experience.

*Emergency response plans are in place but some are outdated and often are not effective.* According to the Romania Water Law, each company should have an emergency response plan. Although many companies have such plans, capacity for implementation and coordination with local and central authorities is poor. Mining companies and regulatory agencies have voiced the need for improved in-house risk assessment and risk management capability, real time monitoring and response capability in order to increase their contribution to management decisions related to tailings dams facilities.

**Government Policies and Strategies and Ongoing Programs.** The Government policies and programs to mitigate the risk related to mine-induced pollution in Romania are as follows:

*Reorganization of the mining sector.* In 1998, the Government of Romania launched the reform of the mining sector. A new Mining Law was passed in 1998, which sets modern rules for the management of the mineral resources. Implementation of the reform is ongoing. Several unprofitable mines have been closed and environmental and safety concerns are being addressed in the decommissioning and post-closure phases.

*Legislation on the safety of tailings dams.* After the two accidents in the Maramures region, the Government decided to harmonize tailings dams legal framework with international practice and

procedures and in 2001 the Dam Safety Law was amended to address the safety of tailings storage facilities. This assumes particular relevance in the context of the recent update of the World Bank safeguard policy on Dams Safety. Regulations are being prepared to provide guidance on how to enforce the legislation. Romania has established index prioritization procedures for tailings dams facility, which aim at risk-based prioritization rather than broader risk management objectives. Limited data precludes quantification of realistic risk indexes.

*Mine closure procedure manual.* Under the MCSMP a Mine Closure Procedure Manual for the closure of state owned mines has been drafted and issued as a Ministerial Order. Drafting of a version of the Manual for privately owned mines and eleven annexes to support both Manuals are under preparation. These annexes will include guidelines on the decommissioning and rehabilitation of tailings dams and waste dumps.

*Environmental improvement in the mining sector.* An environmental action plan has been drawn to mitigate environmental impacts in each sub-sector and a pilot environmental action plan for Lipuna Mine has been prepared. The Government is committed to improve the environmental conditions in the mining sector, and is currently establishing requisite mechanisms to ensure implementation of priority investments.

*Improving knowledge base.* Several government and donor activities relevant to the proposed project have supported development of information and monitoring systems in the Maramures region, i.e., UNEP-supported risk assessment and environmental impact assessment, EU-supported compilation of available data to determine causes and effects of the spills, ICPDR-supported identification of pollution sources, Italian-supported risk environmental and health impact risk assessment, WWF-supported assessment of impacts of the spills. The effectiveness of these efforts however is hampered by lack of adequate equipment and mobile analytical capability, transport and computers. Moreover, methodologies for data collection and transmission is not standardized, e.g., each entity used its standard for “sea level” or elevation benchmark rather than that used by Romania. Analytical data was also not comparable due to varied analytical methods and sampling methods. In some cases analytical results varied by over 112 fold. This resulted from variations in sample preparation (filtered vs. unfiltered and digested vs. undigested).

*Emergency response capability.* Plans are under way to transpose the EU Water Framework Directive, which calls for measures at the watershed and basin levels to prevent significant pollution from these facilities and reduce the impacts of accidental pollution incidents, and for installation of systems to detect or give warning of such events. The central and local governments don't have yet the response capability to address emergency situations and to monitor response activities and corrective actions in a timely manner.

*Outstanding Issues.* The outstanding sector issues that remain to be addressed include:

*Regulatory framework on the safety of tailings dams.* The current system on the safety of tailings dams can be improved by independent verification of the status of the facility. At present, the information used to perform risk categorization is provided by the mine operators or designers. Experts from the design institutions, certified to perform dam safety evaluation, are sometime among the permanent members of the dam safety commission (CONSIB). The proposed project envisages the involvement of two international experts to strengthen CONSIB. One of the experts will focus on the safety of tailings facilities and mine waste dumps and the second will focus on failure modes and effect analysis. This arrangement will allow to bring competence and expertise from abroad (international/regional experts) to reduce the risk of mistakes in design, construction, operation and management.

*Financing.* The Government will need to provide financial support to mines to improve their

environmental performance and address historical legacy and inherited liabilities of operational and closed mines. The MCSMP is currently financing the closure and rehabilitation of 29 mines in line with good industry practice. The Government is financing the closure of a further 262 mines using state budget resources. The Mine Sector Strategy prepared recently by the Government recognizes the importance of addressing environmental liabilities and call for more financial support for these purposes. The 2004-10 Government program in the mining sector plans to allocate US\$150.7 million for investments on environmental rehabilitation of mines that will be closed and privatized, including improvements on the safety and management of tailings facilities. The Government and the Bank has just started discussions on a FY05 operation to further advance the implementation of the Mine Sector Strategy .

*Baseline.* Improved baseline, information and knowledge base is necessary to support decisions on improving the safety of tailings dams and protection of water quality. Lack of reliable data is a significant impediment to the effective implementation of the current system for ranking tailings dams facilities. A comprehensive inventory and a detailed assessment of all abandoned and active mining sites and tailings dams in the Tisza basin has recently being completed and is being subject to verification. A similar inventory of waste dumps facilities is still missing. Similarly, a comprehensive assessment of existing contamination in the region is not available.

*Strategic planning and coordination.* The central government should play a stronger role in the area of strategic planning and coordination by helping to identify a priority range of corrective measures on the basis of a risk assessment of all mine sites (abandoned and under operation). Given the large number of mine sites that require improvements, there seems to be a need to try to strike a balance between being cost-effective and technically and scientifically comprehensive, detailed and sound. A more soundly based risk management approach to identify the best way to phase investments so that available resources can be channeled to those measures with the highest benefits – i.e., those that bring risk reduction and greater public safety, protection of water quality (surface and groundwater), soil and aquatic ecosystems as well as the economy of Romania and across the boarder needs to be put in place. Under the project, a Regional Task Force will be established to assist in getting the right balance so the project can maximize risk reduction within a reasonable timeframe and with tolerable cost, and bring the residual risk to an overall sustainable and acceptable level.

*Environmental and water management monitoring.* The environmental and water management monitoring systems need to be strengthened and laboratories should harmonize analytical procedures and establish a system of accreditation. Cooperation between various organizations involved on water quality monitoring needs to improve, as well as their roles need to be clarified. Several agencies have responsibility for surface water monitoring, mine environmental compliance and mine operation. It appears that operation and oversight may be held by the same agencies. For example, the Ministry of Agriculture, Forestry, Waters and Environmental Protection and the Local EPAs have limited monitoring capability and often rely on the regulated agencies and companies to provide them with data to determine compliance. This severely limits the effectiveness of the regulators. The proposed project will enhance the current environmental monitoring capacity in the Tisza basin.

*Emergency response capability.* If the current system is to function adequately, the emergency response capability must include appropriate response equipment, personal protective equipment, training, and environmental monitoring equipment. A review of current response and monitoring capability revealed that mobile analytical capability was nonexistent and local response entities lacked adequate personal protective equipment and spill response equipment. The proposed project will enhance the current emergency response capability in the Tisza basin. It will focus on strengthening capacity on emergency response, monitoring and surveillance as well as on-site contingency and emergency preparedness planning and to

improve emergency preparedness capabilities, particularly in relation to local communities at risk.

**Rational for World Bank and GEF Support.** The proposed project provides an opportunity to create a forum for transboundary cooperation to reduce the risk of accidental mining pollution and to identify concrete mechanisms to engage riparian countries in the development of integrated water and environment management strategies. Moreover, the proposed GEF-supported component directly supports the goals of the International Convention for the Protection and Sustainable Use of the Danube River. The 1994 Danube Strategic Action Plan under the Convention on Cooperation for the Protection and Sustainable Use of the Danube River is concerned with transboundary water issues and includes provisions to protect the Black Sea and Danube Delta against pollution by nutrient and hazardous. Until recently, most of the attention on the Danube and Black Sea basins has been concentrated on reduction of nutrient loads to address the problem of eutrophication in the Black Sea. The recent mining accidents in the Tisza catchment area, however, have pointed out that additional priority should be placed to address mine-induced water pollution and mining accidents.

Mining accidental spills in one country can have huge transboundary impacts in other riparian countries of the Danube River and Black Sea basins. Communities and ecosystems located far away from the mining region where the accidents takes place are at risk of pollution exposure. The recent mining accidents have increased public awareness of the environmental and safety hazards of the mining industry and have shown that the risk assessment and prevention of tailing dams pollution accidents have to improve. The long-term protection of Danube and Black Sea water quality thus calls for addressing ongoing degradation of mine tailing dams and continuous erosion of contaminants into surface waters of the area.

#### **Component Description:**

The component will identify, pilot and replicate cost-effective, efficient and innovative methods for tailing facilities management; contribute to improvement of capacity at both the national and local levels to conduct risk assessment and identify risk-based priority actions; establish comprehensive management guidelines to improve the performance of tailings management facilities by Romanian companies; strengthen capability to develop a long-term tailings dams risk/hazard mitigation strategy; strengthened environmental monitoring program to assess performance of the mining industry; establish a regional emergency preparedness and response system linked to the Danube Accident and Emergency Warning system; and strengthen further regional collaboration on integrated water resources management. This component will accomplish “on-the-ground-fixes” under Sub-component D.2. About US\$13.85 million will be devoted to physical hazards prevention and mitigation measures such as upgrading water management systems and water treatment plants, structural improvements and the upgrading of the geotechnical stability of retaining tailings dams and waste dumps, improvements of accessibility and communication. A detailed implementation plan has been prepared for this component and will be part of the PIP. The component will consist of the following activities:

#### **Sub-component D.1 Establishment of a Baseline and an Environmental Monitoring System (US\$0.87 million: US\$0.65 million GEF; US\$0.22 GoR)**

The project would assist in the establishing of common baseline indicators for water, sediment and air quality monitoring as well as the improvement and harmonization of Romanian environmental monitoring system with those of the other riparian countries of the Tisza Basin. The improved system will allow to monitor mining related impacts on streams and aquatic ecosystems, air and soil. The specific baseline values and methods would meet international standards and would serve as benchmark values in evaluating spill response and effectiveness of tailing dams remediation/reclamation activities for maintaining surface

and groundwater quality in key catchments in the Tisza basin. Since EU requirements for dangerous substances discharged to water have been transposed into Romanian legislation and approximation with the EU Water Framework Directive has been completed, the environmental monitoring system will meet EU standards. Apele Romane and the Regional Environmental Inspectorates of Alba Iulia and Baia Mare will be responsible for implementing the environmental monitoring system and to maintain it after project completion. The project will also support in strengthening institutional capacity.

The GEF funds will finance consultancy services to: (i) conduct baseline surveys to identify sources of sediment-associated harmful or toxic metals and compounds within the catchment, and examine distribution, storage and mobility of contaminant metals in river valley floors, floodplains and groundwater sources; (ii) design of the environmental monitoring system (including a qualification system, numerical indicators and methods to quantify them, and monitoring system necessary to identify extraordinary pollution); (iii) develop operational and maintenance manual; (iv) develop a computer-based model to forecast the long-term dispersal, storage and remobilization of sediment associated metals; and (iv) and train technical personnel. In addition, the GEF funds will finance equipment needs for the environmental monitoring system and will finance incremental operating expenses (on a declining basis).

**Sub-component D.2 Hazard Prevention and Remediation Interventions (US\$12.58 million: US\$4.24 million GEF; US\$2.86 million GoR; US\$5.48 million IBRD. In addition, Austria and USTDA will contribute with about US\$1.3 million equivalent)**

This activity will support the identification of a risk-based priority investment program for the Tisza River catchment area and the implementation of efficient and cost-effective hazard prevention and remediation measures in identified high-risk and high-priority hot spots in the Tisza Basin, aiming at improving the safety and management of tailing and waste facilities, thus reducing the risk for catastrophic release and the introduction of contaminants into surface waters contributing to the Tisza and Danube. This sub-component will accomplish “on-the-ground-fixes,” and about US\$11.2 million will be devoted to physical interventions to reduce the high-risk of failure of tailings facilities, such as upgrading water management systems and water treatment plants, structural improvements and the upgrading of the geotechnical stability of retaining tailings dams and waste dumps, and improvements of accessibility and communication.

*Inventory of tailings dams and waste facilities in the Tisza Basin.* The project will finance consultancy services to review the recently completed comprehensive inventory of tailings dams and waste dumps in Romanian part of the Tisza Basin. This will involve site visits of selected individual tailings and waste facilities to clarify status and risk situation, elaboration of a comprehensive list of tailings facilities, indicating ranking of risks/hazard and a prioritization regarding further works.

*Development of an improved risk-reduction approach.* During project preparation, technical assistance will be provided to Romanian experts to assess the existing conditions of two high-risk and high-priority sites on the basis of a risk analysis, which will incorporate identified failure modes and effects analysis (i.e., downstream consequences). A regional task force (including experts from Hungary, Serbia and Montenegro, and Ukraine) will be formed to review and harmonize failure modes and effects analysis, since a number of countries are affected by these consideration. The risk analysis will assist in identifying the risk reduction measures in the two sites in a cost-effective manner. During project implementation, advisory services will be provided to institutionalize a revised risk assessment approach and to expand it to also cover waste dumps facilities, on the basis of the lessons learned during the preparation phase. The project will support development of detailed procedures, covering geo-technical and environmental hazards, and integrating them into the legal and administrative framework for the management of mine

tailings facilities. Institution building measures, including potential failure modes and effects analysis workshops targeted to mine owners, operators and regulators as well as training for tailings dam safety regulators on risk assessment and risk management will also be provided under the project. This activity will be carried out by the National Agency for Mineral Resources in close coordination with CONSIB and assisted by advisors financed by the project.

*Prevention and remediation works.* During the preparatory phase, two sites have been identified as high-risk and high-priority sites for which immediate and emergency remedial works are required during the first phase of project implementation: (i) tailings dams and waste facilities associated with the Rosia Poieni mine; and (ii) tailings dams facilities associated with the Baia Borsa mine. Criteria used in the selection of these two sites include: (i) pose very high risks and hazards with significant and harmful transboundary consequences in case of failure of tailings facilities; (ii) exceptional high risk ratings according to Romanian methodology; (iii) typical tailings dams and waste facilities operations; (iv) potential for replication of risk reduction measures to be supported under the project – nature of risks and proposed measures are typical of many mines throughout the country; and (v) willingness of mine operators to implement mitigation measures.

Additional high priority candidate sites for remediation works will be identified during project implementation on the basis of a comprehensive risk assessment of all tailings dams facilities. While waiting for the completion of the comprehensive risk assessment, CONSIB will be prompted to act immediately on the immediate/emergency safety measures identified in the other tailings facilities in the Tisza basin. Project funds might be allocated for physical improvements.

The Rosia Poieni mine is located in the south part of the Aries valley in the Apuseni Mountains. It is the largest cooper open-pit operation in Romania, occupying about 40 BCM. The mine operation involves the Rosia Poieni open-pit, a processing plant, three waste dumps and three tailings dams facilities (one is close and two are under operation). About 130 million tons of mining waste is disposed of on three waste dumps, two of which are located in close proximity upstream of one of the operational tailings lagoons. The components of the mining operation, which have been assigned a particularly high risk during the preparatory phase are listed in the table below.

<b>Element</b>	<b>Identified Risk/Hazard</b>
Valea Cuiarului waste dump (250-300 meter height)	Generation of high amounts of acid rock drainage leaching heavy metals from the waste rock and low grade ore, geotechnically weakening the rock fabric and having a negative impact on the downstream Valea Sesei tailings dam facility.  Geotechnical failure of waste dump debris flows due to heavy precipitation and melting snow could trigger large, rapid mass movement that if reaches Valea Sesei tailings dam facility could cause overtopping of the embankment dam and displacement of acidic water.
Valea Sesei tailings dam facility (76 meter height)	Depletion of dam rockfill material and sub-erosion of limestone dam base and abutments by acid rock drainage, causing increased seepage and loss of fines through and under the dam body and geotechnical destabilization.
Valea Sesei and Valea Stefancei No. 2 tailings dam facilities	Blockage or collapse of decantation system.
Valea Stefancei No. 1 tailings dam facility	Blockage of spillway, erosion of dam crest/body and subsequent loss of tailings by overspill.

The Baia Borsa mine for non-ferrous metals is located near Borsa town in Maramures County. The main river within the area is the Cisla river. Tailings from the processing plants are placed in valley type tailings dam facilities of uphill construction. Certain parts of the mine complex were shut down in 1997. Out of the total five tailings dams facilities, only the Novat Pond is currently being used. The combined Colbu I and Colbu II tailings dams facility is used as a stand-by and contingency facility. The Novat dam had failed in March 2000. Novat is supposed to be one of only two closed-circuit tailings facilities in Romania, where all discharge water is being recycled. The lack of proper operation and maintenance of the the surface runoff diversion tunnel was the main reason for the March 2000 main dam breach: a 2.5 meter of thick snow cover and a 5-hour period of heavy rainfall led to an uncontrolled increase of the water level. The resultant overspill caused the total failure of the embankment. There were no sufficient contingency measures or emergency plans to cope with these conditions. The components of the mining operation, which have been assigned a particularly high risk during the preparatory phase are listed in the table below.

<b>Element</b>	<b>Identified Risk/Hazard</b>
Embankment dam at Novat	Continuous seepage through dam body, especially around the repaired breach area, and subsequent loss of fine material. Risk of rapid and progressive piping failure.  Rapid failure due to liquefaction, which could be triggered by small seismic event or even machinery vibrations.
Decantation facility at Novat	Inverse decantation system has been recently upgraded, but pumping station is in very poor conditions and very close above the waterline (risk of flooding in case of rapid rise of pond surface). A high risk of repeated lack in dewatering capacity as in March 2000.
Access road and power supply	Overall improvement of emergency response capabilities.

