#### Document of The World Bank

Report No: ICR2384

## IMPLEMENTATION COMPLETION AND RESULTS REPORT

## (IBRD-47360 TF-53472)

## ON A

## LOAN

## IN THE AMOUNT OF US\$150 MILLION

## AND A GRANT FROM THE GLOBAL ENVIRONMENT FACILITY

## IN THE AMOUNT OF US\$7 MILLION

## TO GOVERNMENT OF ROMANIA

## FOR A

## HAZARD RISK MITIGATION AND EMERGENCY PREPAREDNESS PROJECT

December 27, 2012

Environmentally and Socially Sustainable Development Unit Europe and Central Asia Region

## CURRENCY EQUIVALENTS (Exchange Rate Effective November 2012)

## Currency Unit = Lei [RON] US\$ 1.00 = RON 4.52

## FISCAL YEAR [January 1 – December 31]

## ABBREVIATIONS AND ACRONYMS

ANAR	National Administration of Romanian Waters
CAS	Country Assistance Strategy
CSA	Commission for Insurance Supervision
ECA	Europe and Central Asia Region
EMIS	Emergency Management Information System
EMP	Environmental Management Plan
EU	European Union
FM	Financial Management
FMR	Financial Monitoring Report
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEO	Global Environment Objective
GIS	Geographic Information System
GOR	Government of Romania
HRMEP	Hazard Risk Mitigation and Emergency Preparedness Project
IBRD	International Bank for Reconstruction and Development
IGSU	General Inspectorate for Emergency Situations
IRR	Internal Rate of Return
LAPF	Land Acquisition Policy Framework
M&E	Monitoring and Evaluation
MAI	Ministry of Administration and Interior
MDRT	Ministry of Regional Development and Tourism
MEF	Ministry of Environment and Forests
MTR	Midterm Review
ANRM	National Agency for Mineral Resources
NGO	Non-Governmental Organization
PAD	Project Appraisal Document
PAID	National Catastrophe Insurance Pool
PMU	Project Management Unit
SNIF	National Company "Land Reclamation"
TDF	Tailings dams facilities

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## HAZARD RISK MITIGATION AND EMERGENCY PREPAREDNESS PROJECT

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A. Basic Information					
Country:	Romania	Project Name:	Hazard Risk Mitigation & Emergency Preparedness Project		
Project ID:	P075163; P081950	L/C/TF Number(s):	IBRD-47360,TF-53472		
ICR Date:	06/19/2012	ICR Type:	Core ICR		
Lending Instrument:	SIL,SIL	Borrower:	ROMANIA		
Original Total Commitment:	US\$ 150.00M,US\$ 7.00M	Disbursed Amount:	US\$ 125.36M,US\$ 5.32M		
Environmental Category: B,B       Focal Area: I         Implementing Agencies: Ministry of Administration and Interior, Ministry of Regional					

Development and Tourism, Ministry of Environment and Forests, National Agency of Mineral Resources

Cofinanciers and Other External Partners: None

## B. Key Dates

		D 1 D			
Hazard Risk Mitig	gation & Emerger	icy Preparedness Pi	coject - P075163		
Process     Date     Process     Original Date     Revised / Actual Date(s)					
Concept Review:	03/08/2002	Effectiveness:	10/20/2004	10/20/2004	
Appraisal:	01/26/2004	Restructuring(s):		08/31/2010	
Approval:	05/20/2004	Mid-term Review:		11/16/2007	
		Closing:	12/31/2009	06/30/2012	

Hazard Risk Mitigation & Emergency Preparedness GEF Project - P081950					
ProcessDateProcessOriginal DateRevi					
Concept Review:	03/08/2002	Effectiveness:	10/25/2004	10/20/2004	
Appraisal:	01/26/2004	Restructuring(s):			
Approval:	05/20/2004	Mid-term Review:	11/15/2007	11/15/2007	
		Closing:	12/31/2009	06/30/2012	

C. Ratings Summary			
C.1 Performance Rating by ICR			
Outcomes	Moderately Satisfactory		

GEO Outcomes	Satisfactory
Risk to Development Outcome	Moderate
Risk to GEO Outcome	Negligible to Low
Bank Performance	Moderately Satisfactory
Borrower Performance	Moderately Satisfactory

## C.2 Detailed Ratings of Bank and Borrower Performance (by ICR)

Bank	Ratings	Borrower	Ratings
Quality at Entry	Moderately Unsatisfactory	Government:	Moderately Satisfactory
Quality of Supervision:	Satisfactory	Implementing Agency/Agencies:	Moderately Satisfactory
Overall Bank Performance	Moderately Satisfactory	Overall Borrower Performance	Moderately Satisfactory

## C.3 Quality at Entry and Implementation Performance Indicators

Hazard Risk Mitigation & Emergency Preparedness Project - P075163					
Implementation Performance	Indicators	QAG Assessments (if any)	Rating:		
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA)	None		
Problem Project at any time (Yes/No):	Yes	Quality of Supervision (QSA)	None		
DO rating before Closing/Inactive status	Moderately Satisfactory				

Hazard Risk Mitigation & Emergency Preparedness GEF Project - P081950					
Implementation Performance	Indicators	Rating:			
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA)	None		
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA)	None		
GEO rating before Closing/Inactive Status	Moderately Satisfactory				

D. Sector and Theme Codes				
Hazard Risk Mitigation & Emergency Preparedness Project - P075163				
	Original	Actual		
Sector Code (as % of total Bank financing)				
Central government administration	20	15		

Flood protection	50	54
Mining and other extractive	5	8
Sub-national government administration	25	23

Theme Code (as % of total Bank financing)		
Natural disaster management	29	38
Other urban development	14	8
Pollution management and environmental health	14	10
Rural services and infrastructure	14	20
Water resource management	29	24

Hazard Risk Mitigation & Emergency Preparedness GEF Project - P081950				
	Original	Actual		
Sector Code (as % of total Bank financing)				
General water, sanitation and flood protection sector	80	80		
Mining and other extractive	20	20		

Theme Code (as % of total Bank financing)		
Pollution management and environmental health	67	75
Water resource management	33	25

## E. Bank Staff

Hazard Risk Mitigation & Emergency Preparedness Project - P075163

Positions	At ICR	At Approval
Vice President:	Philippe Le Houerou	Shigeo Katsu
Country Director:	Peter Harrold	Anand K. Seth
Sector Manager:	Sumila Gulyani	Marjory-Ann Bromhead
Project Team Leader:	Gabriel Ionita	Christoph Pusch
ICR Team Leader:	Gabriel Ionita	
ICR Primary Author:	Sati Achath	

Hazard Risk Mitigation & Emergency Preparedness GEF Project - P081950

Positions	At ICR	At Approval
Vice President:	Philippe Le Houerou	Shigeo Katsu
Country Director:	Peter Harrold	Anand K. Seth
Sector Manager:	Sumila Gulyani	Marjory-Ann Bromhead
Project Team Leader:	Wolfhart Pohl	Christoph Pusch

ICR Team Leader:	Wolfhart Pohl	
ICR Primary Author:	Sati Achath	

#### F. Results Framework Analysis

#### Project Development Objectives (from Project Appraisal Document)

The overall objective of the project was 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.