During the preparatory phase, a risk assessment will be conducted for each of the two priority sites to assist in the selection of remediation measures. The risk assessment will help assess what could go wrong in each site – i.e., identification of the potential triggers and failure modes, the probability of failure, and the consequences of failure, which will provide the basis for the development of a risk management system. Criteria will be develop to guide to establish levels of acceptable or unacceptable risks. Risk assessment will be conducted in close cooperation with riparian countries – see description of regional task force on failure modes and effects analysis.

The project will support the elaboration of detailed engineering design and supervision of civil works. Under the framework of this project, a few technical studies will be supported by USTDA valued at US\$1.0 million. The project will also support implementation of prevention and remediation works in the two already identified priority sites, including (among other works) tailings dam stabilization (buttressing the dam toe, strengthening the dam body, dam impermeabilization, stabilization of dam crest), emergency spillways, deviation/diversion channels, backup reservoirs, upgrading/reconstruction of pumping facilities, acid rock drainage treatment, waste dumps stabilization/rehabilitation/upgrading, and infrastructure and communication improvements. The project will also support the upgrading of technical equipment and operational training.

During the second phase of this activity, the project will focus on the replication of prevention and remediation works in other critical mines sites located in the Tisza basin. The project will assist in undertaking a portfolio risk assessment of identified priority tailings dams and waste dumps (from Activity 2.1), using a broad range of criteria developed during the preparation phase (e.g., tolerable risk criteria such as probability of failure, population at risk, potential economic losses, potential environmental



losses). This activity will finance consultant services for portfolio risk assessment, pre-feasibility and feasibility studies, detailed engineering design and supervision during construction of civil works; as well as the necessary civil works to mitigate the risks of failure.

Under the framework of this project, the Austrian government will provide financial support to Baia Borsa mine to implement critical works for improving water management in its tailings facilities in addition to emergencies preparedness and access. Total cost of these works will amount to US\$300,000 equivalent over year 2004 and it includes US\$60,000 equivalent from the mine operator.

**Sub-component D.3 Engineering and Environmental Guidelines for Tailings Dams and Waste Facilities (US\$0.21 million: US\$0.16 million GEF; US\$0.05 million GoR).**

On the basis of the results of Sub-component D.2, the project will support technical assistance and training for developing engineering and environmental guidelines for tailings facilities and waste dumps in the mining sector that minimize environmental risks during operation and after closure. Key features to consider during the development of the guidelines include: geotechnical stability, seismic strength, resistance to flood events, capacity to collect runoff water, etc. It is anticipated that the guidelines will cover the following topics: design and construction of new tailings dams facilities and waste dumps; safe operation and upgrading of existing tailings dam facilities and waste dumps; planning ahead for closure and safe rehabilitation of tailings facilities; and decommissioning and closing tailings facilities. Training and awareness of mine operators and design institutions are required for effective implementation of new guidelines. Training schedules will be established during project implementation and handbooks and training material will be developed.

**Sub-component D.4 Regional Mine Spill Disaster Response System (US\$1.21 million: US\$0.91 million GEF; US\$0.30 million GoR).**

This activity will improve the effectiveness of the current system for contingency planning, emergency response, awareness, preparedness and communication and will support the development of a regional mine spill disaster response system to deal in a incremental manner with the risks posed by accidental mining spills of selected mining companies located in the Tisza basin. The regional mine spill disaster response system will integrate the emergency response plans of targeted mines. Mechanisms will be put in place to assess the hazards posed by the spills as well as for reporting information to those responsible for taking action at the local, national and regional level (through the International Commission for the Protection of the Danube River and the regulatory entities). This system will complement activities proposed under the HRMEP, namely, Component 1, which focuses on strengthening and upgrading the emergency response capacity, and Sub-Component B.2, which among other things will focus on upgrading the flood forecasting and dissemination systems.

The project will finance consultant services to: (i) assist in preparing codes of practice and guidance on the preparation and implementation of emergency response plans; (ii) develop training programs for designated mining company personnel, who will be responsible for implementation of emergency response plans; (iii) assist in the development and installation of emergency response plans for selected mine operations posing high-level of risk from potential accidental failures of either tailings dam facilities or waste dumps with mine operators and local communities; (iv) public awareness programs; (iv) develop and implement training programs for technical and non-technical regional staff of the National Agency for Mineral Resources, Environmental Protection Inspectorates, Apele Romane and Civil Protection on mining disaster management and preparedness; and (v) develop technical specification for strengthening current communication systems. The project will also finance the procurement of the needed communication

equipment as well as incremental operating expenses (on a declining basis) for implementation of emergency response plans.

**Sub-component D.5 Promoting Transboundary Cooperation on Integrated Water Resources Management for the Tisza Basin (US\$0.37 million; GEF US\$0.28 million; GoR US\$0.09 million).**

Recognizing that it is only through regional dialogue between riparian countries that sustainable management of the Tisza basin can be achieved, during the preparation phase, Romanian authorities with the support of the World Bank organized a Regional Workshop on the management and safety of tailing dams facilities to start dialogue on the formulation of policies and programs geared to specifically address tailing dams and mining safety. Participants at Workshop agreed to foster and promote transboundary cooperation on the management of tailings facilities within the context of overall integrated water resources management. A proposal was put forward during the workshop to establish a Regional Task Force to review and harmonize the Failure Mode and Effects Analysis process and standards. The task force will be conformed by representatives from the riparian countries of the Tisza Basin, who will have the support of national policy makers. The project will support a first concrete step towards a basin-wide cooperation among the riparian countries.

During project implementation other efforts will be supported to promote integrated river basin management, building on existing transboundary and bilateral initiatives. The project will provide financial support to allow Romania experts and institutions to further advance and promote dialogue on basin-wide cooperation with other riparian countries and facilitate the development of a regional policy of cooperation in the management of tailings and waste facilities in the Tisza and Danube basins as well as the drafting of a proposal for a regional water resources project for the Tisza Basin (i.e., to support implementation of the EU WFD). The project will strengthen recent and ongoing bi-lateral environmental agreements as well as basin-wide initiatives directed towards integrated water resources management. The project will provide financial assistance to cover the cost associated with keeping the Regional Task Force, the participation of Romanian experts and decision-makers in regional events that promote transboundary cooperation on a broad range of topics and issues, and organization of meetings and workshops with the participation of upstream and downstream countries.

**Project Component E - Project Management - US\$5.21 million  
(US\$0.77 million GEF; US\$3.14 million IBRD; US\$1.30 million GOR )**

This component will provide support for project implementation. The main items to be financed from the loan proceeds include office equipment and furniture, means of transportation, staff salaries, staff training, and incremental operational costs associated with establishment and maintenance of the PMUs and implementing agencies located in the line ministries and responsible for implementation of relevant components. The proposed GEF grant will finance the cost of the core staff of the PMU under the National Agency for Mineral Resources.

**Institutional Arrangements.** The project will not create new institutions but will support the existing government entities by setting up Project Management Units (PMU) within their structures. Each ministry will be responsible for implementation of its component. This includes the full responsibility for all technical aspects of the implementation, monitoring, financial management, as well as procurement. The PMU located in the MTCT will be responsible for overall coordination and reporting including consolidation of implementation progress reports and financial management reports for the whole project.

The project components will be implemented by the following executing agencies:

- Ministry of Administration and Interior (MAI), for Component A
- Ministry of Transport, Constructions and Tourism (MTCT) for Component B
- Ministry of Environment and Water Management (MEWM) for Component C, and
- National Agency for Mineral Resources (NAMR) for Component D

**Component A - Strengthening of Disaster Management Capacity.** The Project Management Unit (PMU) for component A will be located in MAI, and will serve as the nodal coordinating vehicle for the activities included under the component. It will be responsible for assisting the ministry with procurement procedures, including preparation of tender documents, execution of tenders, assistance in selection of contractors; payment functions, accounting, and legal, financial and procurement record keeping. The TORs for activities under the sub-component A.5 (Preparation of Catastrophe Insurance Program) will be prepared by the Catastrophe Insurance Technical Working Group. The PMU will be staffed with key personnel consisting of: Director; Disaster Information Management Specialist; Emergency Management Specialist; Financial Manager; Accountant; Procurement Specialist; Assistant. The PMU staff will receive specialized training on project management, procurement, and financial management. It is envisaged that the implementation of activities under component A will be completed within 3.5 years, after which time the PMU will cease its operations.

**Component B – Earthquake Risk Reduction.** The PMU for this component, to be located in MTCT, will have dual functions: firstly, implementation of project component B, and secondly, reporting to the Bank on overall project implementation progress. In the latter function, the PMU will receive quarterly reports from other PMUs and implementing agencies, and consolidate them into a comprehensive reports to be submitted to the Bank. Reporting formats were developed in consultation with all implementing entities and included in the PIP. In its implementation function, the PMU will be fully in charge of procurement of works, goods and consulting contracts, conducting all procurement activities, management of contracts, supervision of works through site supervisors, management of project funds received from the Bank and state budget and record keeping on component B implementation. The PMU staff will include: Director, Structural Engineers, Environmental Specialist, Monitoring and Evaluation Specialist, Financial Manager, Accountant, Procurement Specialist, Procurement Assistant, Executive Assistant, Office Assistant (securing also translation activities), Driver. The PMU staff will receive training on project management, procurement, financial management, projects monitoring and evaluation, and other subjects as necessary.

**Component C – Flood and Landslide Risk Reduction.** All component activities will be implemented by the MEWM through its existing agency, the National Administration “Romanian Waters” (“Apele Romane”). MEWM was assigned to implement under the project also the activities related to Danube River bank protection and landslide risk mitigation (sub-components C.2 and C.5), which are under the statutory authority of the Ministry of Agriculture, Forestry and Rural Development (MAFRD) but have been delegated to MEWM. “Apele Romane”, acting as implementing agency, will implement the project through its staff (existing or newly recruited) and will be fully in charge of procurement, contracting, technical and financial supervision on contracts, monitoring and evaluation of project results, environmental supervision, reporting on project progress. Before project implementation starts, project implementation agreements between MEWM and “Apele Romane” will be signed, and will include provisions on roles and responsibilities of each party. MEWM, through its Department of Water Management, will retain the overall responsibility of project implementation and reporting on the component status. A small project monitoring team (PMT), including a technical and a financial staff funded by MEWM, will be established at the ministry level. The staff assigned to the project by MEWM and the implementing agency may receive training in Bank procedures in procurement, financial

management, and other fields, as deemed necessary during project implementation. In addition, the loan will provide funding for a Procurement Advisor who will help “Apele Romane” fully meet the World Bank procurement requirements, particular with regard to the ICB contracts.

**Component D - Risk Reduction of Mining Accidents in the Tisza Basin.** Component D will be implemented by the NAMR through an existing PIU, which is currently in charge of implementation of a component of the Bank-financed Mine Closure and Social Mitigation Project (MCSMP). The NAMR will retain the MCSMP PIU staff (Project Director, Financial Manager and Procurement Expert) to form the PMU for Component D once the implementation phase begins. The current staff of the PMU will be supplemented by an Accountant, Communication, Technical and Environmental specialists as well as support staff. The PMU will also hire experts/advisors on-demand. The PMU will report directly to the President of NAMR. Through June 2005, the PMU will continue to implement activities under the MCSMP in parallel with the component D of the HRMEP project. The PMU will be in charge of procurement of works, goods and consulting services, management of contracts, supervision of works through site supervisors, management of project funds received from the Bank and state budget, record keeping on component implementation. The PMU staff will receive training on project management, procurement of works, financial management, projects monitoring and evaluation, contract monitoring and supervision, as necessary. The HRMEP project will support financing of salaries and fees of the PMU staff and technical experts/advisors (on-demand); incremental operating expenses; finance audit services over the life of the project; and finance training of staff.

While the project envisages the National Agency for Mineral Resources to coordinate activities under Component D, the NAMR will coordinate development of manuals, guidelines and training activities very closely with CONSIB, MEWM, and the Ministry of Economy and Commerce. CONSIB will gradually take responsibility for the elaboration of dam-safety related manuals and training activities.

Since the implementation of Component D involves several sectors, namely water resources, environment, and mining, its implementation requires close cooperation between the Ministry of Economy and Commerce, NAMR, mine operators, MEWM, Apele Romane, the National Environmental Protection Agency, Regional Environmental Protection Agencies, and local authorities. In order to ensure smooth implementation and that the project builds on existing structures, procedures and systems, the Government of Romania has agreed to establish an Implementation Support Committee (ISC) for Component D to address inter-sectoral issues relevant to project implementation. The ISC will comprise representatives from the entities listed above, and will be chaired by the State Minister for Water (MEWM). The NAMR-PMU will provide secretarial support to the ISC.

Regular coordination meetings will be organized during project implementation among the PMUs for Components C and D in order to build a common knowledge base, particularly in the areas of flood management and water-retention and tailings dam safety. International experts on dam safety funded under the project would facilitate some of the coordination meetings.

All project PMUs and implementing agencies will secure annual audit of project accounts (Special Account and Treasury Account), and submit the audit reports to the Bank for review and acceptance, at dates and in terms established by the Loan Agreement.

The PMUs and the implementing agencies will be responsible for the following activities, for which they will have to be delegated with relevant powers:

- implementation of the respective project components;

- monitoring, including compliance with the relevant Bank policies, and evaluation;
- financial management for the given project component;
- development of Terms of Reference for the activities under their jurisdiction;
- preparation of bidding documents and contracts for works, goods and consultancy services;
- organization of, and participation in bids evaluation, according to their technical expertise;
- signing of the contracts;
- supervision of the contractors;
- certification of delivered products;
- making payments to the contractors from the respective Special Account;
- managing the Special Accounts and monitoring of financial flows resulting from the contracts;
- submission of financial and implementation reports in an agreed format to the MTCT for further consolidation.

The PMU established in the MTCT will coordinate the project's overall financial management arrangements, produce the project's financial monitoring reports, organize the project's audit, and provide ad hoc advice to the project's other implementing entities, as required. The consolidated financial and progress reports will be based on quarterly reports from other PMUs and the MEWM. The reporting formats, agreed by all implementing agencies, are included in the Project Implementation Plan.

### Annex 3: Estimated Project Costs

#### ROMANIA: HAZARD RISK MITIGATION AND EMERGENCY PREPAREDNESS PROJECT

Project Cost by Component	Local	Foreign	Total
A. Strengthening Response Capacity	6,951	3,063	10,014
B. Seismic Risk Reduction	36,326	26,725	63,051
C. Flood and Landslide Risk Reduction	52,400	36,811	89,211
D. Mining Accident Risk Reduction	7,274	6,437	13,711
E. Project Management	4,762	231	4,993
<b>Total Baseline</b>	<b>107,713</b>	<b>73,267</b>	<b>180,980</b>
Physical Contingency	9,001	6,577	15,578
Price Contingency	4,186	2,913	7,099
<b>Total Project Costs</b>	<b>120,900</b>	<b>82,757</b>	<b>203,657</b>
Front end fee	0	1,500	1,500
<b>Total Financing Required</b>	<b>120,900</b>	<b>84,257</b>	<b>205,157</b>

Project Cost by Category	Local	Foreign	Total
Goods	5,836	3,489	9,325
Works	96,928	71,616	168,544
Technical Services	274	0	274
Consultant Services	13,865	6,917	20,782
Training	264	539	803
Project Management	3,733	196	3,929
<b>Total Project Costs</b>	<b>120,900</b>	<b>82,757</b>	<b>203,657</b>
Front end fee	0	1,500	1,500
<b>Total Financing Required</b>	<b>120,900</b>	<b>84,257</b>	<b>205,157</b>

## Annex 4: Economic Analysis

### ROMANIA: HAZARD RISK MITIGATION AND EMERGENCY PREPAREDNESS PROJECT

#### Economic Analysis of Flood Risk Reduction Investments

##### Main Assumptions

The Flood Risk Reduction component of the Hazard Risk Mitigation and Emergency Preparedness project will support activities which will:

- a) Reduce the flood risk and vulnerability of rural areas
- b) Reduce the risk of large and small dam failures and
- c) Rehabilitate dams to operate as safe structures which provide flood control, water supply to cities and irrigation and, hydropower.

There are also significant social and environmental project benefits. In particular, flood control infrastructure will substantially reduce the risk of loss of life in the case of a major rivers overtopping their banks causing floods or dam failure. Historical records of large floods, where there were both advance warning, and orderly evacuation, suggest that fatality rates of nearly 1 percent of the affected population might be expected. Approximately 500,000 people live and work in areas that could be inundated by a major flood due to overtopping of river banks or due to possible dam failure. No attempt was made to estimate the value of human lives that might be saved by the project.

All investment costs, including physical contingencies, and operation and maintenance costs have been taken into account in estimating the economic costs of the project. Economic O&M costs include: contributed labor valued at the shadow wage rate, as well as other labor, management, maintenance, repair, overhaul and replacement costs expressed as economic values.

##### Alternatives

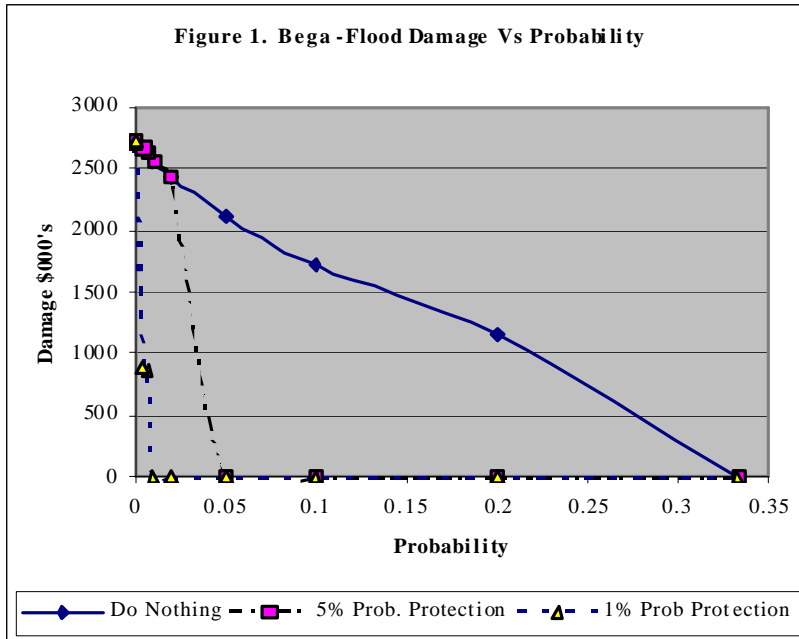
**Flood Defense Sub-Projects.** The selected projects are all very high priority in terms of impacts and have been selected out of a portfolio of one billion dollars, as the most critical for implementation. There are three categories of projects:

- a) Flood defense projects
- b) Large dam safety projects
- c) Small dam safety projects

For each category of projects different alternatives were investigated. For **the flood defense** projects, after clearly optimizing the engineering options to reduce all environmental and social impacts, three alternatives were analyzed:

- a) "Do nothing" alternative
- b) 5% probability protection
- c) 1% probability protection

For each case, the benefits were determined based on the entire probability of damages, and through integration below the curve the average annual damage (see Figure 1 for Bega Flood Defense scheme). As can be seen, a large part of the damage is avoided if protection to the 5% probability scheme is adopted.



The incremental cost and benefits were determined for the 5% and 1% schemes and are shown below in Figure 2 and Table 1. It indicates that it the 1% probability protection is the preferable option since most of the damages are avoided and the costs are much lower than the 1% probability case.

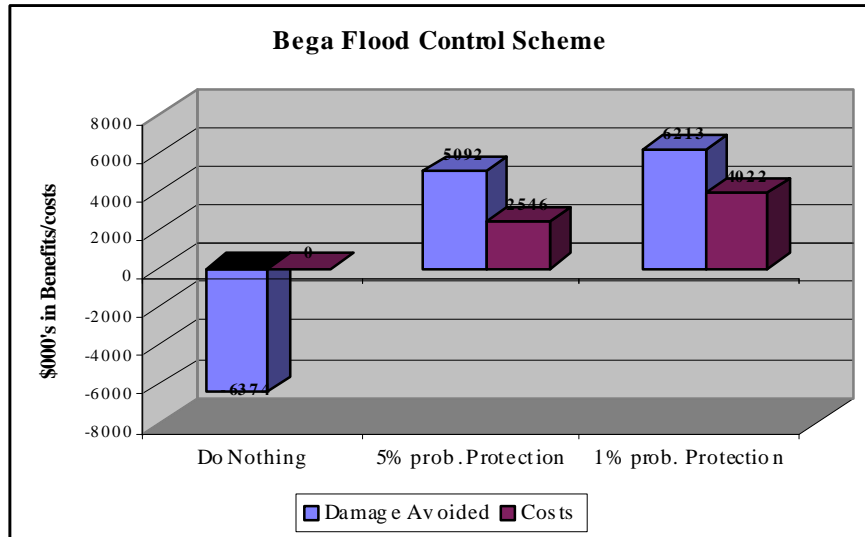
**Dam Safety Projects** For dam safety projects four alternatives were considered

- a) “Do nothing” alternative
- b) One-stage rehabilitation
- c) Two-stage alternative
- d) Complete replacement of the dam

Analysis of the four alternatives indicate that the one stage rehabilitation is the most economic. Typical example of the analysis is for the Berdu dam rehabilitation, in which case the best alternative is the one stage rehabilitation although the economic rates of return are slightly lower and costs are slightly higher than the two-stage approach. It is clear that the “do nothing” option produces significant negative benefits and the “complete replacement” of the dam is too expensive. On the other hand, the one-stage and two-stage rehabilitation are both very feasible but from the practical point of view, completion of the one-stage rehabilitation can be assured, while the there is no guarantee that investment of the second stage rehabilitation will be realized. Hence, the choice between the one-stage or two stage investment is based on a very practical consideration. Based on conclusion, the one stage rehabilitation has been selected (see Figure 3 for benefits/costs and IRR for the alternatives).

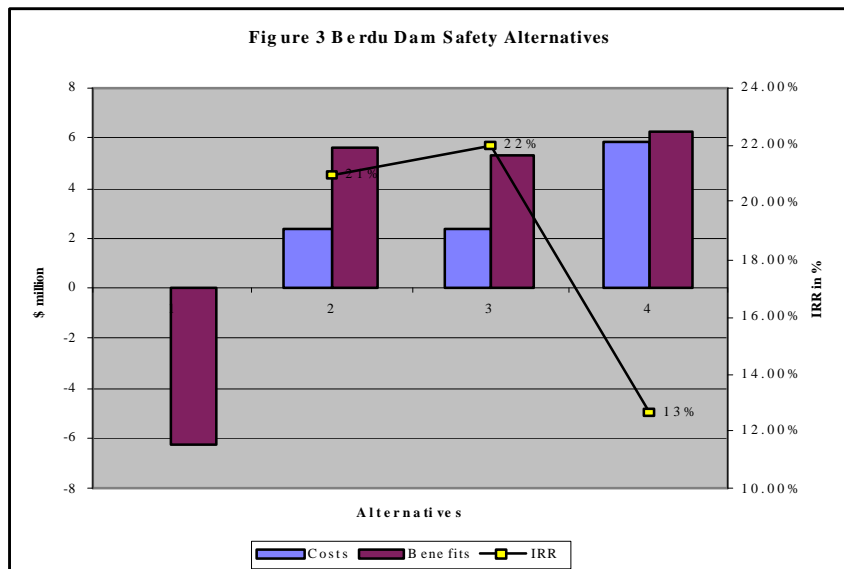


**Figure 2. Bega Flood Control Scheme**



**Table1. Incremental Damage Avoided and Cost**

Options	Damage	Damage Avoided	Costs	B/c
Do Nothing	6374	-6374	0	
5% prob. Protection	1282	5092	2546	2.00
1% prob. Protection	161	6213	4022	1.54



## **Economic Benefits**

The main economic benefits for the flood defense project are the reduction of flood hazards and vulnerability to flood damage. In case of dam safety projects, the main benefit is a significant reduction of risk of serious damages, if there is a dam break. In addition, a rehabilitated dam provides water supply to cities, hydropower, irrigation water, and also protection from floods. Economic benefits come not only from reduction of direct asset loss, but also from indirect loss of economic activity for several months, loss of market which could be permanent, loss of life, etc. Direct losses are in private assets (housing, commercial centers, etc.), and public assets (roads, bridges, etc.). The indirect losses have been estimated at 50% of the direct losses.

## **Social Benefits**

Table 2 shows that estimated 453,364 people will benefit from this project. The Social Assessment conducted during project preparation indicates that out of this number, 124,000 people in the flood defense areas can be classified as poor. This group will benefit significantly since it will be protected from frequent floods and loss of property, and economic and social activity. The flood protection for these people represent about 90% of the most vulnerable groups of people in Romania.

**Table 2. Population Benefiting from the Project**

<b>Project Name</b>	<b>County</b>	<b>Project type</b>	<b>Number of inhabitants benefiting</b>
Dridu Storage	Ialomita	large dam	10435
Varsolt Dam	Salaj	large dam	107670
Berdu Dam	Maramures	large dam	137976
Poiana Uzului	Bacau	large dam	30000
Lesu Dam	Bihor	large dam	28
Siriu Storage Lake	Buzau	large dam	3320
Maneciu Dam	Prahova	large dam	3320
Mihaileni	Hunedoara	large dam	29276
Taria	Caras Severin	small dam	5212
Sanmihailul Roman	Timis	Assurance	1063
Catamarasti	Botosani	small dam	950
Tarna Mare	Satu Mare	flood protection	500
Mihoiesti	Alba	flood protection	116750
Cetatea De Balta	Alba	flood protection	380
River Bega Balint-Bethausen	Timis	flood protection	300
River Cibin	Sibiu	flood protection	414
Vedea	Teleorman, Olt, Arges	flood protection	3200
Prut Petresti	Iasi	flood protection	2300
Bentu	Ialomita	flood protection	70
Bordusani	Ialomita	flood protection	50
Facaieni	Ialomita	flood protection	150
	Total		453364

### **IRR and Benefit/Cost Analysis**

**Benefits estimates.** Detailed economic analysis was performed on 16 sub-projects where detailed data was available. The incremental direct benefits for flood defense projects were estimated as the flood damage avoided (as indicated in Figures 1 and 2). The flood damage curves were determined by detailed surveys in the field as required by the Romanian codes. Indirect benefits were estimated as 50% of the direct benefits. Indirect benefits are mainly losses due to loss of economic activity. (E.g., in Britain these are generally estimated at 30% because the flood periods are much shorter (1 month) however in Romania floods occur several times in the year (2-3 times) and the flood periods can be as long as 3-4 months in the year and economic losses are much higher.)

**Economic Costs** The incremental economic costs of the project were derived from the financial costs by adjusting for taxes, credits, and interest during construction, and shadow-pricing foreign exchange at ROL 33,524 = US\$1. These costs include the environmental costs and other costs such as land acquisition.

### **IRR and Benefit/Cost Analysis**

Table 3 indicates that for the base case the IRR and B/C the sub-projects chosen represent good economic returns.

**Table 3. IRR and B/C Ratios by Projects**

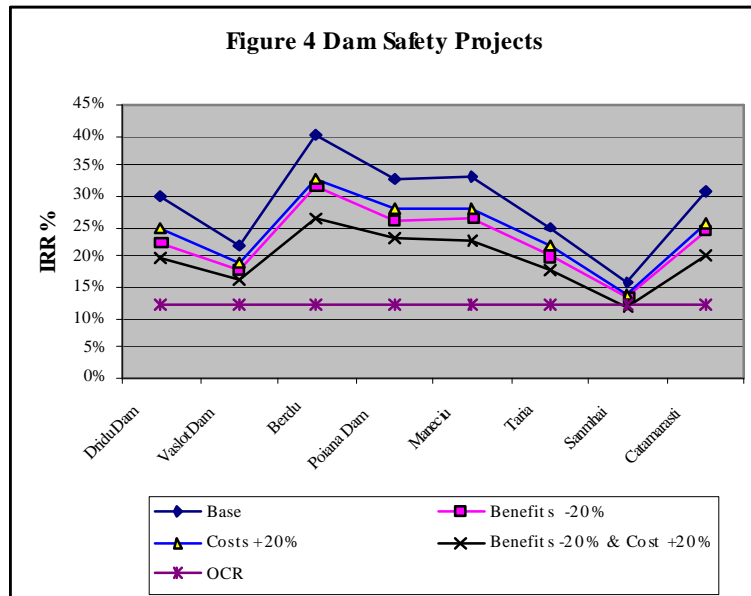
<b>Large and Small Dams</b>	<b>IRR</b>	<b>B/C Ratio</b>
Dridu Dam	30%	2.9
Vaslot Dam	22%	2.3
Berdu	40%	4.4
Poiana Dam	33%	3.8
Maneciu	33%	3.8
Taria	25%	3.0
Sanmhai	16%	1.5
Catamarasti	31%	2.6
<b>Flood Defense</b>		
Teleorman Colonesti	21.1%	1.4
Teleorman-Tiganesti	13.2%	1.1
Teleorman-Tartaresti	20.9%	1.4
Teleorman Orbescea	17.7%	1.2
Bega	27.0%	1.6
Cetrata de Blta--Tarnava Mica river	29.4%	1.6
Cibin dwnstr. Gura Raului	17.7%	1.2
Tarna	22.3%	1.5
Prut river bed restoration	42.3%	2.1
<b>Average IRR and B/C Ratio</b>	<b>26%</b>	<b>2.20</b>

Based on the costs and benefits economic analysis, the IRR and B/C ratios were calculated. For the base case, the IRR and B/C ratios show very strong returns for most projects. The Dam Safety projects show a much stronger IRR and B/C ratios, generally over 20% and B/C ratios well above 2. Most of the benefits for the dam safety projects come from the damage avoided from dam failure. Many of the unsafe dams in Romania are in a poor condition, with leaking foundations or embankments, poor gates and water release structures. In many cases, the Apele Romane has indicated that the structures can fail any day. The flood defense projects also indicate fairly strong IRR for most of the projects. However, there is one flood defense project which is marginal.

### **Risks and Sensitivity Analysis**

The major economic risks associated with the project are related to: (a) cost overruns; and (b) over-estimation of flood damage. Other risks relate to delays in construction and therefore, delays in the benefits and construction quality risks. Construction quality risks are within reasonable limits and would be manageable with continuous supervision by Apele Romane and their consultants, and the panels who are retained for the construction phase. The possible cost overruns and overestimation of flood damage functions were assessed to determine the viability of the project. The results are presented in Table 4 and

Figure 4.



**Table 4 : IRR Estimates for Sensitivity of Cost Overruns or Benefit Declines and Cost Overruns**

	Base	Benefits -20%	Costs +20%	Benefits - 20% & Cost +20%	Cross Over Cost IRR= 12%	Cross Over Benefits IRR= 12%
<b>Large and Small Dams</b>						
Dridu Dam	30%	22%	25%	20%	175%	-60%
Vaslot Dam	22%	18%	19%	16%	120%	-55%
Berdu	40%	32%	33%	27%	>200%	-75%
Poiana Dam	33%	26%	28%	23%	>200%	-62%
Maneciu	33%	27%	28%	23%	>200%	-70%
Taria	25%	20%	22%	18%	180%	-55%
Sanmhai	16%	14%	14%	12%	45%	-32%
Catamarasti	31%	24%	26%	20%	150%	-57%
<b>Average</b>	<b>29%</b>	<b>23%</b>	<b>24%</b>	<b>20%</b>	<b>159%</b>	<b>-58%</b>
<b>Flood defense</b>						
Teleorman Colonesti	21%	12%	15%	9%	35%	-21%
Teleorman-Tiganesti	13%	8%	9%	5%	10%	-5%
Teleorman-Tartaresti	21%	12%	15%	8%	35%	-19%
Teleorman Orbescea	18%	10%	14%	8%	34%	-15%
Bega	27%	18%	19%	13%	55%	-35%
Cetrata de Blta--Tarnava Mica river	29%	17%	21%	13%	62%	-32%
Cibin dwnstr. Gura Raului	18%	10%	13%	7%	25%	-16%
Tarna	22%	14%	17%	11%	50%	-25%
Prut river bed restoration	42%	28%	30%	21%	110%	-50%
<b>Average</b>	<b>24%</b>	<b>14%</b>	<b>17%</b>	<b>10%</b>	<b>46%</b>	<b>-24%</b>

For Dam Safety projects, if costs increase by 20%, the IRR drops to 24% and if benefits decline by 20% the IRR drops by 23%. Further, if benefits decline by 20% and costs increase by 20%, the IRR drops to 20%. The Figure 4 also indicates these values in graphic form. The crossover point for cost is that costs have to increase by 134% before the IRR declines to 12%, and for benefits these have to decline by 58% before the IRR declines to 12%. Therefore, the set of projects can be considered as economically robust.

The Flood Defense projects are also robust except for one sub-project. Decline in benefits of 20% results in IRR declining to 14% from 26%, and a cost overrun of 20% causes the IRR to decline to 17%. However, a 20% decline in benefits and 20% increase of costs would cause the IRR to decline to 10%. One project, Teleorman-Tiganesti in particular fares poorly. On the other hand, it should be noted that all the flood defense projects benefit very poor people in rural areas, and for the social reasons, it would be advisable to support these investments.

Delays in construction (which would not affect costs) of one year implies that all benefits would be delayed by one year. This would be an intermediate case of the 20% decline in benefits or a 20% cost increase or a combination of both, therefore, this case was not analyzed. (?)

In addition to further verifying the robustness of these projects (using “@Risk”, an add-on to Excel), the costs and benefits were estimated as distributions and the IRR and B/C ratios were estimated. A typical analysis for a Dam Safety project and a Flood Defense project are shown below. For all the dam safety projects, despite the variations in benefits and costs, the 95% confidence belt for IRR do not go below 12%.

Overall, the presented analysis shows that the projects are economically viable and very robust.