## **Revised Project Development Objectives** (as approved by original approving authority)

The PDO was not revised.

#### Global Environment Objectives (from Project Appraisal Document)

The Global environmental objective was to demonstrate and provide for replication for the reduction of catastrophic accidental spills of trans-boundary pollution loads from mine operations flowing into the Danube and Black Sea basins. In support of this objective, the project, through a 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 trans-boundary 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.

#### **Revised Global Environment Objectives** (as approved by original approving authority)

The GEO was not revised.

#### (a) **PDO Indicator**(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Strengthened institutional and technical capacity for emergency management and emergency response through the information systems.			
Value quantitative or Qualitative)	The current institutional setup and technical capacity are obsolete and does not match	The technical capacity of the emergency response units and of other involved institutions	EMIS will be installed in 23 central and local administration institutions	EMIS software developed and the system is ready to be used in real mode, in all 48

	the requirements of a	is strengthened. T	he involved in	sites, after the Final
	modern emergency	enhanced capabili	ty emergency	Operational
	management system,	is proved in real li	fe management.	Acceptance, in
	nor the requirements	situations		2013
	of EU.			
Date achieved	30-Jan-2004	30-Dec-2009	30-Jun-2012	2 30-Oct-2012
Comments	Roll out Operational A	Acceptance Phase	was approved by	Implementation
(incl. %	Coordination Commit	tee (CCI) member	s and PMU-MAI	has issued the Roll-
achievement)	out Operational Accept	ptance Certificates	for all 48 sites (in	ncluding pilot sites).
Indicator 2 :	Increased earthquake retrofitted.	risk mitigation wi	th some key, prio	oritized public facilities
Value quantitative or Qualitative) Date achieved Comments	More than 350 public facilities are at risk, of which 84 high risk facilities (which normally host over 27,000 people and service over 2 million people) were selected for seismic retrofitting 30-Jan-2004	The risk of collaps of 60 critical public buildings in case of a seismic event removed and they will be safely operational in case of a strong seism. 30-Dec-2009	The risk of collapse of at least 40 critica public building in case of a seismic event removed and they will be safely operational. 30-Jun-2012	Seismic retrofitting of 44 public buildings il completed. About gs 23,350 people working in the public buildings retrofitted are being protected. No opportunity to check in absence of a major earthquake. 2 30-Oct-2012
(incl. % achievement)	Exceeded the target			
Indicator 3 :	Increased level of pro of recurrent floods.	otection against flo	ods of population	n exposed to high risk
Value quantitative or Qualitative)	About 30,000 people live and work in the 10 areas exposed to flood risk due to river flooding.	The flood risk in all 11 critical locations significantly reduced.	Flood protection works completed in all 10 critical locations included in the investment program and no people at risk in the project areas	Construction works for flood protection completed in all 10 sites. The flood protection works proved effective during the floods that occurred in the past three years, after they have been completed.
Date achieved	30-Jan-2004	30-Dec-2009	30-Jun-2012	30-Jun-2012
Comments (incl. % achievement)	Revised target met 100 % since 2009. Protection against floods was provided to over 43,500 people.			
Indicator 4 :	Improved dam safety	of the selected price	ority structures	
Value	55 dams are at risk	The risk of dam	The risk of dam	Work contracts for

quantitative or Qualitative)	and need rehabilitation, of which 13 high risk dams were selected for improving their safety, to protect about 300,000 people living in their neighborhood.	failure removed and improved safety in place for all 13 critical dams selected	failure removed and improved safety in place for seven critical dams selected.	increasing the safety of all seven dams have been completed and the National Commission of Dam Safety issued the license for their operation at full capacity. This confirms that the respective dams are now safe.
Date achieved	30-Jan-2004	30-Dec-2009	30-Jun-2012	30-Jun-2012
Comments (incl. % achievement) Indicator 5 :	Revised target met 100%. About 222,700 people are now protected against dam accidents/failure. Enhanced Borrower's capacity to undertake land acquisition with positive net			
Value quantitative or Qualitative)	Land acquired at full market value of replacement cost and net income restored or enhanced.	All of land acquisition conducted in line with the Bank safeguards on involuntary resettlement		A LAPF (Land Acquisition Policy Framework) was developed and fully observed during the project.
Date achieved	30-Jul-2010	30-Jun-2012		30-Jun-2012
Comments (incl. % achievement)	All land acquisition w	as conducted acco	rding to LAPF -	100% achievement

## (b) GEO Indicator(s)

Indicator	<b>Baseline Value</b>	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Gradual reduction in r pollutants into the Tisz	number and negativ a Basin and in the	e impacts of min volume of toxic r	ing accidental spills of eleases from mines

	into the Danube River		
	Fragmented,	Integrated	The core modules of
Value	dispersed and	monitoring and	an integrated
quantitative or	inconsistent national	emergency	monitoring and
Qualitative)	approach and	warning system	emergency warning
	awareness of	implemented,	system are under

Date achieved	environmental dimension of mine waste, not consolidated national policy or management efforts <u>30-Jan-2004</u> Tendering for supply a	operated / maintained by Romanian public agencies and used by Romanian mining / environment experts 30-Dec-2009 and installation of i	ntegrated monito	installation; operation and maintenance arrangements have been agreed between and clearly assigned to Romanian public agencies. 30-Jun-2012
(incl. % achievement)	warning system compl 2012.	leted in April 2012,	, installation was	completed in August
Indicator 2 :	Improved factors of sa in risk awareness and	fety in high risk tai emergency prepare	lings facilities and dness of owners, o	d increased standards operators and regulators.
Value quantitative or Qualitative)	Performance standards with clear technical criteria to be developed within first year of project implementation.	Management and maintenance achieved according to best available techniques and internationally accepted performance standards achieved for at least 70% of the inventory of mine waste facilities.		The use of performance standards has been further consolidated, with the target value of 70% of the country's portfolio achieved or even surpassed. Romanian public agencies have taken over standards and practices developed under the project on a broad front and are consistently implementing the good practice approach and techniques promoted by the project.
Date achieved	30-Jan-2004	30-Dec-2009		30-Jun-2012
Comments (incl. % achievement)	Target met 100%.	1	,	