**Annex 5: Financial Summary**

**ROMANIA: HAZARD RISK MITIGATION AND EMERGENCY PREPAREDNESS PROJECT**

**Implementation Period**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Total Financing Required</b>						
Project Costs						
Investment Costs	710	19,867	46,955	53,930	51,400	26,806
Recurrent Costs	268	797	901	865	610	548
<b>Total Project Costs</b>	<b>978</b>	<b>20,664</b>	<b>47,856</b>	<b>54,795</b>	<b>52,010</b>	<b>27,354</b>
Fron-end Fee	1,500	0	0	0	0	0
<b>Total Financing</b>	<b>2,478</b>	<b>20,664</b>	<b>47,856</b>	<b>54,795</b>	<b>52,010</b>	<b>27,354</b>
<b>Financing</b>						
IBRD	1	12	35	42	40	21
Government	1,961	18,602	46,312	53,363	50,633	27,333
Central	1,961	18,602	46,312	53,363	50,633	27,333
Local	0	0	0	0	0	0
GEF	516	2,050	1,509	1,390	1,337	0
Co-financiers	0	0	0	0	0	0
User Fees / Beneficiaries	0	0	0	0	0	0
<b>Total Project Financing</b>	<b>2,478</b>	<b>20,664</b>	<b>47,856</b>	<b>54,795</b>	<b>52,010</b>	<b>27,354</b>



**Operational Period**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Total Financing Required</b>						
Project Costs						
Investment Costs	710	19,867	46,955	53,930	51,400	26,806
Recurrent Costs	268	797	901	865	610	548
<b>Total Project Costs</b>	<b>978</b>	<b>20,664</b>	<b>47,856</b>	<b>54,795</b>	<b>52,010</b>	<b>27,354</b>
Fron-end Fee	1,500	0	0	0	0	0
<b>Total Financing</b>	<b>2,478</b>	<b>20,664</b>	<b>47,856</b>	<b>54,795</b>	<b>52,010</b>	<b>27,354</b>
<b>Financing</b>						
IBRD	0	0	0	0	0	0
Government	1,962	18,614	46,347	53,405	50,673	27,354
Central	1,962	18,614	46,347	53,405	50,673	27,354
Local	0	0	0	0	0	0
GEF	516	2,050	1,509	1,390	1,337	0
Co-financiers	0	0	0	0	0	0
User Fees / Beneficiaries	0	0	0	0	0	0
<b>Total Project Financing</b>	<b>2,478</b>	<b>20,664</b>	<b>47,856</b>	<b>54,795</b>	<b>52,010</b>	<b>27,354</b>

## **Annex 6(A): Procurement Arrangements**

### **ROMANIA: HAZARD RISK MITIGATION AND EMERGENCY PREPAREDNESS PROJECT**

#### **Procurement**

Procurement of goods, technical services and works would be done in accordance with World Bank Guidelines: *Procurement under the IBRD Loans and IDA Credits* (issued in January 1995, revised January and August 1996, September 1997, January 1999, May 2004). Consulting Services, technical assistance and training would be procured in accordance with the Guidelines - Selection and Employment of Consultants by World Bank Borrowers, January 1997, revised September 1997, January 1999, May 2002, and May 2004. The Bank's Standard Bidding Documents, Request for Proposals and Forms of Consultants' Contract would be used. A General Procurement Notice (GPN) would be published in the U.N. Development Business in April 2004.

#### **1. Procurement Responsibilities**

##### ***1.1 Project Management***

The project components will be implemented by the following four agencies:

- Ministry of Administration and Interior (MAI), would be responsible for component A;
- Ministry of Transport, Construction and Tourism (MTCT), will be responsible for component B;
- Ministry of Environment and Water Management (MEWM), responsible for component C; and
- National Agency for Mineral Resources (NAMR), responsible for component D.

For implementation of components A, B, and D, Project Management Units (PMU) will be established in the respective ministries, which will be responsible for project implementation, monitoring, financial management, as well as procurement. Component C will be implemented by MEWM through its agency, the National Administration "Romanian Water" ("Apele Romane") acting as implementing agency.

Each PMU will open a Special Account in a commercial bank under conditions satisfactory to the Bank, and will be responsible for maintenance of the financial management system for each of the components. For Component C, this responsibilities will be carried out by MEWM, through its Water Department.

In addition, in order to allow for consistent supervision, monitoring and reporting on the project as a whole, it was agreed with the Romanian Government that consolidation of project implementation reports (including financial reports) will be carried out by the PMU located in MTCT.

In particular, the implementing units will have the following responsibilities:

- implementation of the respective project components;
- monitoring, including compliance with the relevant bank policies, and evaluation;
- financial management for the given project component;
- developments of Terms of Reference for the activities under their jurisdiction;
- preparation of bidding documents and contracts for works, goods and consultancy services;
- evaluation of bids;
- signing of the contracts;
- monitoring and management of contracts
- certification and/or commissioning of delivered products;

· making payments to the contractors from the respective Special Account.

The PMUs will be staffed with a Procurement Specialist, Financial Manager, Accountant, and other qualified consultants as required in each of the units. The implementing agencies will also assign procurement and financial staff with adequate experience, qualifications and proficiency in English language to manage large ICB contracts.

The core MTCT/ PMU staff comprising the PMU director, procurement specialist and FMS will be employed by the end of April 2004, through the Global Environment Facility (PDF-B GEF) grant proceeds, for the preparation of the HRMEP project.

The MTCT/ PMU procurement specialist's contract will be renewed for the loan implementation period if he/she proves adequate performance during the preparation stage. In addition to this one procurement assistant will be recruited before loan effectiveness on a competitive basis pursuant to issue of EOIs in the local press. Furthermore, the MTCT/ PMU will be temporarily assisted by international individual consultants in contract management and supervision when and as needed. The minimum TOR requirements will be "to be familiar and experienced with World Bank procurement procedures, and procurement under internationally financed projects".

The PMU in the Ministry of Administration and Interior (MAI), responsible for the component A, will employ a PMU Director, a procurement specialist and financial management specialist on a competitive basis pursuant to issuance of EOIs in the local press by loan effectiveness. The Ministry of Environment and Water Management (MEWM), responsible for the component C, will implement the project through its affiliated agency "Apele Romane". To support the staff assigned for this project at "Apele Romane" the Ministry will employ a procurement specialist experienced in World Bank procurement procedures on a competitive basis pursuant to issue of EOIs in the local press by the loan effectiveness. .

Component D will be implemented by the existing PMU in the National Agency for Mineral Resources (NAMR). This PMU is experienced in goods and consultant contracts but not in works contracts. The other ministries are not as experienced with World Bank procurement. Procurement specialists for the three PMUs in the line ministries will be recruited before the loan effectiveness on a competitive basis pursuant to issuance of EOIs in the local press. All procurement specialists would be sent to a training program, preferably to a program conducted by ILO at Turin /Italy, according to their needs for further development of procurement knowledge and qualifications. The public servants assigned for procurement in the implementing agencies for Component C, would also benefit of similar training programs to ensure that all those involved in project implementation become familiar with procurement procedures and requirements under Bank-financed projects.

The PMUs and implementing agencies will be supported by consultant firms and individuals for the preparation of designs, bidding documents and supervision of works. All the PMU staff should be assigned or employed before loan effectiveness.

#### **Procurement methods (Table A)**

#### ***Thresholds***

The following thresholds are recommended. The aggregate amounts for each procurement method discussed below are shown in the footnotes to Table A:

(i) **Goods and Equipment:** Goods and equipment costing US\$100,000 and more would be procured

through ICB. Readily available off-the-shelf goods estimated to cost less than US\$100,000 per contract may be procured through shopping. In the procurement of IT hardware and software by shopping, when soliciting bids, the firms operating in Romania registered to the Bank's Web site should be solicited in addition to the other available firms.

(ii) **Civil Works** : Civil works estimated at US\$ 3 million and above would each be procured through ICB, and civil works of less than US\$3 million may be procured on the basis of national competitive bidding (NCB).

It is proposed that works contracts to cost less than US\$3,000,000 be awarded through NCB considering the experience gained by Romania in dealing with large contracts under other projects financed by the Bank and other IFIs (e.g. Bucharest Water Supply Project, Roads Rehabilitation Project, Petroleum Sector Rehabilitation Project, EIB financed flood infrastructure rehabilitation project, etc.), as well as provisions of similar projects recently approved by the Bank (e.g. Rural Development Project, Forestry Sector Development).

NCB would be acceptable subject to the conditions that Bank's sample NCB document for ECA region be used, a point system of evaluation would not be used, domestic preference would not be applied, international bidders would not be excluded from bidding, and the draft NCB bidding documents would be prepared and submitted to the Bank for review and no-objection before the first two NCB tenders is issued for each component of the Project. No bids would be rejected at the bid opening. All bids submitted on or before the deadline for submission of bids would be opened and read out at public bid opening. Successful bidders will be selected by post qualification procedure (an assessment made by the employer after the evaluation of the bids to ensure that the lowest- evaluated, responsive, eligible bidder is qualified to perform the contract in accordance with previously specified qualification requirements) whereas local and international bidders shall demonstrate the required average annual turnover, availability of obtaining securities and reasonable access to credit lines to meet the construction cash flow requirements for the subject contract(s), experience in similar works, availability of technical staff, equipment capabilities and etc. Bid evaluation criteria shall be pre-disclosed to bidders, and technical specifications shall be clearly written. These conditions shall be discussed at the negotiations and made part of the Loan Agreement. Based on the performance of the PMUs and the implementing agencies on the NCB contracts the Bank will consider increasing the NCB works threshold per contract to USD 4 million after one year of implementation pursuant to effectiveness of the Loan Agreement.

Minor works estimated to cost less than US\$100,000 per contract may be procured on the basis of shopping.. Bank's sample bidding documents and evaluation report templates would be used.

(iv) **Consultant Services, TA and Training**: Consultant's services would be selected in accordance with the Bank Guidelines issued in January 1997 and revised in September 1997, January 1999, May 2002, and May 2004 and for this project, would include Quality and Cost Based Selections (QCBS), Consultant Qualifications (CQ), Least Cost Selection (LCS), and Individual Consultants (IC). QCBS selection over US\$200,000 would be advertised in Development Business on line version DG-market ( Gateway) and in local media ( one newspaper of national circulation or the official gazette, or /and electronic portal of free access) from which a short list of six firms would be drawn. For contracts estimated to cost less than US\$100,000, short lists may be based solely on national firms unless international firms expressed interest. The contracts for preparation of designs and auditing would be procured following the LCS method. Contracts estimated at less than US\$200,000 each for technical assistance, preparation and review of designs, legal advice, study tours, quality control, and publicity campaigns and other services agreed by the Bank would be procured following the CQ. Individual consultants would be selected in accordance with Part V of the Consultants Guidelines. Training for the PMU and Public staff would be conducted in accordance with a biannual training program that the PMUand/or the implementing agencies would submit

to the Bank for its agreement before implementation.

(v) **Incremental Operating Costs:** The Loan would finance the incremental operations costs of the PMUs. These would be incurred in accordance to an annual budget that the PMU would prepare and submit to the Bank for its approval before any expenditures are incurred. The operating costs of the PMUs will cover the consultants' fees (excluding Government employees), office equipment and supplies, utilities, communication, refurbishment of the PMU offices, maintenance of equipment and vehicles, travel expenses, accommodation, per-diems during field trips, advertising for procurement, workshops for project launch, and project implementation, etc.

### ***Prior Review***

The following prior review requirements would be applicable:

#### **Goods and Civil Works**

- (a) All ICB packages.
- (b) First two NCB, Goods and Works contracts conducted in shopping procedure and technical services contracts under each component of the Project..

#### **Consulting Services**

- (c) **Consulting Firms:** For each contract estimated to cost \$200,000 or more, all TORs, draft RFPs, short lists, technical and financial evaluation reports, and negotiated draft contracts would be submitted to the World Bank for its prior review.

### ***Post Review***

All contracts not subject to the Bank's prior review would be subject to ex-post review, on a selective basis. One out of five contracts for goods, works, technical services and consulting services would be subject to ex-post review. Supervision missions would include a procurement specialist especially in the first year, whose main responsibility would be to conduct ex-post reviews of the procurement process and documentation, and provide his or her findings.

**Table A: Project Costs by Procurement Arrangements**  
(US\$ million equivalent)

Expenditure Category	ICB	Procurement NCB	Method <sup>1</sup> Other <sup>2</sup>	N.B.F.	Total Cost
<b>1. Works</b>	93.24	70.28	0.90	36.82	164.42
	(72.26)	(54.64)	(0.70)	(0.00)	(127.60)
<b>2. Goods</b>	7.14	0.00	0.87	2.00	8.01
	(5.35)	(0.00)	(0.65)	(0.00)	(6.00)
<b>3. Services</b>	0.00	0.00	20.96	5.19	20.96
	(0.00)	(0.00)	(15.76)	(0.00)	(15.76)
<b>4. Miscellaneous</b>	0.00	0.00	0.86	0.21	0.86
	(0.00)	(0.00)	(0.64)	(0.00)	(0.64)
<b>5. Front-end fee</b>	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
<b>TOTAL</b>	100.38	70.28	23.59	44.22	194.25
	(77.61)	(54.64)	(17.75)	(0.00)	<b>(150.00)</b>

<sup>1/</sup>	Figures in parentheses are the amounts to be financed by the Bank Loan. All costs include contingencies.
<sup>2/</sup>	Includes civil works and goods to be procured through shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project.

<p><b>Section 1: Capacity of the Implementing Agencies in Procurement and Technical Assistance requirements</b></p> <p>The PMUs would be responsible for implementing the project components A, B and D , including procurement. Component C would be implemented by the line agency Apele Romane under the Ministry of Environment and Water Management (MEWM) The line agency is experienced in local procedures, but has no experience in World Bank procurement. The implementing institutions will employ a procurement specialist to support the local staff in launching large works and consultants contracts within the scheduled program. Staff to be assigned to the project by this implementing agency should have proficiency in English language and be trained in World Bank procurement procedures particularly for works and services before loan effectiveness.</p> <p>The PMUs would:</p> <p>(i) employ at least one procurement officer, with suitable educational background and experience in procurement and familiarity with World Bank procurement guidelines, before project effectiveness;</p> <p>(ii) Around the loan effectiveness period, the MTCT/PMU would lead to hold a project launch workshop (with the Bank) for all government officials involved in project implementation. During the project launch workshop, adequate time would be spent on procurement training, the procurement book would be discussed and explained, and a half-day session would be held for those responsible for procurement decision making</p>
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<p>under this project;</p> <p>(iii) Establish a computerized monitoring system within six months of loan effectiveness;</p> <p>(iv) Immediately after Board approval, the Bank staff would prepare a procurement book containing all procurement related documents, including Standard Bidding Documents, both in hard and soft copies, and send it to the PMUs. The contents of the procurement book would be discussed during the project launch workshop.</p>
<p>Country Procurement Assessment Report or Country Procurement Strategy Paper status: Country Procurement Assessment Report dated August 1999.</p> <p>Are the bidding documents for the procurement actions of the first year ready by negotiations Yes No <input checked="" type="checkbox"/> X</p>
<p>Section 2: Training, Information and Development on Procurement</p> <p>Estimated date of Project Launch Workshop June 2004</p> <p>Estimated date of publication of General Procurement Notice : April 2004</p> <p>Indicate if there is procurement subject to mandatory SPN in Development Business : YES</p> <p>Yes <input checked="" type="checkbox"/> X No Domestic Preference for Goods</p> <p>Yes No <input checked="" type="checkbox"/> X Domestic Preference for Works, if applicable</p>
<p>Retroactive financing</p> <p>Yes No <input checked="" type="checkbox"/> X Explain: No need</p> <p>Advance procurement</p> <p>Yes No <input checked="" type="checkbox"/> X Explain: No need</p>
<p>Explain briefly the Procurement Monitoring System: The PMUs would establish a computerized procurement monitoring system.</p>
<p>Co-financing: Component D of the project would be co-financed by the proceeds of GEF Grant.</p>
<p>Section 3: Procurement Staffing</p> <p>Indicate name of Procurement Staff or Bank's staff part of Task Team responsible for the procurement in the Project:</p> <p>Name: Ibrahim Sirer, Sr. Procurement Specialist( ECSPS)</p>
<p>Explain briefly the expected role of the Field Office in procurement: Mr. Gabriel Ionita, Senior Agriculture Specialist, will manage procurement for the Field Office.</p>

Prior review thresholds (Table B)

Table B: Thresholds for Procurement Methods and Prior Review<sup>1</sup>

<b>Expenditure Category</b>	<b>Contract Value Threshold (US\$ thousands)</b>	<b>Procurement Method</b>	<b>Contracts Subject to Prior Review (US\$ millions)</b>
<b>1. Works</b>	> or equal to \$3 million	ICB	93.24
	< \$3 million	NCB	53.61
	< \$100,000	S	0.65
<b>2. Goods</b>	> or equal to \$100,000	ICB	7.14
	< \$100,000	S	0.31
			--
<b>3. Services</b>	> or equal to \$200,000	QCBS	11.53
	< \$ 200.000	LCS	0.39
	< \$ 200.000	CQ	0.32

<b>Total value of contracts subject to prior review:</b>	<b>US \$ 167.19 million</b>
<b>Overall Procurement Risk Assessment:</b>	<b>High</b>
<b>Frequency of procurement supervision missions proposed:</b>	One every 6 months (includes special procurement supervision for post-review/audits)

<sup>1</sup> Thresholds generally differ by country and project. Consult "Assessment of Agency's Capacity to Implement Procurement" and contact the Regional Procurement Adviser for guidance.



**Annex 6(B): Financial Management and Disbursement Arrangements  
ROMANIA: HAZARD RISK MITIGATION AND EMERGENCY PREPAREDNESS PROJECT**

**Financial Management**

**1. Summary of the Financial Management Assessment**

***Country Issues.***

The first Country Financial Accountability Assessment (CFAA) for Romania was finalized in December 2003 and concluded that the overall fiduciary risk associated with the public financial management and financial accountability arrangements of the Romanian government administration is considered to be moderate, with the systems for accounting, financial reporting and internal control representing the areas with the higher risks and budgeting, cash management and external audit and Parliamentary oversight representing the lower risks.

The implications of the CFAA for the project are addressed by the following actions:

- A detailed review of the systems was performed for each implementing entity;
- Each implementing entity will have a distinct project-specific accounting ledger;
- Project accounting staff was nominated for each implementing entity;
- Internal control and accounting procedures manual was developed for the project;
- The format of the FMRs and financial reports agreed with all implementing entities;
- Workshop to explain the project's financial management requirements and disbursement procedures was carried out on 3/25/2004;
- Regular training events for the project's accounting staff over the project life;
- The PMU within MTCT will be in charge with the reporting and auditing coordination;
- Project financial statements audited by an independent auditor annually.