## (c) Intermediate Outcome Indicator(s)

Indicator	<b>Baseline Value</b>	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
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Indicator 1:	The principles of a modern emergency management information systems are embedded in the design of the system under the Project				
Value quantitative or Qualitative)	The communication systems in use by the firefighting and civil protection units are obsolete and unreliable.	Equipment for the new emergency management information system procured, installed tested, and operational.		Hardware for EMIS installed in 48 sites and operational.	
Date achieved	30-Jan-2004	30-Dec-2009		30-Jun-2012	
Comments (incl. % achievement)	Target met 100%.				
Indicator 2:	The Romanian Program	n for Catastrophe I	nsurance of Dwe	llings is operational.	
Value quantitative or Qualitative)	No legislation on insurance of dwellings against natural disasters	Indicator introduced at project restructuring	To complete technical work to support drafting the legislation and institutional building for the new Romanian Catastrophe Insurance Program	Technical work to support drafting the legislation and institutional building for the new Romanian Catastrophe Insurance Program was completed.	
Date achieved	30-Jan-2004	30-Dec-2009	30-Jun-2012	30-Jun-2012	
Comments (incl. % achievement)	Target met 100%.	-	1	- -	
Indicator 3 :	Provisions on seismic code, including use of building.	retrofitting of build innovative, cost-ef	ings are included fective technolog	l in the new building jies in at least one	
Value quantitative or Qualitative)	The current building code does not include provisions for seismic retrofitting and the provisions for new buildings are too conservative.	Provisions on seismic retrofitting of buildings are included in the new building code, including use of innovative, cost-effective technologies in 2 buildings.		The new building code, compliant with Euro Code 8, finalized and enforced. Designs for two buildings selected for pilot implementation of innovative methods have been completed. In absence of funds, the works contract was dropped from the	

				project.			
Date achieved	30-Jan-2004	30-Dec-2009		30-Jun-2012			
Comments (incl. % achievement)	Target was only partially met (in a proportion estimated to 40%) through approval of the new Building Code and preparation of designs for retrofitting of two buildings using innovative methods. However, the innovative methods have not been implemented under the project.						
Indicator 4 :	Increased level of floor investments implemente	d protection and da d.	m safety with so	ome high priority			
Value quantitative or Qualitative)	Recurrent floods were recorded in all 10 locations selected for protection works under the project	Flood protection works finalized in all critical locations for floods and safety of 4 dams increased.		10 flood protection sites and 4 dam safety sites.			
Date achieved	30-Jan-2004	30-Dec-2009		30-Jun-2012			
Comments (incl. % achievement)	Target met 100% in 2008.						
Indicator 5 :	Improving the operational safety and reducing the number and magnitude of accidents of mine waste facilities (tailings ponds, waste dumps) in the Romanian part of the Tisza Basin.						
Value quantitative or Qualitative)	Current tailings facilities present several risks of failure.	Significantly improve the safety of at least 5 high risk sites (revised target from originally 3 sites).	H S C T C S S C S S C T T S S C C	Remediation works in six sites have been completed. The remediated sites have clearly ceased to be a significant environmental risk, and the emission of contaminated dust, surface runoff and groundwater nfiltration have been erminated. Since project implementation to major accidents / spills with TMF have poccurred.			
Date achieved	30-Jan-2004	30-Dec-2009		30-Jun-2012			
Comments (incl. % achievement)	Target met 100% in 2	009.	· /				

## (d) Additional Indicators monitored during implementation

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Increased trans-bound management	ary cooperation for	integrated wate	r resources
Value quantitative or Qualitative)	No formal forum to foster trans-boundary cooperation.	Proposal is drafted for continued initiatives / projects for trans- boundary water resources management		Under the project, close personal and professional ties were established between Romanian and riparian stakeholders, which will continue to works towards improved trans-boundary water resources management.
Date achieved	30-Jan-2004	30-Dec-2009		30-Jun-2012
Comments (incl. % achievement)	The benefits and neces recognized and strengt now generally accepte required. Target met 1	ssity of a trans-bour thened during the pu d by both RO and r 00%.	ndary dialogue h roject implemen iparian Governr	ave been widely tation period and are nents. No further action
Indicator 2 :	Gradual reduction in p spills of mining-relate Basin.	brobability and negative depollutants into the	tive consequence hydrological ne	etwork of the Tisza
Value quantitative or Qualitative)	Tailing facilities are not safe and at least four objects are prone to catastrophic accidents. Quantitative indicators to be determined during field surveys.	The residual accident risk for the sites remediated by the project is considered very low (estd. less than 1 event per 100 years). A similar trend has significantly reduced the country's overall portfolio, due to Government- funded programs motivated by EU alignment and fostered by the project's technical		The target has been substantially met with the probability of accidental spills at the project sites significantly reduced (estimated to less than 1 significant event per 100 years), through project activities complemented by the government programs and EU alignment.

		expertise.					
Date achieved	30-Jan-2004	30-Dec-2009		30-Jun-2012			
Comments (incl. % achievement)	Remediation works at 2011. Target met 1009	the new high risk si 6.	tes were comple	eted since November			
Indicator 3 :	Reducing the number of Romania, and increasi sustainably safe condition	Reducing the number of abandoned and orphaned mines waste facilities in Romania, and increasing the number of properly closed facilities put in a sustainably safe condition by at least 3.					
Value quantitative or Qualitative)	High number of orphaned / abandoned sites in RO, no consistent inventory or management system	3 additional sites to be rehabilitated, methodology to be consolidated and widely disseminated by RO agencies		Rehabilitation of 3 additional sites completed, sites handed over to Govt. / communities for care and maintenance.			
Date achieved	30-Jan-2004	30-Dec-2009		30-Jun-2012			
Comments (incl. % achievement)	The original target 3 additional high risk sites with acute risks were remediated by the project. Target met 100%.						
Indicator 4 :	Establishment and maintenance of an integrated knowledge base about trans- boundary impacts of mine-induced pollution in the Danube and Black Sea basins.						
Value quantitative or Qualitative)	Limited appreciation of the hazards associated with tailings management facilities, especially on policy- & decision making levels.	Environmental monitoring systems installed and operational in all project sites, linked with other closed mines and high risk spots		Environmental monitoring systems contracted and under implementation (installation being carried out). Operation and maintenance arrangements agreed between RO public agencies. The system put into operation in June 2012.			
Date achieved	30-Jan-2004	30-Dec-2009		30-June- 2012			
Comments (incl. % achievement)	The system will be ins However, due to the m Internet-based access t	talled at one pilot si nodular and expanda to data, a swift expa	te only due to b ble character of nsion and wides	udget constraints. The system, and the spread use is expected.			
Indicator 5 :	Increased adoption of Tisza Basin and Danul	best mine waste ma be basins	nagement practi	ces throughout the			
Value quantitative or Qualitative)	Poor management of tailings dams and waste facilities	Formal adoption of guidelines in context of international good practice and wider		Romanian public agencies (e.g. CONVERSMIN) are consolidating their experience with EU			

		legislative environment (EU).	mine waste directive alignment. BAT. Continue to be widely used in the mining sector, and quality of remediation works
			continues to increase.
Date achieved	30-Jan-2004	30-Dec-2009	30-Jun-2012
Comments (incl. % achievement)	EU mine waste direc Target met 100%.	ctive is legally binding	in RO. No further action required.