***Strengths and Weaknesses.***

The significant strengths that provide a basis of reliance on the project's financial management systems include: the experience of the already-identified accounting staff at the various implementing entities; and the tried and tested financial management systems of these entities.

The significant weakness of the project financial management system and the way in which they will be addressed are presented in the table below.

<b><i>Significant Weaknesses</i></b>	<b><i>Resolution</i></b>
Lack of experience in implementing Bank-financed projects in some of the entities	Workshop to explain the project's financial management requirements and disbursement procedures
Lack of clarity regarding the project's financial management requirements and disbursement procedures	The development of a project accounting procedures manual and the conclusion of project implementation agreements
No formally appointed project financial management staff at the PMUs in the MAI, MTCT and MEWM	Formal appointment and hiring of project financial management staff at the PMUs in the MAI, MTCT and MEWM
No project-specific accounting ledgers have been established at the implementing entities	Establish project-specific accounting ledgers at all implementing entities

### ***Implementing Entities.***

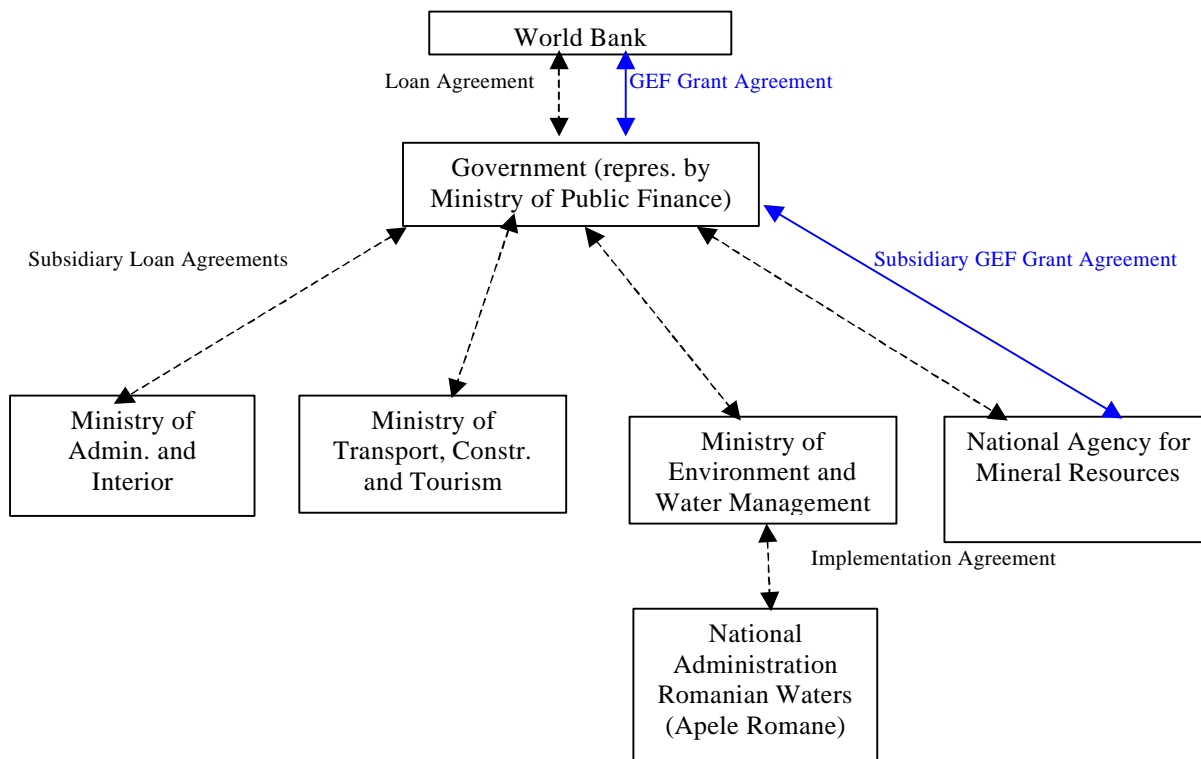
The project's components will be implemented as follows:

- Component A by a PMU to be established in the Ministry of Administration and Interior (MAI);
- Component B by a PMU to be established in the Ministry of Transport, Construction and Tourism (MTCT);
- Component C by the Ministry of Environment and Water Management (MEWM) whose accountant will manage the component's Special Account, together with the National Administration "Romanian Waters" (Apele Romane);
- Component D by the existing PMU in the National Agency for Mineral Resources (NAMR); and
- Component E by all of the above implementing entities.

The PMU established in the MTCT will coordinate the project's overall financial management arrangements, develop the project's financial procedures manual, produce the project's financial monitoring reports, organize the project's audit, and provide ad hoc advice to the project's other implementing entities as required.

A Loan Agreement will be signed by the World Bank (IBRD) and the Government of Romania represented by the Ministry of Public Finance (MPF). The MPF will in turn conclude subsidiary loan agreements with the MAI, MTCT, MEWM and NAMR. MEWM will further sign a subsidiary loan agreement (implementation agreement) with National Administration Romanian Waters (Apele Romane). In respect to component D, a GEF Grant Agreement will be signed by the World Bank on behalf of the GEF and the Government of Romania represented by the MPF, who will then conclude a subsidiary grant agreement with the NAMR.

The diagram below shows the necessary legal agreements for the implementation arrangements:



***Funds Flow.***

Project funds will flow in respect of each of the three sources of project financing as follows:

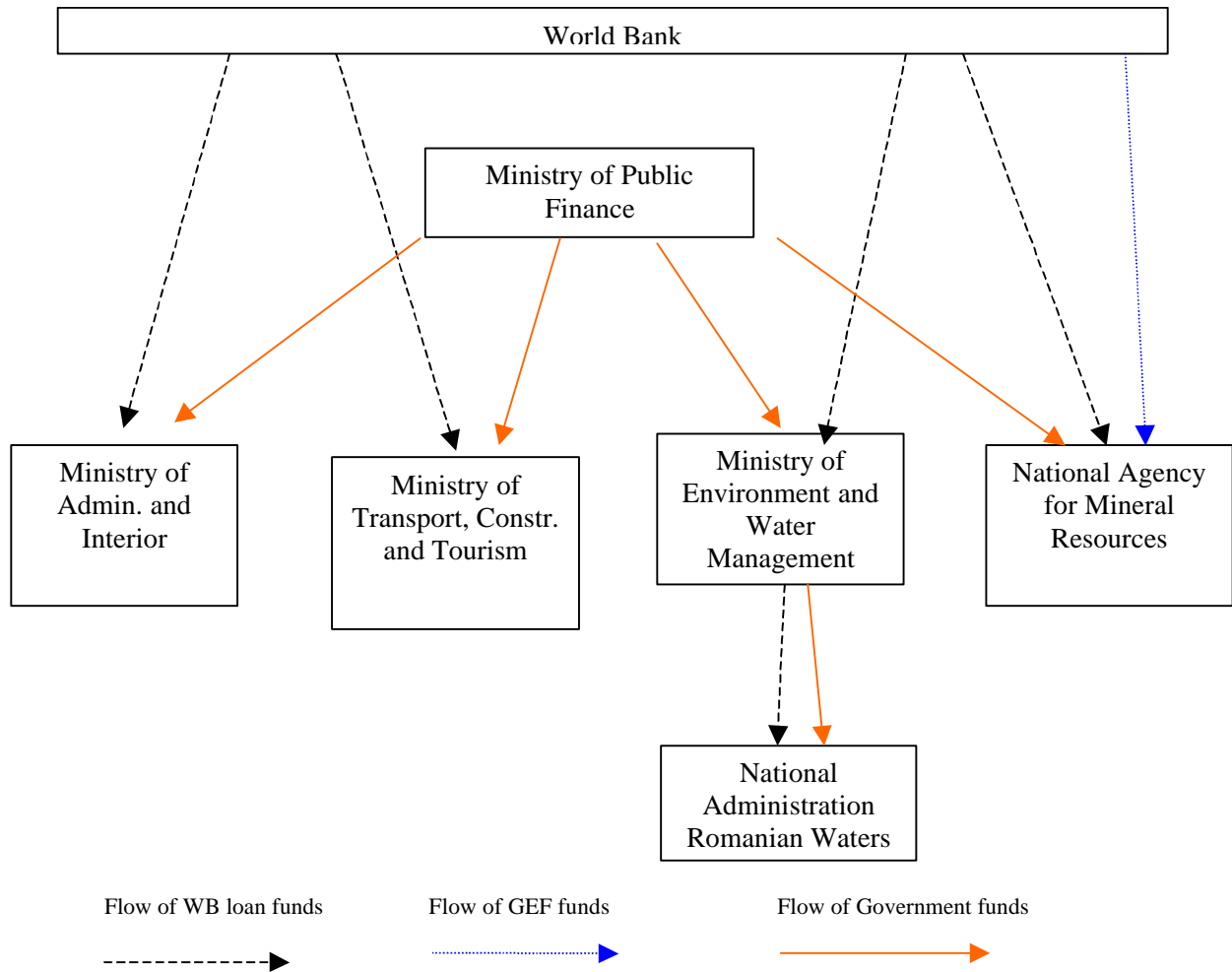
- (i) the Bank loan, by direct payment or via four Special Accounts (SAs), one for each component (A to D), which will be replenished with traditional methods (SOEs);
- (ii) the GEF grant, for component D only, by direct payment or via a Special Account (GEF SA) which will be replenished with traditional methods (SOEs);
- (iii) the Government, via Treasury project accounts.

Special Accounts will be opened at commercial banks and on terms and conditions acceptable to the WB. Foreign currency amounts will be exchanged as needed in local currency (ROL), to cover eligible expenditures payments in local currency to suppliers, from the Special Accounts into local currency transfer accounts that will be opened at commercial banks and on terms and conditions acceptable to the WB. In respect to Component C, MEWM will operate a Special Account, from which foreign currency will be converted in local currency and will advance funds to Apele Romane on a monthly basis, sufficient to cover the following month’s projected eligible expenditures. ROL funds will be transferred to a dedicated account used for project foreign financing for Apele Romane.

Counterpart Government contributions payments will be made from separate Treasury project accounts, being sub-accounts of the main entities’ budgetary accounts, and which will be used specifically for the Romanian contributions to the project. These contributions will be received monthly in accordance with normal budget procedures.

Counterpart funds are provided annually in the State Budget and are not rolled over from one year to

another. A number of Bank financed projects have experienced a reduction in the allocated counterpart funds while others received the amounts with some delays. These generic issues have been discussed during the ongoing FY 2004 Country Project Portfolio Review (CPPR). The proposed solution discussed with the MPF is to adjust the relevant legislation to allow the counterpart funds to be rolled over from one year to another.



**Staffing.**

Each implementing entity is or will be staffed as follows in terms of project financial management:

- MAI – the MAI has identified a staff member to manage the Special Account. The arrangement will be confirmed on or around March 30, 2004.
- MTCT – the MTCT has identified a suitable candidate for the position of financial manager and is in the process of concluding a contract with that person.
- MEWM – the MEWM has identified a staff member to manage the Special Account. It is anticipated that this position will be confirmed by March 31, 2004.
- Apele Romane – the project’s financial management will be performed by the existing financial management and accounting staff of the Apele Romane; and
- NAMR – the existing PMU in the NAMR will work together with the NAMR’s accounting department

on the project's financial management arrangements.

Many of the entities and project financial management staff lack experience in implementing Bank-financed projects. Therefore, a workshop was carried out on March 25, 2004 to explain the project's financial management requirements and disbursement procedures.

### ***Accounting Policies and Procedures.***

The project's accounting books and records at the various agencies will be maintained on a cash basis and denominated in Romanian Lei (ROL) with the exception of the books and records in respect of the Special Accounts which will be maintained in the currency of the IBRD Loan and GEF Grant.

Each implementing entity will build upon its existing accounting procedures and internal controls. However, not all of these procedures and controls are adequately documented; contract monitoring and invoice payment procedures need uniformly to be strengthened across all project implementing entities; and there is uncertainty regarding certain aspects of the project's financial management requirements and disbursement procedures. Accordingly, a project accounting procedures manual was developed and rolled out across all project implementing entities prior to Board presentation.

## **2. Audit Arrangements**

### ***Internal Audit.***

All implementing entities have an internal audit department. It is anticipated that these internal audit departments will review the project's financial management arrangements. The extent of these internal audit reviews will be confirmed prior to Board presentation. The internal audit departments in all implementing entities will include in their annual work program the HREMP project, as part of their entities' overall activities.

A number of internal audit reports prepared by the relevant departments of the implementing entities have been reviewed during appraisal. The various findings reported do not have an impact on the project.

### ***External Audit.***

As of the date of this report, the Borrower is in compliance with its audit covenants of existing Bank-financed projects, except for the Railway Rehabilitation Project (P036013), of which the FY 2002 audited financial statements that were due on November 30, 2003 have not been finalized. However, the National Railway Company has submitted all the audit reports in draft final (not yet signed) formats and it has been agreed that all signed audited financial statements will be submitted to the Bank by March 25, 2004.

In respect of the WB projects implemented by NAMR, the Borrower is in compliance with its audit covenants.

The project will be audited annually both by an audit firm and on terms of reference acceptable to the Bank. The terms of reference for the audit have been agreed at negotiations. The audit scope will include the project's books and records as maintained by each implementing entity, all withdrawal applications, and all Special Accounts. The audited project financial statements together with the auditor's opinion thereon will be provided to the Bank within six months of the end of the reporting period, being the fiscal year. The

audit contract will be financed by the Loan and be awarded to a single audit firm for the life of the project, subject to satisfactory performance. The PMU in MTCT will coordinate the auditing and will sign the audit contract for the entire project.

National Administration Romanian Waters (Apele Romane) financial statements will be audited annually by an audit firm and on terms of reference acceptable to the Bank. The terms of reference for the audit have been agreed at negotiations. The audited entity financial statements together with the auditor's opinion thereon will be provided to the Bank within six months of the end of the reporting period, being the fiscal year. The costs of these audits will be covered by the entity from its own sources.

In addition, the Romanian Court of Accounts (CoA), the country's supreme audit institution, will continue to perform ad hoc external audits of the various implementing agencies, including this project.

The audit reports prepared by the CoA for FY 2002 for the MAI, MTCT, MAFWE (currently split into MAFRD and MEWM) and NAMR were reviewed. The CoA has granted the 'discharge of responsibility', being a process of whereby the CoA confirms that a budget holder has discharged its obligations in respect of the execution and reporting of the budget, to all the above mentioned budgetary holders (i.e. the respective Ministers and the President of NAMR), except for MTCT. In regard of MTCT, the findings of the CoA relate to different interpretation of pieces of Romanian legislation (in respect of privatization, etc), cut-off procedures and a case of fraud occurring at a subordinated MTCT entity. Most of these findings have been addressed, penalties discharged where necessary and there are only a few issues that remain to be addressed. The management of MTCT believes that the CoA will grant discharge of responsibility by April 2004.

The CoA performs once every 3 years audits of the various National Companies and National Administrations. Thus, the latest CoA audit of Apele Romane (its predecessor entity – Romanian Waters National Company) was done in 2001. A review of these reports indicates that most of the findings of the CoA have been appropriately addressed.

Overall, the CoA's audit reports in respect of all of the project's implementing entities do not contain findings that will adversely impact the project. These findings relate primarily to various and understandable differences of interpretation of legislation applicable, have been acknowledged by the management of the entities and have been subsequently addressed. The CoA separately confirmed that they were not aware of any financial management issues that would adversely impact project implementation at any of the project's implementing entities.

### **3. Disbursement Arrangements**

Bank funds will be disbursed either as direct payments, or to one of the five Special Accounts (four for the Loan funds and one for the GEF Grant) opened for each component which will be replenished under the traditional disbursement procedures. Withdrawal applications for the replenishments of the SAs will be sent to the Bank directly by each responsible project implementing entity every quarter, or when about a third of the initial deposit in the SA has been utilized, whichever comes first. All replenishments for transactions above the prior-review threshold will be fully documented. Supporting documentation for all transactions, including completion reports, goods received noted and acceptance certificates, will be retained by each implementing entity and made available to the Bank during project supervision. There is no plan to move to forecast-based periodic disbursements.

### **4. Reporting and Monitoring**

Project management-oriented Financial Monitoring Reports (FMRs) will be used for project monitoring and supervision. The PMU in the MTCT will produce the project's FMRs every calendar quarter and the reports will be submitted to the Bank within 45 days after the calendar quarter-end. The FMRs will be aggregated from the reports provided to the MTCT PMU by the implementing entities. Each implementing entity will produce its financial reports in a spreadsheet based on data extracted from its accounting systems and submit the reports to the PMU in MTCT within 30 days after the calendar quarter-end. Draft formats of the FMRs and financial reports were developed, agreed prior to negotiations and included in the project's accounting procedures manual.

## 5. Information Systems

### *Information Systems.*

Each entity already has access to an accounting software system on which it will create and maintain project-specific accounting ledgers, as follows:

- MAI – a copy of the existing accounting system will be used by the PMU and a separate notional company will be established in the MAI's in-house developed statutory accounting software system in order that the operations of the project may be recorded and identified separately in a completely new accounting database;
- MTCT – the MTCT's existing accounting software system will be used to record the operations of the project. A copy of the existing accounting software will be used and a separate 'department' will be established in the software and operated by the PMU on the new accounting database. The project data will later be uploaded onto the MTCT's systems;
- MEWM – a spreadsheet system to record the project financial transactions will be used whilst at the same time recording these transactions in the MEWM's existing accounting systems;
- Apele Romane – a national 'branch' for the relevant part of the project implemented by Apele Romane has been established within the Apele Romane's accounting information systems; and
- NAMR – the existing accounting software will be used to record the operations of the project. The software will use the existing chart of accounts with a coding structure that will enable the NAMR to identify project related transactions.