## G. Ratings of Project Performance in ISRs

-							
No.	Date ISR	DO	GEO	IP	Actual Disburs (USD millio	rsements ions)	
	Archived				Project 1	Project 2	
1	06/28/2004	S	S	S	0.00	0.00	
2	12/23/2004	S	S	S	0.10	0.00	
3	04/11/2005	S	S	S	0.20	0.38	
4	06/22/2005	S	S	S	2.05	0.38	
5	05/18/2006	S	S	MS	3.25	0.56	
6	07/20/2006	S	S	MU	4.66	0.65	
7	11/03/2006	S	S	MU	5.57	0.65	
8	02/27/2007	MU	MU	U	9.84	0.65	
9	06/28/2007	MU	MU	MU	11.92	0.85	
10	08/09/2007	MS	S	MS	13.80	1.22	
11	01/11/2008	MS	S	MS	26.28	1.72	
12	06/19/2008	MS	S	MS	38.60	2.30	
13	02/24/2009	MS	S	MS	55.88	3.65	
14	06/17/2009	MS	S	MS	55.89	3.76	
15	12/05/2009	MS	S	MS	81.87	3.76	
16	03/26/2010	MS	S	MS	93.95	4.02	
17	06/30/2010	MS	S	MS	94.08	4.14	
18	12/15/2010	MS	MS	MS	102.07	4.34	
19	06/26/2011	MU		MU	110.40	5.32	

20	01/22/2012	MS	MS	MS	116.99	5.32
21	07/10/2012	MS	S	MS	125.36	5.81

## H. Restructuring (if any)

Restructuring Approved		ISR Ratings at Restructuring		Amount Disbursed at Restructuring in USD millions		Reason for Restructuring		
Date(s)	PDO Change	GEO Change	DO	GEO	IP	Project1	Project 2	Changes Made
07/22/2009	NO	NO	MS	S	MS	63.08	3.65	Extension
08/31/2010	NO	NO	MS	S	MS	99.35	4.02	New safeguard
12/09/2010	NO	NO	MS	MS	MS	102.07	4.34	Reallocation
12/20/2011	NO	NO	MS	MS	MS	116.99	5.32	Cancellation and Extension
03/15/2012	NO	NO	MS	MS	MS	121.45	5.32	Reallocation GEF
04/16/2012	NO	NO	MS	MS	MS	121.91	5.41	Reallocation Loan

## I. Disbursement Profile

## P075163 – IBRD Loan







#### 1. Project Context, Development, and Global Environment Objectives and Design

#### **1.1 Context at Appraisal**

*Country and Sector Background*: Romania is severely prone to a range of natural disasters, particularly earthquakes and floods that cause economic and human losses across the country. Since 1908, 14 earthquakes of magnitude 7 or greater, and eight major floods, affected almost two million people and caused massive economic losses. Floods in 1997 and 1998 caused damages estimated at US\$310 million and US\$150 million, respectively. Landslides are another natural hazard. The total area exposed to landslide hazards is about 700,000 ha, putting at risk 50,000 households, 250,000 people, agricultural land, public and private buildings, public utility networks, and roads. 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, on January 30; and Baia Borsa mine, on March 20) demonstrated the need to mainstream safety and environmental concerns into mining operations.

**Project Background.** The aim of the project was to assist the Government of Romania (GOR) in reducing the country's social and economic vulnerability through a set of comprehensive and high-priority measures addressing a number of critical hazards. The design was based on experience from other countries, which showed that tackling each category of hazard in isolation from other risks was less efficient and effective.

After the devastating earthquake in Turkey in 1999, which killed thousands of people and destroyed many public buildings and private households, GOR resolved to take a proactive approach to natural risk management by enhancing preparedness for earthquakes, floods (including enhancing dam safety), landslides, and accidental spills of pollutants in case of mining accidents. In addition, the project assessed the improvements needed to implement modern procedures for disaster management and response. This project – the first in the region and one of the first that the Bank financed to help countries prepare for major natural hazards – helped establish a new Bank paradigm for disaster risk management.

Mitigating different kinds of risks in Romania is the responsibility of various government agencies. Therefore, the design considered implementation through three ministries and one Government agency, which increased the complexity and proved difficult in implementation. The implementation arrangements also aimed at raising ownership of the owners of the public buildings through a project-specific (but cumbersome) co-financing mechanism. This added to an already complicated design and should have been corrected during implementation, but the Borrower and the implementing agency did not agree to do so. Thus, project implementation became very complicated and difficult.

These difficulties were compounded by the lack of readiness for implementation (e.g., existence of detailed designs ready to be translated into bidding documents for works), contrary to information provided by the implementing agencies. Detailed (but incomplete) designs existed only for one building; for all other construction activities, only feasibility studies had been prepared. The underestimation of costs resulted in further delays.

Although the Government had strongly supported the project during preparation, it gradually became less of a priority (the Government focused more to implementation of projects financed from the EU structural funds), as manifested through insufficient funding, support, and

supervision by the responsible officials (ministers, deputy ministers). Under such circumstances, there were many barriers to the project achieving its objectives.

*Rationale for Bank assistance*: The project supported the Country Assistance Strategy  $(CAS)^1$  objective of improving national preparedness for natural disasters. The CAS stated that the HRMEP 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.

*Global operational strategy/Program objective addressed by the project:* The GEF-supported component was fully consistent with the GEF's Operational Strategy. It supported long-term protection of international waters and complied with the long-term objective of "Water Body 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 water bodies can be resolved."

## **1.2 Original Project Development Objectives (PDO) and Key Indicators** (as approved)

The overall objective of the project was to assist the Government of Romania in reducing the country's environmental, social, and economic vulnerability to natural disasters and catastrophic pollutant spills resulting from mining accidents. The project aimed specifically to: (a) strengthen institutional and technical capacity for disaster management and emergency response by upgrading communication and information systems; (b) implement specific risk reduction investments for floods, landslides, and earthquakes; (c) improve the safety of selected water-retention dams; and (d) pilot improvements in the management and safety of tailings dams and waste dump facilities.

## **1.3 Original Global Environment Objectives (GEO) and Key Indicators (as approved)**

The project's global environmental objective was to demonstrate the reduction of catastrophic accidental spills of trans-boundary pollution loads from mine operations flowing into the Danube and Black Sea basins.

Key indicators were:

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

# **1.4 Revised PDO** (as approved by original approving authority) and Key Indicators, and reasons/justification

<sup>&</sup>lt;sup>1</sup> Document number 22180-O. Date of latest CAS discussion: May 22, 2001.

The PDO was not revised. However, the following indicator was added at project restructuring.

• Enhanced Borrower capacity to undertake land acquisition with positive net benefits to affected persons.

In addition, the targets for some indicators were revised at restructuring.

## **1.5 Revised GEO (as approved by original approving authority) and Key Indicators, and reasons/justification**

The GEO was not revised.

## **1.6 Main Beneficiaries**

The expected beneficiaries of the project included:

• *Government*. Significant public benefits expected to be derived from the project included: (a) strengthened government capacity to respond rapidly in the face of disaster; (b) increased earthquake preparedness, with critical public facilities retrofitted; (c) reduction of water pollution risk from mining operations; (d) improved dam safety in the selected priority structures; (e) development of policy and technical foundations for a 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.

• *Romanian population.* The population expected to benefit from reduced risk of loss of life and property included: (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 landslide risk areas; (c) people living in 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 accidental spills.

• *Local insurance industry*. The possible creation of an insurance pool was expected to benefit the local insurance industry by establishing best practices in underwriting property risks.

## 1.7 Original Components (as approved)

The project consisted of five components as follows:

## Component A: Strengthening of Emergency Management and Risk Financing Capacity

The objective of Component A was 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; increased planning and training efforts at all levels of government; increased public awareness and preparedness; and complete technical feasibility work and creation of an institutional framework for launching the Romanian Catastrophe Insurance Program.

## **Component B: Earthquake Risk Reduction**

The objective of Component B was to assist the Government in reducing the seismic vulnerability of priority technical and social infrastructure, through the retrofitting of key structures and strengthening of relevant institutions.

## **Component C: Flood and Landslide Risk Reduction**

The objective of Component C was to reduce flood risk and vulnerability in critical areas in Romania; improve safety of large and small dams to enable them to function as designed; and map and model the risk of landslides in order to reduce losses and provide for better land use planning tools.

## Component D: Risk Reduction of Mining Accidents in Tisza Basin

The development objective of this component was to reduce the risk of water and soil contamination and loss of human and aquatic life from catastrophic accidental spills of mining pollutants. The global environmental objective was to demonstrate the methods for reduction of catastrophic accidental spills of trans-boundary pollution loads from mine operations flowing into the Danube and Black Sea basins, and provide for the replication thereof. In support of both these objectives, the project was to assist in the implementation of mitigation and hazard prevention replicable activities.

## **Component E: Project Management**

The objective of Component E was to finance the costs of creation and maintenance of the Project Management Units (PMUs) to be established in the ministries responsible for project components: Ministry of Administration and Interior (Component A), Ministry of Regional Development and Tourism (Component B), Ministry of Environment and Forests (Component C), and National Agency for Mineral resources (Component D).

## **1.8 Revised Components**

The components were not revised.

## **1.9 Other significant changes**

*Project Restructuring*. The project was restructured three times during implementation:

*First restructuring*: The project was first restructured in August 2010<sup>2</sup> (Level 1), primarily to:

(a) Apply World Bank Safeguard Policy OP 4.12, Involuntary Resettlement, to all project components involving execution of works. During appraisal, OP 4.12 had not been triggered due to Borrower confirmation that all project sites were on State–owned land, and no land acquisition would be required. However, during project implementation, some land acquisition was required.

(b) Reduce the scope of envisaged project investments due to increased construction costs and loan currency depreciation.

(c) Restructure output indicators for Components B and C to adjust them to the revised scope of the investment program; and revise the Results Framework. Changes to project components included:

- *Component A:* Financing implementation of a modernized management information system to integrate data management and voice communication.
- *Component B:* Reducing the number of high-priority public facilities to be retrofitted from 84 to 40 buildings.

 $<sup>^2</sup>$  The first project restructuring was done only in August 2010 because of the slow preparation and approval of the Land Acquisition Policy Framework (LAPF) by the GOR, a condition for confirming compliance with OP 4.12. The Bank was also slow in deciding the course of action once the land acquisition issue arose.

- *Component C:* Reducing the number of: (i) flood mitigation schemes on internal rivers from nine to eight; (ii) Danube River flood protection sites for rehabilitation from three to two sites; (iii) large dams to be rehabilitated from eight to four and small dams from five to three.
- *Component D:* Works for increasing the safety of two additional high-risk sites would be executed using savings from efficient contract management.

(d) Extend the project closing date from December 31, 2009 to December 20, 2011, to enable the Government to complete all project activities.

*Second restructuring:* The project was restructured (Level 2) again in December 2010 to reallocate part of the Loan proceeds, to allow for completion of activities under Components B and C; and reallocation of a part of GEF Grant proceeds to allow for better use of funds for ongoing and future contracts for goods and services under Component D.

*Third restructuring* was undertaken in December 2011, primarily to:

(a) Increase the percentage of Loan and GEF Grant financing to 100 percent for all categories of expenditure.

(b) Reallocate the Loan proceeds as follows: US\$3,085,000 from category (1)(a) to category (1)(b); US\$300,000 from category (1)(c) to category (2)(d); and US\$34,000 from category (1)(a) to category (4)(d)(ii).

(c) Cancel an amount of US\$6,675,537 from the Loan, in response to Borrower's request.

(d) Extend the current closing date for both the Loan and GEF Grant by six months, from December 20, 2011 to June 30, 2012, in response to Borrower's request to allow for completion of all ongoing project activities.

## 2. Key Factors Affecting Implementation and Outcomes

## 2.1 Project Preparation, Design and Quality at Entry

**Project Design and Quality at Entry.** The project did not create new institutions, but rather supported existing government entities by setting up PMUs inside existing institutions which: (a) drew on prevailing institutional capacities; and (b) provided technical assistance, training, and consulting services to enhance the institutions' technical capabilities for implementation. The Environmental Management Plans (EMPs) were prepared for Components B, C and D. For Component B (Earthquake Risk Reduction), a pool of existing public buildings that met agreed criteria was established during project preparation. A number of alternatives were considered while designing the project.

The project design had the following drawbacks:

- Project design was overly ambitious. Having different types of hazards such as earthquakes, flood, landslides, and mining spills under one project added complexity and caused project funds to be spread too thinly.
- The implementation structure was complex, involving multiple institutions.
- With regard to earthquake risk reduction, the PAD referred only to structural retrofitting of buildings, but did not mention subsequent restoration of functionality and

modernization, which was left to the beneficiaries. This was a major deficiency in the design and affected the implementation pace and duration.

- Financing by beneficiaries for restoration of functionality and modernization came into effect only after the project became effective. The Bank did not have control over beneficiary financing, as this parallel financing was not within project control. In hindsight, it would have been preferable for the Bank to finance all aspects, including retrofitting, functionality, and modernization, even though that would have meant covering fewer buildings.
- Investment costs were significantly underestimated, which led to the selection of too many sites and activities.

*Soundness of background analysis.* As part of project preparation, sector issues were analyzed in depth and Government strategies to address them were considered.

*Lessons of earlier operations taken into account.* The project introduced hazard risk management instruments as the main project activity. In the past, the Bank operations were mostly designed to respond to disasters, with the main objective being to contribute to reconstruction and recovery efforts. The Bank's experience with post-disaster assistance worldwide had shown the need for a more pro-active approach, and the importance of mitigation activities aimed at reducing the impact of future disasters, including on state budgets.

*Risk assessment.* The overall risk of the project was rated Moderate in the Project Appraisal Document (PAD). The PAD had identified several potential risks to effective implementation and put in place mitigation measures deemed appropriate at the time.

Adequacy of participatory processes. Many of the flood mitigation investments included in the project were developed over several years and in most of the cases, public meetings and consultations about the project scope and activities were carried out before Bank project formal preparation. The meetings were attended by local authorities, engineers, planners, representatives of the National Water Authority, the national land reclamation company (SNIF), various ministries, utility companies, and the people who would be directly affected by the investments. For the other project components, there was a series of meetings with key institutional stakeholders, including the central and local offices of relevant ministries.

Adequacy of Government commitment. At project preparation, the Government's commitment to the project was exemplified by the process of prioritization and selection of investments to be supported by the loan. Government institutions invested their own limited resources in preparation of feasibility studies, designs, and other documents, such as environmental management plans and social assessments, to prepare the project. These institutions had previously made substantial progress toward setting up an institutional framework for coping with disasters, consisting of central, sectoral, and local commissions with a mandate to coordinate responses to emergencies.

## 2.2 Implementation

The Bank conducted a Midterm Review (MTR) in November 2007. Based on the recommendations of the MTR, measures were taken to improve implementation performance.