## 6. Action Plan (Agreed with Borrower)

The financial management arrangements need to be strengthened prior to Board presentation of the project in order to be acceptable to the Bank. The financial management action plan agreed at negotiations is presented below.

<i>Action</i>	<i>Responsible Person</i>	<i>Completion Date</i>
Establish project-specific accounting ledger	MAI	3/30/04
Deliver remaining Railway audit reports for FY 2002	MTCT and Railways	3/25/04
Re-assess adequacy of project's financial management arrangements	World Bank	3/31/04

## 7. Supervision Plan

During project implementation, the Bank will supervise the project's financial management arrangements in two main ways: (i) review the project's quarterly financial monitoring reports (FMRs) as well as the project's annual audited financial statements and auditor's management letter; and (ii) during the Bank's supervision missions, review the project's financial management and disbursement arrangements (including a review of a sample of withdrawal applications and movements on the Special Accounts) to ensure compliance with the Bank's financial management requirements.

### Allocation of loan/grant proceeds (Table C)

**Table C: Allocation of Loan/Grant Proceeds**

<b>Expenditure Category</b>	<b>Amount in US\$million</b>	<b>Financing Percentage</b>
Works	115.76	100% foreign expenditures, 78% local expenditures
Goods	5.52	100% foreign expenditures, 100% local expenditures (ex factory cost), and 75% local expenditures for other items procured locally
Technical Services	0.20	100% foreign expenditures, , and 75% local expenditures
Consultants' Services, including Audit and Training	15.77	85% of expenditures incurred by foreign consultants and 75% of expenditures incurred by local consultants
Operating Costs	0.62	75%
Unallocated	12.13	
<b>Total Project Costs with Bank Financing</b>	150.00	
<b>Front-end fee</b>	0.00	
<b>Total</b>	150.00	



## Annex 7: Project Processing Schedule

### ROMANIA: HAZARD RISK MITIGATION AND EMERGENCY PREPAREDNESS PROJECT

Project Schedule	Planned	Actual
Time taken to prepare the project (months)	21	27
First Bank mission (identification)	12/21/2001	12/21/2001
Appraisal mission departure	01/30/2004	01/30/2004
Negotiations	03/15/2004	03/15/2004
Planned Date of Effectiveness	07/01/2004	

#### Prepared by:

Ministry of Administration and Interior; Civil Protection Command; Fire Corps; Ministry of Transport, Construction and Tourism; Ministry of Agriculture, Forestry and Rural Development; Ministry of Environment and Water Management; Apele Romane; SNIF; National Agency for Mineral Resources.

#### Preparation assistance:

An Austria Consultant Trust Fund for \$166,750 (TF038198) and \$185,100 (TF030454) were received and used for support of the Bank work in the area flood and landslide risk reduction, as well as social and environment assessments.

The Austria GEF CTF for \$91,450 (TF030304) was received and used for support of the Bank work in regard to priorities setting for risk reduction of mining accidents in Tisza Basin.

A Bank-Netherlands Water Partnership Program (BNWPP) TF for \$61,875 (TF051001) was received in support of activities related to the flood risk reduction component, and to provide training on Economic Analysis of Flood Protection and Dam Safety Investments.

The BNWPP TF for \$30,000 (TF050933) was received and used in support of Bank work in the area of mining accidents risk reduction in Tisza Basin.

#### Bank staff who worked on the project included:

Name	Speciality
Christoph Pusch	Task Team Leader
Gabriel Ionita	Deputy Team Leader
Rita Cestti	GEF Task Manager
Daniel Gunaratnam	Flood and Landslide Risk Reduction
Eugene Gurenko	Catastrophe Insurance and Risk Financing
Eric Peterson	Urban Planning and Infrastructure
Peter Yanev	Seismic Engineering
Jolanta Kryspin-Watson	Institutional Capacity Building
Richard Andrews	Emergency Management and Disaster Mitigation
Ibrahim Sirer	Procurement
Nicholay Chistyakov	Disbursement
Irina Kichigina	Lawyer
Bogdan Constantinescu	Financial Management

Stanley Peabody  
Joseph Bishop  
Koshie Michel

Social Assessment  
Emergency Response  
Program Assistant

## **Annex 8: Documents in the Project File\***

### **ROMANIA: HAZARD RISK MITIGATION AND EMERGENCY PREPAREDNESS PROJECT**

#### **A. Project Implementation Plan**

#### **B. Bank Staff Assessments**

"Observations on Earthquake Risk and Engineering Practices in Romania", Peter Yanev, May 2002

"Romania - Seismic Risk", Dan Lungu, June 2002

"Sector Environmental Assessment Mining Sector of Romania", September 2001

Back-to-Office Reports of Bank Missions

Project Cost Tables

"Dam Safety Assessment Report", Daniel Gunaratnam, July 2003

Procurement Capacity Assessment Report, 2003

Financial Assessment Report, 2004

#### **C. Other**

Project Social Assessment, 2003

Environmental Management Plan, 2003

Feasibility Studies for Flood Prevention Schemes

Feasibility Studies for Facilities Proposed for Retrofitting

Prioritization of Structures for Seismic Strengthening

\*Including electronic files

## Annex 9: Statement of Loans and Credits

### ROMANIA: HAZARD RISK MITIGATION AND EMERGENCY PREPAREDNESS PROJECT

27-Oct-2003

Project ID	FY	Purpose	Original Amount in US\$ Millions			Cancel.	Undisb.	Difference between expected and actual disbursements <sup>a</sup>	
			IBRD	IDA	GEF			Orig	Frm Rev'd
P043881	2004	IRRIG REHAB	80.00	0.00	0.00	0.00	80.00	0.00	0.00
P073967	2003	RURAL EDUC	60.00	0.00	0.00	0.00	60.00	1.00	0.00
P069679	2003	PPIBL	18.60	0.00	0.00	0.00	18.56	-0.04	0.00
P068062	2003	ENERGY EFF (GEF)	0.00	0.00	10.00	0.00	10.27	3.65	0.00
P067575	2003	PSAL 2	300.00	0.00	0.00	0.00	194.02	0.00	0.00
P081406	2003	ELEC MARKET	82.00	0.00	0.00	0.00	80.71	0.00	0.00
P067367	2003	FOREST DEVT	25.00	0.00	0.00	0.00	25.00	0.40	0.00
P057960	2002	RURAL DEV (APL #1)	40.00	0.00	0.00	0.00	38.40	1.90	0.00
P068808	2002	SDF 2 (APL #2)	20.00	0.00	0.00	0.00	17.67	-2.33	1.42
P066065	2002	AG POLLUTION CONTROL (GEF)	0.00	0.00	5.15	0.00	4.64	0.92	0.00
P008783	2001	SOC SECT DEV (SSD)	50.00	0.00	0.00	0.00	49.64	27.70	0.00
P056891	2001	RURAL FIN (APL #1)	80.00	0.00	0.00	0.00	78.97	17.57	0.00
P065041	2000	TRADE & TRANS FACIL IN SE EUR	17.10	0.00	0.00	4.47	5.84	-6.79	0.00
P056337	2000	MINE CLOSURE	44.50	0.00	0.00	0.00	31.54	30.94	-4.96
P043882	2000	AGR SUPPORT SERVS	11.00	0.00	0.00	0.00	7.32	6.12	0.00
P008797	2000	HEALTH SECTOR REFORM	40.00	0.00	0.00	0.00	8.13	7.13	0.00
P039251	1999	PIBL	25.00	0.00	0.00	1.10	10.10	11.20	0.00
P058284	1999	CULTURAL HERITAGE	5.00	0.00	0.00	0.00	3.45	3.45	1.13
P044176	1999	BIODIV CONSV MGMT (GEF)	0.00	0.00	5.50	0.00	2.88	2.58	0.08
P034213	1998	GEN'L CADASTRE	25.50	0.00	0.00	0.00	17.18	17.18	9.36
P044614	1998	SCHOOLS REHABILITATION	70.00	0.00	0.00	0.00	7.06	7.06	1.06
P039250	1997	SECOND ROADS	150.00	0.00	0.00	0.00	17.61	17.61	0.00
P008794	1996	POWER SECTOR REHAB	110.00	0.00	0.00	33.50	13.13	46.63	4.70
<b>Total:</b>			1253.70	0.00	20.65	39.07	782.12	193.88	12.79

ROMANIA  
STATEMENT OF IFC's  
Held and Disbursed Portfolio  
June 30 - 2003  
In Millions US Dollars

FY Approval	Company	Committed				Disbursed			
		IFC				IFC			
		Loan	Equity	Quasi	Partic	Loan	Equity	Quasi	Partic
1999	Ambro	4.13	0.00	0.00	0.00	4.13	0.00	0.00	0.00
2003	Arctic	11.48	0.00	0.00	0.00	9.18	0.00	0.00	0.00
1998/02	Banc Post	0.00	0.00	10.00	0.00	0.00	0.00	10.00	0.00
2003	Banca Comerciala	75.00	0.00	0.00	0.00	75.00	0.00	0.00	0.00
2001	Banca Romaneasca	5.26	0.00	0.00	0.00	5.26	0.00	0.00	0.00
1998	Bilstein Compa	0.88	0.00	0.00	0.88	0.88	0.00	0.00	0.88
1996	Danube Fund	0.00	1.40	0.00	0.00	0.00	1.40	0.00	0.00
2001	ICME	12.63	0.00	0.00	0.00	12.63	0.00	0.00	0.00
1998	Krupp Compa	2.71	0.00	0.00	1.16	2.71	0.00	0.00	1.16
2002/03	MFI MFB Romania	0.00	0.53	0.00	0.00	0.00	0.53	0.00	0.00
1997/98/00	Mobil Rom	1.35	0.00	0.00	1.80	1.35	0.00	0.00	1.80
1997	Rambox	0.81	0.00	2.00	0.00	0.81	0.00	2.00	0.00
1994/98/01	Romlease	3.11	0.00	0.00	0.00	3.11	0.00	0.00	0.00
	<b>Total Portfolio:</b>	<b>117.36</b>	<b>1.93</b>	<b>12.00</b>	<b>3.84</b>	<b>115.06</b>	<b>1.93</b>	<b>12.00</b>	<b>3.84</b>

FY Approval	Company	Approvals Pending Commitment			
		Loan	Equity	Quasi	Partic
2003	Banca Comerciala	0.00	0.00	0.08	0.00
2003	Ro-Fin Mortgage	0.01	0.00	0.00	0.00
	<b>Total Pending Commitment:</b>	<b>0.01</b>	<b>0.00</b>	<b>0.08</b>	<b>0.00</b>

## Annex 10: Country at a Glance

### ROMANIA: HAZARD RISK MITIGATION AND EMERGENCY PREPAREDNESS PROJECT

POVERTY and SOCIAL	Romania	Europe & Central Asia	Lower-middle-income		
<b>2002</b>					
Population, mid-year (millions)	21.8	476	2,411		
GNI per capita (Atlas method, US\$)	1,920	2,160	1,390		
GNI (Atlas method, US\$ billions)	41.9	1,030	3,352		
<b>Average annual growth, 1996-02</b>					
Population (%)	-0.6	0.1	1.0		
Labor force (%)	0.2	0.4	1.2		
<b>Most recent estimate (latest year available, 1996-02)</b>					
Poverty (% of population below national poverty line)	30	..	..		
Urban population (% of total population)	55	63	49		
Life expectancy at birth (years)	70	69	69		
Infant mortality (per 1,000 live births)	18	25	30		
Child malnutrition (% of children under 5)	..	..	11		
Access to an improved water source (% of population)	58	91	81		
Illiteracy (% of population age 15+)	2	3	13		
Gross primary enrollment (% of school-age population)	99	102	111		
Male	100	103	111		
Female	98	101	110		
<b>KEY ECONOMIC RATIOS and LONG-TERM TRENDS</b>					
	<b>1982</b>	<b>1992</b>	<b>2001</b>	<b>2002</b>	
GDP (US\$ billions)	..	28.4	39.1	42.4	
Gross domestic investment/GDP	33.7	31.4	22.6	23.1	
Exports of goods and services/GDP	..	27.8	33.3	35.4	
Gross domestic savings/GDP	..	23.0	14.8	17.3	
Gross national savings/GDP	..	22.9	17.0	19.8	
Current account balance/GDP	..	-5.3	-5.7	-3.6	
Interest payments/GDP	..	0.2	1.5	1.3	
Total debt/GDP	..	11.5	29.5	31.4	
Total debt service/exports	23.3	9.1	18.5	17.9	
Present value of debt/GDP	..	11.1	28.3	30.1	
Present value of debt/exports	..	61.9	79.8	76.8	
	<b>1982-92</b>	<b>1992-02</b>	<b>2001</b>	<b>2002</b>	<b>2002-06</b>
<i>(average annual growth)</i>					
GDP	-1.9	1.0	5.7	4.9	5.0
GDP per capita	-2.1	1.3	5.9	7.8	4.6

**Development diamond\***

Life expectancy

GNI per capita

Gross primary enrollment

Access to improved water source

— Romania

— Lower-middle-income group

**Economic ratios\***

Trade

Domestic savings

Investment

Indebtedness

— Romania

— Lower-middle-income group

STRUCTURE of the ECONOMY	1982	1992	2001	2002
<i>(% of GDP)</i>				
Agriculture	19.9	19.4	14.8	13.1
Industry	55.2	44.0	37.0	38.1
Manufacturing	..	..	..	..
Services	24.9	36.6	48.1	48.8
Private consumption	53.9	62.7	78.5	76.0
General government consumption	10.5	14.3	6.7	6.6
Imports of goods and services	..	36.2	41.1	41.2
	<b>1982-92</b>	<b>1992-02</b>	<b>2001</b>	<b>2002</b>
<i>(average annual growth)</i>				
Agriculture	1.4	-1.0	25.2	-3.9
Industry	-2.9	0.7	7.5	7.2
Manufacturing	..	..	..	..
Services	..	1.2	0.4	5.6
Private consumption	0.3	4.2	6.5	3.0
General government consumption	2.6	-9.3	-0.3	2.1
Gross domestic investment	..	-1.2	18.0	7.4
Imports of goods and services	..	10.0	17.2	12.1

**Growth of investment and GDP (%)**

30

15

0

-15

97 98 99 00 01 02

— GDI — GDP

**Growth of exports and imports (%)**

30

20

10

0

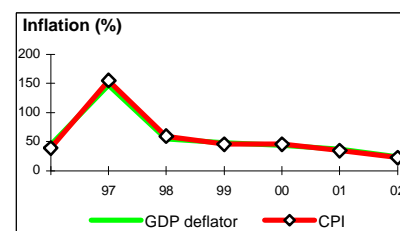
-10

97 98 99 00 01 02

— Exports — Imports

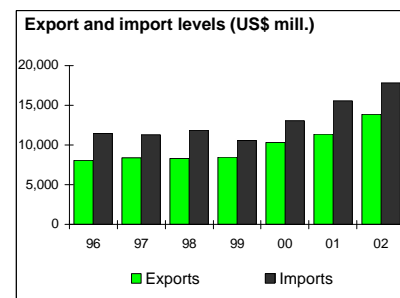
## PRICES and GOVERNMENT FINANCE

	1982	1992	2001	2002
<b>Domestic prices</b>				
(% change)				
Consumer prices	..	210.9	34.5	22.5
Implicit GDP deflator	12.1	199.9	37.3	23.6
<b>Government finance</b>				
(% of GDP, includes current grants)				
Current revenue	..	36.7	30.1	29.6
Current budget balance	..	-0.1	0.0	0.7
Overall surplus/deficit	..	-5.3	-3.2	-2.5



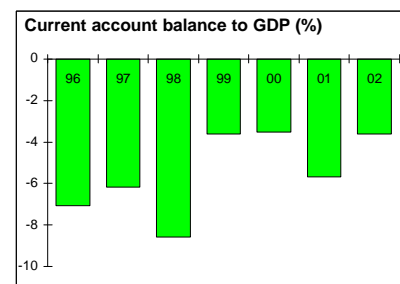
## TRADE

	1982	1992	2001	2002
(US\$ millions)				
Total exports (fob)	..	4,363	11,385	13,876
Textiles	..	735	1,516	1,782
Metals	..	572	784	1,181
Manufactures	..	2,613	8,122	9,851
Total imports (cif)	..	6,260	15,552	17,862
Food	..	996	1,207	1,174
Fuel and energy	..	2,028	2,237	2,272
Capital goods	..	1,208	4,326	5,111
Export price index (1995=100)	..	..	96	97
Import price index (1995=100)	..	..	88	88
Terms of trade (1995=100)	..	..	110	111



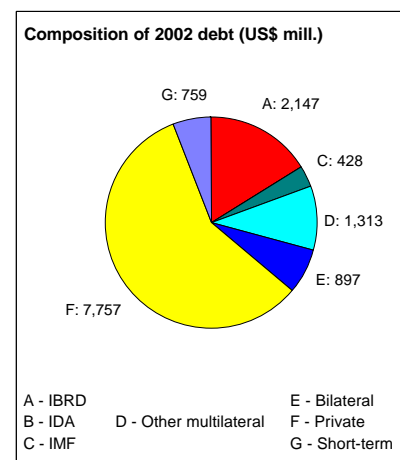
## BALANCE of PAYMENTS

	1982	1992	2001	2002
(US\$ millions)				
Exports of goods and services	12,384	5,023	13,418	16,223
Imports of goods and services	10,493	6,504	16,502	18,825
Resource balance	1,891	-1,481	-3,084	-2,602
Net income	-851	-90	-282	-459
Net current transfers	0	65	1,143	1,536
Current account balance	1,040	-1,506	-2,223	-1,525
Financing items (net)	-988	1,393	3,707	3,327
Changes in net reserves	-52	113	-1,484	-1,802
<b>Memo:</b>				
Reserves including gold (US\$ millions)	..	858	4,861	7,306
Conversion rate (DEC, local/US\$)	..	212.5	29,875.3	35,684.2



## EXTERNAL DEBT and RESOURCE FLOWS

	1982	1992	2001	2002
(US\$ millions)				
Total debt outstanding and disbursed	10,003	3,272	11,524	13,301
IBRD	1,483	210	1,876	2,147
IDA	0	0	0	0
Total debt service	2,910	464	2,571	2,971
IBRD	162	2	204	194
IDA	0	0	0	0
Composition of net resource flows				
Official grants	0	199	257	327
Official creditors	378	1,006	17	-34
Private creditors	410	144	1,434	859
Foreign direct investment	0	73	1,174	1,128
Portfolio equity	0	0	8	..
World Bank program				
Commitments	197	500	150	384
Disbursements	413	211	132	307
Principal repayments	73	0	101	119
Net flows	340	211	31	188
Interest payments	89	2	103	76
Net transfers	251	209	-72	112



**Additional GEF Annex 11**  
**Incremental Costs and Global Environmental Benefits**  
**ROMANIA: HAZARD RISK MITIGATION AND EMERGENCY PREPAREDNESS PROJECT**

*Global Environmental Objective*

The global environmental objective is to demonstrate and provide for replication for the reduction of catastrophic accidental spills of transboundary pollution loads from mine operations flowing into the Danube and Black Sea basins. Proposed project activities are in line with the objectives of the Programmatic Approach to the Danube and Black Sea Basin, namely, that Danube and Black Sea basin countries: (i) adopt and implement policy, institutional and regulatory changes to reduce point and non-point source nutrients discharges, restore nutrient sinks and prevent and remediate toxic hot spots; and (ii) gain experience in making investments in prevention and remediation of toxic “hot spots.”