The following factors affected project implementation:

- *Romania's accession to European Union (EU).* In 2007, in the middle of the project, Romania became a member of the EU. Under Component B, because regulations were changed to harmonize them with EU guidelines and norms such as such as sanitary law, education law, environmental process, and regulation for construction materials, some works had to be put on hold and realigned with the EU guidelines. This delayed works by about six months, as the redesign of retrofitting and functionality of buildings was a time-consuming and laborious process.
- *Financial crisis.* Many project activities were severely impacted by the financial crisis in Europe in 2009, and the resulting fallout on the domestic budget situation. The financial crisis led to severe shortfalls in the Government's contributions/releases to the project budget. For example, under Component B, the funds allocated by the Government in 2010 and 2011 did not allow even for completion of all ongoing works contracts, with three critical buildings remaining unfinished.
- *Political instability.* During the eight years of the project, the Government changed seven times, the prime minister changed five times, and the heads of relevant ministries also changed several times. Every time the Government changed, the new ministers and deputies (state secretaries) took time to learn the project details which created several months of uncertainty each time, and brought implementation almost to a standstill. In addition, even under the same Government, some PMUs were shifted to different ministries.
- Depreciation of the Loan currency (US\$) against the Euro and RON between Board approval and the onset of the financial crisis resulted in a loss of funds. In 2008, project funds decreased by about 35 percent (from 3.25 RON/US\$ at appraisal to 2.40 US\$/RON) due to depreciation of US dollar. Since then, the dollar has gradually strengthened and is once again at the value at project appraisal.
- *Cost of labor and construction materials.* Following EU accession, prices for labor and construction materials in Romania rose by 23 percent; and international oil prices caused fuel prices to rise by 20 percent. This reduced the availability of project funds and in particular affected components B and C.
- *Emergency Management Information System (EMIS).* Implementation was affected by delayed decisions on the technical features of the system, and by the lack of adequate technical staff in the PMU.
- Seismic risk reduction. Because the project design was silent about responsibility for restoring the functionality of each building after the seismic retrofitting, and for corresponding costs, this responsibility fell to the respective beneficiaries, from their own funds (or what they were able to mobilize from the state or local budget). This situation made it difficult for the PMU to manage contracts with multiple funding sources. Further, with the project funding covering, on average, only 41 percent of total costs, the balance of 59 percent remained the financing responsibility of the beneficiaries, a burden that not all of them could sustain; thus some of the buildings could not be fully completed (e.g., Prefecture Calarasi, University of Music Bucharest) by project closing.
- *New Building Code.* The project aimed to introduce innovative and cost-effective methods for seismic retrofitting in Romania through: (a) review of the Building Code for both new construction and retrofitting of existing buildings; and (b) pilot implementation

of new retrofitting methods. While the new Building Code was successfully harmonized with EU practice, the implementation of new methods for seismic retrofitting failed because of delays in design preparation and the MDRT-PMU's late decision to address the causes of these delays.

## 2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization

**M&E design.** Outcome/impact and output indicators for the PDO and GEO were developed to monitor the progress of each component. The targets were clear and appropriate. However, one indicator that should have been included was the number of people who would be protected as a result of project activities, in the event of an earthquake or flooding. All four PMUs used adequate data collection methods. During the first restructuring in August 2010, output targets were revised due to the downsizing of the project.

**M&E implementation.** The PMUs were regularly collecting data according to the indicators developed during project preparation, as well as revised indicators developed at first restructuring. These data were closely monitored and the actual figures were compared with the target values. For example, under components B and C, monthly verification was done on works to be paid, certifying the quantity of works completed and the status of implementation.

**M&E utilization.** Appropriate data collected by the PMUs was evaluated and used for decision making on certain activities. For example, under Component B, technical data were used to identify and resolve site problems. Under Component C, data on population and technical status of dams were used to select dams in need of priority attention. Data were also used to identify flood prone areas in need of attention. Under Component D, data were used for reassessment of priority sites and selection of new sites. M&E data were also used to determine reallocations of project funds and cancellation of contracts.

## 2.4 Safeguard and Fiduciary Compliance

*Safeguard issues.* At the start of the project, the following safeguard policies were triggered and provisions were made to ensure compliance.

## Environmental

- *Environmental Assessment (OP 4.01).* In accordance with the requirements for Category B projects, an environmental assessment was conducted by the Borrower and reviewed by the Bank. The Loan and GEF Grant agreements included covenants calling for implementation of the Borrower's Environmental Management Plans under components B, C, and D.
- *Cultural Property (OPN 11.03).* Under Component B, some of the facilities identified for seismic retrofitting were classified by the Romanian authorities as historical monuments. The project assisted the GOR in the preservation of these cultural heritage structures, which also had essential public functions (e.g., city halls, universities).
- *Projects in International Waters (OP 7.50).* The project supported improvements to flood protection schemes in Romania, some of which are located on international waterways. The Bank's safeguard policy concerning Projects on International Waterways O.P. 7.50 therefore applied.
- Safety of Dams (OP 4.37). At project start, Romania had a well-defined system for dam safety, with the National Dam Safety Commission (CONSIB) serving as the consulting

arm of the Government. The project relied on a panel of highly skilled experts during all dam design and construction activities to ensure that all dam safety requirements were met. The project was implemented in compliance with all applicable environmental safeguards.

#### Social

*Involuntary Resettlement (OP 4.12).* As mentioned in Section 1.9, since some land acquisition was found to be required, this Safeguard Policy was triggered during implementation, and Component C was brought into full compliance with the Land Acquisition Policy Framework (LAPF) and Action Plan developed in 2010, during project implementation. No other social issues arose.

#### Fiduciary issues

There were no significant deviations from or waivers to the Bank's fiduciary policies and procedures during implementation of the project.

#### 2.5 Post-completion Operation/Next Phase

*Transition arrangements.* Transition arrangements for continuing the operation appear to be adequate, as demonstrated by the following measures:

- *EMIS.* The Ministry of Administration and Interior will be transferring the software models developed under the project to the General Inspectorate for Emergency Situations (IGSU), the PAID (National Catastrophe Insurance Pool) and the Commission for Insurance Supervision (CSA). In the case of the PAID, the transfer needs to be regulated through a legislation, since it involves the transfer of a good paid from public funds (project funds) to a private entity (PAID has the statute of a private insurance company). These agencies have staff adequately trained to operate the software.
- *Seismic risk reduction.* Each beneficiary has signed a protocol with the Government, under which the beneficiary is responsible for maintaining the functionality of the building or facility after project closure.
- *Flood.* All maintenance will be done by river basin authorities, which belong to the National Administration Romanian Waters (ANAR), a self-financing Government agency. After becoming an EU member, Romania implemented a revised water framework for cost recovery and to cover all expenses, including flood defense.
- *Tailing dams.* CONVERSMIN (state-owned company) has taken over the sites remediated under the project and assumed responsibility for long-term monitoring and maintenance. CONVERSMIN will be using the TMF inventory and risk rankings produced under the project to prioritize interventions and develop a long-term remediation program. It has adequate resources and experienced staff, recruited from the mines that have closed.

*Follow-on project*. No follow-on project is currently envisioned. Various ministries have expressed interest in having a follow-on project to carry on with the activities conducted under HRMEP. However, they have not pursued this with the MOF.

#### **3.** Assessment of Outcomes

## 3.1 Relevance of Objectives, Design, and Implementation

The PDO was clear, relevant, and important to Romania's economic and social development. It was also appropriate to the country's current infrastructure needs, considering the high incidence of flooding and large number of public buildings that were vulnerable to earthquakes, with repeated requests from beneficiaries to retrofit and strengthen their buildings.

The GEO was and is still relevant for mitigating the risk of trans-boundary pollution at the Tiza and Danube basins. The project set the framework and addressed high priority sites. This model is now being replicated by CONVERSMIN in other sites. The project also set procedures for environmental protection and the dumping of waste, which have taken up at the national level and replicated in other projects.

As indicated in Section 2.1, the project design was overly ambitious, even after restructuring. Addressing different types of hazards such as earthquakes, flood, landslides, and mine closings under one project rendered the design too complex and spread project too thinly. In light of these shortcomings, the project design has no relevance for future projects. Likewise, the implementation structure was too complex, with multiple ministries and institutes involved in the project implementation; therefore, implementation arrangements are not relevant for future projects.

**Rating:** Considering these factors, the relevance of objectives, design, and implementation is rated **Moderate.** 

## **3.2** Achievement of Project Development Objectives

*Moderately Satisfactory.* As project scope was downsized and output indicators were revised during the August 2010 restructuring, project outcomes have been assessed against achievements before and after restructuring. To assist in arriving at an overall outcome rating, separate outcome ratings have been weighted in proportion to the share of actual disbursements made in the periods before and after the restructuring. Based on the two ratings, as shown in Table 2, Annex 10, the overall achievement of the project is rated *Moderately Satisfactory*.

Indicators	Before Res	tructuring	After Restructuring	
	Target	Actual	Target	Actual
PDO Indicators				
Strengthened	EMIS will be installed in	Equipment for the	EMIS will be	EMIS software
institutional and	all 23 central	Emergency	installed in 23 central	developed and the
technical capacity for	administration	Management	and local	system will be used
emergency	institutions involved in	Information System	administration	in real mode in all 48
management and	emergency management	(EMIS) was installed in	institutions involved	sites simultaneously,
emergency response	and all 42 county-based	8 pilot sites	in emergency	with effect from
through the	inspectorates for		management.	October 2012.
information systems.	emergency management.			
Increased earthquake	The risk of collapse of at	Works for seismic	The risk of collapse	Seismic retrofitting
risk mitigation with	least 50 critical public	retrofitting of 22	of at least 40 critical	of 44 public
some key public	buildings in case of a	public buildings hosting	public buildings in	buildings completed.
facilities retrofitted.	seismic event is	about 14,000 people	case of a seismic	About 23,350 people
	removed, and they will	were completed, and 18	event is removed, and	working in the
	be safely operational.	of them were returned	they will be safely	retrofitted public
		to normal functionality.	operational.	buildings are being
				protected.
Increased level of	Floor protection works	Flood protection works	Flood protection	Construction works
protection for	completed in all 11	completed in all 10	works completed in	for flood protection
population exposed to	critical locations	critical locations under	all 10 critical	completed in all 10

The project's achievements in terms of PDO and GEO indicators before and after restructuring are given below:

high risk of recurrent floods.	included in the investment program and no people at risk in the project areas.	the investment program; no people at risk in the project areas.	locations included in the investment program, and no people at risk in the project areas.	sites. Completed flood protection works proved effective during the floods that occurred in the past three years.
Improved safety of the selected priority dam structures.	The risk of dam failure removed and improved safety in place for 7 of the 13 critical dams selected; 60 percent of people at risk in the project areas protected.	Works contracts for 5 dams (protecting about 195,000 people) were completed; the remaining two contracts still in progress.	The risk of dam failure removed and improved safety in place for 7 critical dams selected.	Work contracts for increasing the safety of all 7 dams have been completed and the National Commission of Dam Safety issued the license for their operation at full capacity. This confirms that the respective dams are now safe.
Enhanced Borrower capacity to undertake land acquisition with positive net benefits to affected persons.	N/A	N/A	Indicator introduced at project restructuring.	A Land Acquisition Policy Framework (LAPF) was developed and fully observed during implementation.
GEO Indicators		Γ	Γ	Γ
Gradual reduction in number and severity of accidental spills of mining pollutants into the Tisza Basin; and in the volume of toxic releases from mines into the Danube River.	At least 70 percent improvement; e.g., reduction of accident probability by 70 percent.	Since beginning of project implementation, no major spills or accidents occurred. Emissions of contaminated mine water were reduced.	Integrated monitoring and emergency warning system implemented, operated, and maintained by public agencies and used by mining/ environment experts.	The core modules of an integrated monitoring and emergency warning system are under installation; operation and maintenance arrangements have been agreed between and clear responsibilities assigned to Romanian public agencies.
Improved safety in high-risk tailings facilities, and increased standards for risk awareness and emergency preparedness by owners, operators, and regulators.	At least 70 percent of performance standards at level of international good practice.	Remediation works completed at three high- risk sites, and procurement of works for two new sites underway.	Management and maintenance at level of best practice, and internationally accepted performance standards achieved for at least 70 percent of the inventory of mine waste facilities.	The use of performance standards has been further consolidated, with the target value of 70 percent of the country's tailing facilities achieved or exceeded.

## **Project Outcomes before Restructuring**

The following activities were implemented prior to the restructuring:

Component A. Strengthening of Emergency Management and Risk Financing Capacity

• EMIS was installed at six pilot sites.

- *Vrancea Earthquake Scenario*. The technical capacity for disaster risk management was enhanced as a result of the project through the development of the Vrancea Earthquake Scenario, which has been used for: (i) risk modeling for Catastrophe Insurance; (ii) incorporation into the EMIS; (iii) ongoing and future training and education of emergency response professionals; (iv) earthquake response drills and exercises; and (v) ongoing development of the National Earthquake Preparedness and Response Plan.
- *The Catastrophe Insurance subcomponent* achieved its original objective of assisting the Government with establishing the national catastrophe insurance scheme. It helped prepare the PAID legislation, supported regulatory norms, drafted risk management guidelines, and prepared an advanced earthquake and flood risk model. This consequently led to significant reinsurance cost savings for the PAID, and raised the level of public awareness of catastrophe risk insurance reflected in an increase of insurance penetration from 3 percent of households to 59 percent today.
- *Public awareness and education materials.* The public awareness and education program increased the population preparedness for disaster risk management. The activity targeted school children, university students, public media, and the general population. The materials were used in several public awareness campaigns and disseminated in some counties with their own financing.

## B. Seismic Risk Reduction

- Works for seismic retrofitting of 22 public buildings hosting about 14,000 people were completed, and 18 of the buildings were returned to normal functionality.
- The new Building Code became effective, including provisions for seismic retrofitting using innovative, cost-effective technologies.

## C. Flood Protection and Improved Dam Safety

Flood protection works were completed in all 10 critical locations under the investment program. Activities to enhance the safety of five dams (Maneciu, Varsolt, Berdu, Catmarasti, and Taria) were completed, providing direct protection to more than 195,000 people, and indirect benefits to an additional 250,000 people from services (water supply, irrigation) provided by the reservoirs. The two remaining contracts were in progress.