*Regional Context and Broad Development Goals*

**International Convention for the Protection and Sustainable Use of the Danube River.** The 1994 Danube Strategic Action Plan under the Convention on Cooperation for the Protection and Sustainable Use of the Danube River is concerned with transboundary water issues and includes provisions to protect the Black Sea and Danube Delta against pollution by nutrients and hazardous substances. Until recently, most of the attention on the Danube and Black Sea basins has been concentrated on reduction of nutrient loads to address the problem of eutrophication in the Black Sea. The 2000 mining accidents in Baia Mare in the Maramures region in Northern Romania within the Tisza catchment area, however, have pointed out that additional priority should be placed to address mine-induced water pollution and mining accidents. According to field investigations, the two reported accidents could have been avoided if adequate quality assurance, technology and material used in the construction of the tailings dams, a proper forecasting system linked to existing rainfall and snow pack gauge stations, a continuous monitoring system, and proper emergency preparedness and response procedures by the mining companies and local authorities would had been in place.

**Mining sector in Romania.** The Romanian mining sector has a long tradition and is important to the country. It has a good future in terms of reserves and potential exploitation. Currently, the sector faces difficult challenges in relation to economic, social and environmental requirements. Total direct employment in the mining industry is about 10%, and is higher than in any other European Union country. Long-term impacts on the environment and human health have occurred as a result of diffuse pollution from sites subject to mining activities over centuries. The Government has launched a restructuring of its mining industry, and efforts are underway to close uneconomic mines. This undertaking is supported by the FY99 Mine Closure and Social Mitigation Project (MCSMP). Privatization is also part of the restructuring of the sector, which poses additional challenges related to environmental liabilities from past mining operations.

The Government is committed to improve the environmental performance of the mining sector, and has recently completed a comprehensive Mining Sector Environmental Assessment (MSEA), which provides a baseline evaluation of the mines throughout the country. The MSEA identifies the main environmental issues arising from ongoing mining activities, as well as priority areas for future environmental remediation/mitigation efforts. The MSEA has identified that a large number of operating mining sites



require urgent environmental rehabilitation of their tailings dams and waste storage facilities to avoid catastrophic and continued releases of highly persistent toxins, thus reducing the risk of mining accidents with long-term environmental consequences.

**Accidental pollution threats.** According to available information, there are 264 facilities constructed to store mine tailings throughout the country, out of which about 40 pose a severe threat to the surrounding human population and the environment. A recent inventory in the Tisza Basin has identified 17 tailings dams and waste dumps facilities as potential risk spots. Romania has a large number of abandoned tailings storage facilities and mine waste rock dumps, which are also sources of contamination. As proven by the two accidents in northwestern Romania in 2000, the failure of tailings storage facilities can have serious and devastating consequences.

- (a) *Aurul S.A. Mine Accident.* A spill of about 100,000 cubic meters of wastewater, containing about 40 tons of cyanide and other heavy metals (lead, cadmium, copper, manganese, zinc and arsenic), took place on January 30, 2000, at the Aurul S.A., an Australian-owned gold and silver producing mine located in Baia Mare in the Maramures region in northern Romania. The spill was caused by a combination of a break of the Aurul dam as a result of the heavy rains and the melting snow, and design defects in the facility. The polluted wastewater traveled into the Somes River, the Tisza River in Hungary and Serbia and Montenegro, and the Danube River before entering into the Black Sea about four weeks later. The initial cyanide concentration was reported to be between 325 and 700 times permissible levels. This incident resulted in severe deleterious impacts on the aquatic life of the Tisza River, 1,200 tons of fish were reported dead, and threatened people's health and livelihoods as well as drinking water sources for about 2 million inhabitants. The total quantifiable damages were estimated at about US\$3.5 million.
- (b) *Baia Borsa Mine Accident.* A second mining waste spill in the Maramures region of Romania took place five weeks after the earlier accident at the Baia Borsa Preparation Enterprise mining company. A section of the dam built with sediments from the mine failed on March 10, 2000, as a result of the heavy rainfall and melting snow from the slopes surrounding the mine. As a result of this incident, approximately 20,000 tons of mineral waste containing minerals and heavy metals (lead, copper and zinc) were discharged into the Viseu River, the Vasar River and Tisza River

**Uncontrolled discharge of polluted waters.** The Environmental Assessment of the Mine Sector (conducted recently by the Government of Romania) points out that the continuous release of toxic substances from mine operations is caused by the poor management, operation and maintenance of tailings dams facilities, including monitoring, operational control and risk/environmental awareness of the water management systems and the retaining dam structures. This is also the reason for the high level risk of failure at tailings dams facilities. Field surveys have also revealed that a large amount of the contaminated water is actually seeping through the dam body or escaping from dilapidated pipes. Risk mitigation measures, which are the core of the GEF-supported component, will indeed cause a drastic reduction in the amount of continuous discharge in addition to a reduction in the number of catastrophic and massive emission of contaminants, which as we all know have serious negative effects downstream.

**Transboundary impacts of mining accidental spills.** Mining accidental spills in one country can have huge transboundary impacts in other riparian countries of the Danube River and Black Sea basins. Communities and ecosystems located far away from the mining region where the accidents take place are at

risk of pollution exposure. The above-mentioned mining accidents have increased public awareness of the environmental and safety hazards of the mining industry and have shown that risk assessment and prevention of tailings dams accidents have to improve. The long-term protection of Danube and Black Sea's water quality thus calls for addressing ongoing degradation of mine tailings dams and continuous erosion of contaminants into surface waters of the area.

**Bank Strategy.** The World Bank strategy is to support the riparian countries of the Danube River and Black Sea to reduce pollution, protect fragile ecosystems, and improve environmental management. Consistent with this approach, the Country Assistance Strategy for Romania includes activities for helping Romania increase the focus on reducing pollution from non-point sources as well as mining accidental spills and move towards compliance with EU environmental directives as well as international conventions and protocols in a cost-effective and efficient manner.

**Project Development Objective.** The development objective of the proposed project component is to complement Romania's efforts to reduce the risk of water and soil contamination and loss of human and aquatic life from catastrophic mining accidental spills of pollutants by: (i) identifying and piloting cost-effective, efficient and innovative methods for tailings facilities management, which include environmental and safety criteria and could be replicated throughout Romania and the Danube Basin; (ii) improving capacity at both the national and local levels to conduct risk assessment and identify risk-based priority actions; (iii) establishing comprehensive management guidelines to improve the performance of tailings management facilities by Romanian companies; (iv) strengthening capacity and capability to develop a long-term tailings dams risk/hazard mitigation strategy, which can be established for the whole country; (v) strengthening environmental monitoring program, including establishment of credible baseline and measures to assess performance of the mining industry; (vi) establishing a regional emergency preparedness and response system linked to the Danube Accident and Emergency Warning system; and (vii) furthering and promoting regional collaboration on integrated water resources management.

### ***Baseline Scenario***

The international waters of the Black Sea and Danube River are subject to a number of pressures from human activities. Risks involved in mining activities, particularly those located in the Upper Tisza Basin, are threatening the ecological sustainability and integrity of these transboundary ecosystems.

In the absence of GEF assistance for addressing long-term protection of international waters, Romania would continue to support the restructuring of the mining sector, given particular attention to mitigation of social impacts resulting from mine closure programs. Although attention for environmental rehabilitation of (closed) mines is expected, existing government resources and international financing support will not be sufficient to address environmental issues associated with tailings facilities of active mines. While the Romanian government remains prepared to launch a country-wide program on tailings dams safety, serious short-term financial constraints may preclude such ambitious undertaking. Without international assistance, Romania is unlikely to guarantee in the short-term adequate protection of the Danube River and Black Sea.

Romania is undertaking a number of domestically and externally funded programs and activities to reduce the risk of mining accidents in the Tisza Basin. The Baseline Scenario consists of the following investments during the project life:

- *Environmental rehabilitation of the mining sector.* The Government has allocated US\$800,000 in the 2003 budget to address issues related to tailings dams facilities associated with the closure of mines. Approximately US\$150.7 million are being planned for the period 2004-10 for investments

on environmental rehabilitation of mines that will be closed and privatized, including improving the safety and management of tailings facilities. About US\$7.6 million (5%) would relate to GEF-project objective and GEF-project area.

- *Prevention of accidental pollution.* Norway and Finland governments are providing financial support for establishing a remediation plan and a prevention/response plan for accidental pollution in the Somes Basin and Barcau Basin, respectively. Total contribution amounts to US\$100,000 over the life of the project.
- *Emergency preparedness.* Component A of the project will focus on strengthening and upgrading the national emergency response capacity. One could estimate that about US\$200,000 would relate to GEF-project objective and GEF-project area.
- *Flood forecasting system.* Approximately US\$46 million will be invested to establish a flood forecasting system for Romania (DESWAT). The new flood forecasting system will complement the US\$55 million National Integrated Meteorological System (SIMIN), which implementation started in 20002. Both systems will help alert the population and authorities in case of potential floods. Real-time hydro-meteorological data will improve forecasting capabilities of severe hydrological events and will reduce the risk of mining accidents. One could estimate that about US\$2.3 million (5%) would relate to GEF-project objective and GEF-project area.
- *Water management plan and monitoring equipment.* A project supported by EU PHARE aims at piloting the implementation of the EU Water Framework Directive in the Somes River basin. The project will include the procurement of monitoring equipment. About US\$1.5 million relates to GEF-project objective.

### *GEF Alternative*

With GEF assistance for addressing international waters objectives, the Government of Romania would be able to undertake a comprehensive program for improving the safety and management of tailings facilities, which would generate both local and global benefits. The GEF Alternative would include the baseline scenario augmented with activities at the Tisza Basin to address priority mining accidental spill risks. The GEF Alternative will: (i) enable the development of a more integrated knowledge base about transboundary impacts of mine-induced pollution in the Danube and Black Sea basins; (ii) provide capacity building to increase the opportunity for adoption of best mine waste management practices throughout the Tisza and Danube basins; (iii) pilot techniques for hazard prevention and remediation for improving the management and safety of tailings dams and waste dumps facilities; (iv) provide for lessons learned that could be replicated in other parts of the Tisza and Danube basins (v) leverage support from the mine operators to replicate measures to manage the risks associated with tailings dams and waste dumps facilities; and (vi) foster transboundary cooperation on integrated water resources management in the Tisza Basin.

The total cost of the GEF Alternative is estimated at US\$30.23 and will catalyze additional resources beyond the baseline scenario, totaling US\$18.53 million, including the GEF contribution of US\$7.35 million (US\$0.35 million preparatory grant and US\$7.0 full grant) and an additional US\$11.18 million from other sources. There is commitment from the Government of Romania to allocate funds from the FY05 Second Mine Closure and Social Mitigation Project, which preparation is scheduled to start shortly, for further replication of the GEF activities throughout Romania.

### *Incremental Cost*

The difference in cost between the Baseline Scenario and the proposed GEF Alternative is estimated at US\$18.53 million. Of this amount, it is expected that US\$3.84 million would be contributions from the GoR, US\$5.64 million from a IBRD loan, US\$0.26 million from the Austrian Government, US\$1.01 million from USTDA and US\$0.44 from NAMR and mine operators. An incremental cost of US\$7.35 million will be incurred to achieve global benefits through the improved management and safety of tailings dams and waste dumps facilities. This amount would be eligible for GEF support, US\$0.35 million from a PDF-B preparatory grant and US\$7.0 million from the full GEF grant. The table below summarizes the project components and proposed financial plan of the incremental cost.

## Incremental Cost Matrix

Activity	Cost Category	US\$ Million	Domestic Benefits	Global Benefits
Establishing a baseline and an environmental monitoring system	Baseline	3.80	Improved flood forecasting and flood dissemination capabilities.  Improved local capacity of national monitoring institutions, which will result in improved monitoring and assessment capacity.	
	With GEF Alternative	4.81	Same as above.	Integrated knowledge base about transboundary impacts of mine-induced pollution in the Danube and Black Sea basin and improved understanding of mining accidental spills impacts.
	Increment	1.01		
Piloting and replicating hazard prevention and remediation interventions	Baseline	7.60	Some improvements in the management and safety of tailings facilities.  Limited reduction on the risk of local water and soil contamination and loss of human and aquatic life downstream project sites.	
	With GEF Alternative	21.80	Significant risk reduction of local water and soil contamination and loss of human and aquatic life from catastrophic mining accidental spills of pollutants.  Improved environment for local communities.  Enhanced knowledge of tailings dams hazard mitigation by strengthening local capacity through specific training and information dissemination and access.	Accelerate significant risk reduction of degradation of the Black Sea and Danube River through identification and implementation of an effective remediation and prevention program in the Tisza basin.  Establishment of a model for replication for reducing mining accident risks to human and aquatic ecosystem health throughout other parts of the Tisza and Danube basins.  In the long-term, reduced pollution into the Danube River and Black Sea basins --improved water quality from reduced toxic and dangerous waste and protection of sensitive aquatic ecosystems.
	Increment	14.20		

### Incremental Cost Matrix (Continuation)

Activity	Cost Category	US\$ Million	Domestic Benefits	Global Benefits
Developing environmental and engineering guidelines for tailings and waste facilities	Baseline	0.00		
	With GEF Alternative	0.22	Strengthened institutional and human capacity in Romania for proper management of tailings dams and waste dumps facilities.	Accelerate adoption of best tailings dams and mine waste management practices throughout the Tisza and Danube basins.
	Increment	0.22		
Developing a regional mine spill emergency response plan	Baseline	0.30	Limited improvements in the level of preparation and protection of a few communities within the Tisza catchment area.	
	With GEF Alternative	1.72	Significant improvements in the level of preparation and protection of communities within the Tisza catchment area.  Increased technical level of mine operators and local authorities to develop and maintain emergency response plans.	Increased regional capacity for mine accidental spills prevention.  Increased collaboration among the Tisza basin riparian countries.
	Increment	1.42		
Promoting transboundary cooperation on integrated water resources management for the Tisza basin	Baseline	0.00		
	With GEF Alternative	0.37	Improved local awareness of integrated water resources management.	Improved regional cooperation among the riparian countries and increased awareness for sustainable management and development of the Tisza River.
	Increment	0.37		
Monitoring and evaluation and project management	Baseline	0.00		
	With GEF Alternative	1.31	Improved local project implementation capacity	Identification and dissemination of lessons from project implementation relevant for projects elsewhere in the Danube and Black Sea basins.
	Increment	1.31		
Totals	Baseline	11.70		
	With GEF Alternative	30.23		
	Increment (GEF)	<b>18.53</b> <b>(7.35)*</b>		

**Note:** \* US\$0.35 million from the PDF-B preparatory grant and US\$7.0 million from the full GEF grant.

**Additional GEF Annex 12: STAP Review**  
**ROMANIA: HAZARD RISK MITIGATION AND EMERGENCY PREPAREDNESS PROJECT**

**STAP Review of the GEF Project Component (Component D)**

**Risk Reduction of Mining Accidents in the Tisza Basin**

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## **1. Introduction**

On behalf of the World Bank-GEF I have undertaken a scientific and technical review of the Appraisal Document - Romania - Hazards Risk Mitigation & Emergency Preparedness Project - Sub-component D - Risk Reduction of Mining Accidents in Tisza Basin. As the mining waste Component is closely linked to other Components in the project it was necessary to study all the documentation. I based my review on the material provided by World Bank. Previous studies are referred to in the Project Document and these would have provided useful background information but were not made available to me. In any event the timescale for the review was very limited.

In the following review I have, for completeness, given a brief overview of the proposal as I see it and then discussed Component D's five sub-components, the Project Management Component E, Annex 4, Finance and Timelines. Comments/recommendations in the body of the text are shown in bold and these are more concisely presented in the Conclusions and Recommendations [final section].

## **2. Overview**

The Project Component D - Risk Reduction of Mining accidents in the Tisza Basin encompasses issues of environmental pollution from mining activities that apply not only to Romania and neighbouring riparian [Danube] countries but also globally. The outcomes from this Project Component should therefore have widespread international relevance.

The work to be undertaken by the Romanian authorities [involving others as necessary] to reduce the risk of soil, rock and water contamination and potential loss of human and other life following a major spill of mining pollutants is clearly outlined in the proposal. The Component forms a small but important part of a much larger project covering Hazard Risk Mitigation and Emergency Preparedness for earthquakes, floods, landslips etc. The mining waste Component is fully compatible with these other activities and there should be, and is, some commonality between the monitoring, warning and emergency procedures that will be

established.

A number of serious pollution incidents involving the collapse of mine tailings dams have occurred in Romania in recent years and surveys in the region have identified many other such dams potentially unstable in the short term. Mining waste spoil heaps and abandoned mines also present immediate and longer term problems. Large volumes of polluted water are presently subject to uncontrolled discharge. Baseline conditions have not been established fully so the extent of existing, and potential for future, pollution almost certainly exceeds current estimates. The pollution is not restricted to Romania.

The Tisza river, which receives much of the contaminated water from mining activities, passes across several international boundaries and is a principal tributary of the Danube. To protect this freshwater ecosystem trans-boundary co-operation is needed. Further Romania, as a candidate for European Union membership, is moving towards the implementation of EU Directives. The EU Water Framework Directive is particularly relevant with its stress on Integrated River Basin Management in terms of water quantity, quality and ecosystems. An interchange in relation to the management of the Tisza basin between Romania, Ukraine, Slovenia, Hungary, Serbia and Montenegro has just started. This is very welcome, essential to the success of the GEF project, and should be advanced with vigour.

There is an urgent need to address these problems but due to economic constraints in the past investment in environmental protection or remediation has been minimal. The Romanian government is restructuring its mining industry. This will involve closure of uneconomic mines, privatisation and addressing the legacy of pollution from mining activities. Appropriate legislative measures appear to be in place to deal with the pollution problems arising from the mining sector but costs of remedial measures are high, understanding of the environmental issues lacking and there is little operational experience in remediation or emergency management. Nevertheless the government has modified its Dam Safety Legislation to address tailings storage facilities, drafted a mine closure procedure manual and prepared some environmental action plans. Several other countries and donor agencies have supported the development of monitoring and information systems but the potential effectiveness of these inputs has been reduced due to the lack of facilities and absence of standardisation. This is of prime concern in relation to the proposed GEF project, particularly that the water and soil quality data are not comparable between sites due to the variety of laboratory analytical and site sampling methods in use.

The proposal identifies the outstanding issues to be addressed. It recognises that:

- the risk assessment of tailings dams needs a specialist, independent input;
- while a financial programme to assist mine closure and rehabilitation is in place there has been only limited progress in establishing an 'Environmental Fund';
- better baseline information is essential to the improvement and protection of water quality;
- central government should take a stronger lead in strategic planning so that sound priorities for action are identified leading to the highest benefits in relation to investment;
- water and soil monitoring needs to be strengthened and harmonised and accreditation procedures put in place;
- emergency response capability for local EPAs in terms of monitoring and analytical facilities, personnel protection and training is necessary;
- strengthening the capacity and emergency preparedness planning and response, particularly at local level, is needed.

The rationale for World Bank and GEF support is clearly articulated in terms of trans-boundary co-operation to reduce mine pollution risk and integrated water management, particularly in relation to the



goals of the International Convention for the Protection & Sustainable Use of the Danube river. The recent mining accidents in the Tisza catchment give urgency to the establishment of the project.

### **3. Sub-components of Project Component D - Risk Reduction of Mining Accidents in the Tisza Basin**

Component D will be conducted in the following five sub-components:

#### D.1 - Establishing a Baseline and an Environmental Monitoring System

Key catchments in the Tisza catchment will be identified and monitoring systems will be installed to determine the effectiveness of tailings dam remediation activities on surface and groundwater quality. Deliverables are identified [manuals, models, training etc].

**This is an essential first step in Component D but I have two concerns;**

- a. Problems with comparability of water and soil quality measurements have been identified [i.e. sampling & analytical methods]. Every effort must be made to ensure that the data conform to international standards otherwise the outcomes may be meaningless. It is necessary to state explicitly in the proposal how this is to be achieved.**
- b. The project duration, and therefore the monitoring, appears to be from 2004 to 2008 [Annex 5]. At best this would only give four years of monitoring which may be insufficient to indicate the effectiveness of any remedial measures. Opportunities to extend monitoring over a longer period should be examined.**

#### D.2 - Hazard Prevention & Remediation Interventions

High risk tailings and mine waste facilities will be identified in the Tisza basin and a number of hazard prevention and remediation measures will be installed. Two sites have already been selected for urgent work and other sites, following survey, will be considered. The remediation and prevention work will involve an expert multi-national and regional task force. Detailed analytical procedures covering geo-technical and hydrological considerations will be used. Workshops involving designers, regulators and mine operators will be held. A second phase of the activity will use the knowledge gained to replicate prevention/remedial works on other dams/dumps in the Tisza basin.

The concepts are soundly based. It is encouraging that two sites have already been identified. This will enable a rapid start up on this sub-component.

**My concerns are as follows:**

- a. The problems with tailings dams and mine waste dumps are not unique to Romania. There have been many investigations and suggested design/remediation procedures in other parts of the world. A review of current international experience is essential at the outset of this sub-component.**
- b. While it is necessary to involve stakeholders in the deliberations and/or on committees, it is important that strong vested interests from one side or the other do not unduly influence the outcomes. [I am conscious of the debate in this sector that has continued between the International Union for the Conservation of Nature and the International Council on Metals and the Environment, particularly in relation to World Heritage Sites.] How is a balanced outcome**

going to be achieved? Is there a need to establish an independent expert international review group?

- c. **There is the opportunity to select other sites for prevention/remediation works. There could be a push [possibly political] to remediate more sites than can be readily supported by the available funding. This should be resisted. It will be better to do good quality work leading to a sound scientific/engineering understanding of processes and procedures on a few sites rather than lesser quality work on many.**
- d. **There is the need to link the technical aspects of Component D - and in particular the work to be undertaken under D.2 - with other Components of the overall project, particularly floods, dam safety and earthquakes. It is not clear how this technical/scientific link is to be achieved.**

#### D.3 - Engineering and Environmental Guidelines for Tailings Dams and Waste Facilities

On the basis of activities in D.1 and D.2 training will be undertaken and associated guidelines and manuals prepared. This will be a very valuable output.

**My concerns are that:**

- a. **No indication is given as to which organisation(s) will undertake this work - responsibilities should be clearly stated at the start.**
- b. **Use should be made of existing reported technical experience available internationally. The training and guidance material should be set in a regional rather than exclusively Romanian context.**

#### D.4 - Regional Mine Spill Disaster Response System

This activity will improve the effectiveness of the current system in planning and in response to a mine spill for selected mining companies in the Tisza basin. It will complement emergency procedures that will be developed for other elements of the overall project e.g. flood forecasting. D.4 will finance codes of practice, training, response plans[mine operators and local communities], public awareness and communication systems.

**As indicated above this sub-component forms part of the overall Project and I would be concerned if there were not clear links and responsibilities established, for example between technical teams working on flooding and mine spills. How is such technical liaison to be put in place?**

#### D.5 - Promoting Trans-boundary Co-operation on Integrated Water Resources Management for the Tisza Basin

This is a central element of sub -component D.

**The meetings and workshops involving riparian interests need to continue throughout the project and beyond.**

#### **4. Project Component E - Project Management**

This element of the overall proposal is concerned with project implementation. Each of the Project Components will have its own Project Management Unit [PMU] lying in different ministries. That for Component D will be in the National Agency for Mineral Resources. There will be a PMU in the Ministry of Transport, Construction & Tourism concerned with monitoring and reporting on project progress over the Components in the project as a whole. The responsibility of this centralised PMU appears to be focussed on administrative rather than technical aspects.

**If this is the case there is cause for concern. For the Project overall and for Component D to meet their objectives there must be ready exchange of technical information between components. It is not clear how this is to be achieved.**

#### **5. Annex 4- Incremental Costs and Global Environmental Benefits - Component D**

This Annex reviews much of the material previously covered in the proposal document. It does, however, provide more detail of (a) the two major pollution incidents in NW Romania in 2000; (b) the Romanian government's longer term proposed budget to address mine closure and environmental rehabilitation; and (c) the level of finance provided by other countries and international agencies supporting work closely related to the mine waste proposal. The Annex also provides a sound rationale for the World Bank involvement with the project on the basis of incremental costs and benefits.

## 6. Finance

The costs given for each of the sub-components appear adequate for the tasks proposed. However concern has already been expressed that (a) the monitoring activity may be too short and so modest additional funds to support Sub-component D.1 to extend monitoring time may be needed and (b) the number of sites selected for detailed investigation/remediation should be limited [sub-component D.2].

**It is surprising that there is no financial input to the proposed project from the mining industry. The work is in their direct interest. It is noted that the outcomes may be used to exert leverage on the industry in future but some financial input at this stage would demonstrate a commitment to environmental protection. Is it possible to explore this further?**

## 7. Timelines

The progress of the work in Sub-component D [and the remainder of the project] is clearly linked to outcomes. However the proposal gives no indication of how this 'timeline/flowchart' is envisaged.

**It would be helpful to identify key outcomes from the sub-components and their anticipated delivery dates. If this is not done scientists/engineers working on Sub-components may be unaware that lack of a timely activity output is hindering progress in other areas.**

## 8. Conclusions and Recommendations

The proposal is clearly presented. Component D identifies important regional issues in relation to mining wastes and a means of addressing these through the project work. The proposal meets the GEF requirements and will benefit from being part of a much larger World Bank project. The environmental problems identified are major and solutions are needed urgently. The project results will deliver local, regional and international benefits. The overall proposed financial provisions are appropriate to the scheduled work.

I am satisfied with the proposal but have made a number of recommendations [introduced in bold in the body of the text] which I consider would enhance the project. These are as follows:

- make a clear commitment to establishing for the project water and soil quality sampling and analytical methods that meet international standards [D.1]
- extend the monitoring period beyond 2008 and secure appropriate funding for this [D.1 and Finance]
- explicitly identify at the start of the project the need to review fully international experience and guidance manuals in the design and remediation of mine waste systems [D.2, D.3]
- avoid outcomes influenced by strong vested interests e.g. by establishing an independent expert international review group [D.2]
- limit the number of sites for protection/remediation so that a sound understanding of processes and procedures can be obtained [D.2]
- ensure that strong scientific/technical links are established between scientific/engineering teams working on Components and sub-components [D.2, D.4 & Component E]
- clearly identify organisation(s) responsible for the preparation of guidance manuals and training [D.3]
- arrange regular meetings/contacts between trans-boundary parties for the duration of the project and beyond [D.5]

- re-examine opportunities to involve the mining industry in funding some elements of the project [Finance]
- prepare a timeline flow diagram identifying key outputs and the essential links between Components and the D Sub-components.

## **World Bank Response to STAP Reviewer Comments**

The STAP Reviewer recognizes the importance of the proposed GEF-component of the Hazards Risk Mitigation and Emergency Preparedness Project in terms of transboundary cooperation to reduce mine pollution risks and promote integrated water management. He also acknowledges that the recent mining incidents in the Tisza catchment give urgency to the formulation and implementation of the Project.

The STAT Reviewer provides very useful suggestions and recommendations to enhance the quality of the project. These recommendations are summarized presented below (italic text). A brief explanation on how the team is planning to incorporate the recommendations in the revised version of the PAD is also included below.

*Activity D.1: Establishing a Baseline and an Environmental Monitoring System. Under this sub-component, two recommendations were made:*

- *Make a clear commitment to establishing for the project, water and soil quality sampling and analytical methods that meet international standard; and*
- *Extend the monitoring period beyond 2008 and secure appropriate funding for this.*

Harmonization of standards and approaches. The revised PAD will make explicit reference that the project will support the setting of common baseline indicators for water and sediment quality monitoring as well as improvement and harmonization of Romanian monitoring systems with those of the other riparian countries of the Tisza basin. It should be noted that EU requirements for dangerous substances discharged to water have been transposed into Romanian legislation and approximation with the EU Water Framework Directive is expected to be completed at the end of 2003. Thus, the monitoring system will have to meet EU standards.

Sustainability beyond 2008. We would like to point out that one of the objectives of the project is capacity building and capacity enhancement at the level of the mine operators and local environmental authorities. If the project is successful in achieving this goal, environmental monitoring should continue with no external support once the project is over. Commitment will be sought from the Government to provide the necessary funding to operate and maintain the monitoring system on the long-term. There is some assurance that budget resources will be made available to operate and maintain the system since Romania is moving forward with EU accession and the country needs to demonstrate compliance with EU environmental requirements.

*D.2 – Hazard Prevention and Remediation Intervention. Under this sub-component the following recommendations were made:*

- *Explicitly identify at the start of the project the need to review fully international experience and guidance manuals in the design and remediation of mine waste systems;.*
- *Avoid outcomes influenced by strong vested interest, e.g., by establishing an independent expert international review group;*
- *Limit the number of sites for protection/remediation so that a sound understanding of processed and procedures can be obtained; and*
- *Ensure that strong scientific/technical links are established between scientific/engineering teams working on Components and D Sub-components.*

International experience. A review of international experience was performed during the preparatory phase, followed up by the participation of Romanian experts on a NATO-Sponsored Pilot Study on Prevention and Remediation Issues in Selected Industrial Sectors, and the organization of a Regional Workshop on the Management and Safety of Tailings Dams in Sinaia, Romania, in October 2003. Two documents, A Guide to the Management of Tailings Facilities and Developing an Operation, Maintenance and Surveillance Manual for Tailings and Water Management Facilities, developed through coordination of the Mining Association of Canada were found very relevant to the Romania situation. The review of international experience will continue through out project implementation.

Independency. The project envisages the involvement of two international experts to strengthen the National Commission on Dam Safety (CONSIB). One of the experts will focus on the safety of tailings facilities and mine waste dumps, and the second one will focus on failure modes and effects analysis. Both experts will be recruited, under terms of reference satisfactory to the World Bank, to act as independent experts. They will provide an independent and high level technical evaluation of the proposed measures to reduce the risk of dam failures during project implementation. They will undertake review of the hazards prevention and remediation activities twice a year, participate in failure modes and effects analysis workshops, participate in the development of the risk assessment methodology, and identify implementation issues and develop recommendations for the consideration of the Government. The project also envisages the establishment of a Regional Task Force (conformed by representatives from the riparian countries of the Tisza Basin) to review the failure modes and effects analysis to be conducted under the project.

Scope of remediation. Given the large number of mine sites that require improvement, the project will try to strike a balance between being cost-effective and technically and scientifically comprehensive, detailed and sound. The Regional Task Force mentioned above will assist in getting the right balance so the project can maximise risk reduction within a reasonable timeframe and with tolerable cost, and bring the residual risk to an overall sustainable and acceptable level.

Synergies between project components. The revised PAD will provide concrete suggestions for making sure synergies are created between the various project components to build a common knowledge base, particularly in the areas of flood management and water-retention and tailings dams safety. Regular coordination meetings between PMUs will be organized during project implementation, some of which will be facilitated by the two international experts on dam safety.

***D.3 – Engineering and Environmental Guidelines for Tailings Dams and Waste Facilities. Under this sub-component the following recommendation was made:***

- *Clearly identify organizations(s) responsible for the preparation of guidance manuals and training.*

While the project envisages the National Agency for Mineral Resources to coordinate activities under Component D, the NAMR will coordinate the development of manuals, guides and training activities very closely with CONSIB, the Ministry of Agriculture, Forestry, Water and Environment, and the Ministry of Economy and Commerce. CONSIB will gradually take responsibility for the elaboration of dam-safety related manuals and training activities.

***D.5 – Promoting Transboundary Cooperation on Integrated Water Resources Management for the Tisza Basin. Under this sub-component the following recommendation was made:***

- *Arrange regular meetings/contacts between transboundary parties for the duration of the project and beyond.*

Participants at the Sinaia Regional Workshop agreed to foster and promote transboundary cooperation on the management of tailings facilities within the context of overall integrated water resources management. A proposal was put forward during the workshop to establish a Regional Task Force to review and harmonize the Failure Mode and Effects Analysis process and standards. The task force will be conformed by representatives from the riparian countries of the Tisza Basin, who will have the support of national policy makers. The project will support a first concrete step towards a basin-wide cooperation among the riparian countries. During project implementation other efforts will be supported to promote integrated river basin management, building on existing transboundary and bilateral initiatives.

***Finance.*** *Under this heading the following recommendations were made:*

- *Allocate additional funds to extend monitoring program; and.*
- *Re-examine opportunities to involve the mining industry in funding some elements of the project.*

GEF funding. The revised PAD will increase the size of sub-component D.1 by US\$0.2 million to extend the duration of monitoring program to 7 years, similar to the duration of the other project components. Thus the total contribution from GEF towards the project will be US\$7.0 million.

Additional internal resources. At present, all non-metal mines in Romania are state-owned. So far, there is agreement that the Government will to finance 50% of the cost of component D, which demonstrates the commitment of the Government to address environmental concerns in the mining sector. A second World Bank Mining Closure and Social Mitigation Project (under preparation) is expected to address environmental aspects of closed mines, including those related to tailings dams and waste facilities.

***Timelines.*** *Under this heading the following recommendation was made:*

- *Prepare a timeline flow diagram identifying key outputs and the essential links between Components and D Sub-components.*

A detailed project implementation plan will be prepared as part of project appraisal.