#### D. Risk Reduction of Mining Accidents in Tisza Basin

- Since project implementation commenced, no major spills or accidents have occurred. Emission of contaminated mine water has been reduced. Replication under Government-led efforts considerably broadened the positive impacts.
- Remediation works were completed at three high-risk sites, and procurement of works for two new sites was underway.

To arrive at the outcome rating before restructuring, separate outcome ratings were weighted in proportion to the share of actual disbursements under each component (Annex 10, Table 1).

**Rating:** Based on these ratings, project's outcome before restructuring is rated **Moderately Satisfactory**.

## **Project Outcomes after Restructuring**

The following outcomes had been achieved at the time of project closing:

Component A. Strengthening of Emergency Management and Risk Financing Capacity

While the full potential of the EMIS has yet to be realized, its development process has contributed to strengthening cooperation among relevant institutions, and is expected to improve coordination in emergency situations. This, in turn, will improve disaster response and benefit people living in hazard-prone areas.

#### Component B. Seismic Risk Reduction

The project assisted the Government in reducing seismic vulnerability of high- priority technical and social infrastructure through institutional strengthening and retrofitting of 44 public buildings, which will now provide safe shelter to about 24,000 people during earthquakes. Another 2.8 million people who could be indirectly affected will also benefit.

#### Component C. Flood Protection and Improved Dam Safety

Flood protection in 10 vulnerable sites and increased safety of seven large and small dams are expected to provide protection to about 266,000 people (68,000 households) at direct risk of flooding; the outcome exceeded the estimate of 234,000 people protected by 14 percent. In addition, 94 km of national and 115 km of county roads have been protected, as well as many socio-cultural buildings (schools, churches, kindergartens).

#### Component D. Risk Reduction of Mining Accidents in Tisza River Basin

The project assisted the Government in piloting and replicating hazard prevention and remediation activities by improving the management and safety of tailings dams and waste dumps facilities, and catalyzing trans-boundary cooperation on integrated water resources management in the Tisza River Basin. Remediation works at six sites have been completed, exceeding the initial target of three; the quality of works and resulting post-closure condition of the mines has been assessed to be high. The remediated sites have ceased to be a significant environmental risk, and the emissions of contaminated dust, surface runoff, and groundwater infiltration have been terminated.

**Rating:** Considering the above achievements, project outcome after restructuring is rated **Satisfactory**.

Based on all the above achievements, efficacy is rated Moderately Satisfactory.

#### **3.3 Efficiency**

The efficiency outcomes of the four components are presented in this section.

Component A. Strengthening Emergency Management and Risk Financing Capacity

The realization of benefits is dependent on the capacity of strengthened dams to withstand damage. It was not possible to identify all scenarios that might arise, so an economic analysis was not attempted.

#### Component B. Seismic Risk Reduction

The benefits of capacity building under this component also could not be identified, so a full economic analysis was not attempted.

Component C. Flood Protection and Improved Dam Safety

A full economic analysis was done for this component. The analysis related project costs to the benefits from the economic value stream resulting from the project. Project costs for dam safety and flood control were obtained from the implementing agency. Benefits were calculated as losses avoided over the life of the constructed/retrofitted works and were estimated using a loss probability function based on data collected from the project area. The detailed methodology for estimating the benefits using loss probability functions is presented in Annex 3.

Actual cost at completion was as much as 28 percent higher than estimated at appraisal. The cost of flood control infrastructure increased by 79 percent, while the cost of dam safety improvements increased by only 12 percent. Project benefits derive from risk reduction to both flood mitigation schemes and dam safety systems. Flood mitigation reduces the risk of flooding and disrupted water supply and power production. Dam safety systems increase the life of the dam, which benefits flood risk reduction, water supply maintenance, and incremental hydropower production.

The overall evaluation found that the project provided significant benefits in spite of cost increases. Total discounted project costs were US\$103.9 million, while the discounted benefits were US\$345.1million, yielding a benefit/cost ratio of 4.3. This means that for every US\$1 of investment, US\$4.30 in benefits are realized. The net present value of the whole project is estimated at US\$242.9 million. The internal rate of return (IRR) for flood control projects at completion ranged from 25.5 percent for the Slanic sub-project to 11.2 percent for the Teleorman sub-project, with an average of 19.4 percent. In the case of dam safety, the overall IRR was 22.4 percent, with a range of 28 to 14.5 percent. The results demonstrate that both the flood control and the dam safety projects had healthy rates of return.

## Component D. Risk Reduction of Mining Accidents in Tisza Basin

The outcome of Component D is deemed to be efficient. For details see Annex 3.

## 3.4 Justification of Overall Outcome Rating

## Rating: Moderately Satisfactory.

Based on the discussion in sections 3.1–3.3, the overall outcome is rated Moderately Satisfactory.

## 3.5 Overarching Themes, Other Outcomes and Impacts

Poverty Impacts, Gender Aspects and Social Development

## Poverty impacts

Following flood protection work, the price of agricultural and residential land in the project areas has gone up. In addition, crop loss due to floods has been considerably reduced.

## Gender aspects

N/A

## Social development

• The buildings rehabilitated and modernized under the project have created a feeling of safety and security, and an enhanced working environment. In the affected hospitals, a higher quality of service is being provided to patients due to more reliable power, sanitation, and sewerage.

- The project has particularly benefitted: (a) people living in communities vulnerable to the risk of floods and landslides through upgraded flood protection infrastructure and better mapping of landslide risk areas; and (b) people living in the areas adjacent to unsafe dams. For example, more than 43,500 people are protected against floods in 10 critical locations, and more than 222,700 people are protected by the seven improved dams. Further, the rehabilitated dams provide safe and reliable water supply and improved water management.
- Remediation of tailing dams has contributed to reducing pollution and the risk of geotechnical failure that could harm the population living in nearby areas.

## Institutional change/strengthening

The project had a substantial institutional development impact, as demonstrated by achievements in following areas:

- EMIS
- National catastrophic insurance scheme
- New Building Code, enabling the use of innovative methods for seismic retrofitting
- Vrancea Earthquake scenario
- Institutional capacity to manage and respond to floods and manage water resources
- Institutional capacity to monitor the behavior of waste (including tailings) management facilities and respond in case of emergency
- Remediation of tailing dams.

For details, see Section 3.2.

#### Other unintended outcomes and impacts (positive or negative)

- Land Acquisition Policy Framework. Under the project, the LAPF was developed in 2010 in response to the need to acquire private land for project activities. The purpose of the LAPF was to clarify land acquisition principles and organizational arrangements.
- New materials such as geo-membranes and geo-composites were used for embankment of rivers, to provide for filtering and mechanical protection against erosion and stability. This new method is now widely used for all projects in Romania.
- The project made contractors more responsible and gave beneficiaries more confidence in the quality of works, as site supervisors are more closely monitoring sites and keeping control of the quality and cost of construction activities.
- The development of the EMIS has enhanced IT capacity in Romania, not only for emergency management but also for complex software development in the public and private sectors.

## **3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops**

## See Annex 5.

## 4. Assessment of Risk to Development Outcome

## PDO Rating: *Moderate*

• *EMIS.* There is a clear interest on the part of General Inspectorate for Emergency Situations (IGSU) to maintain a fully functional EMIS system and upgrade it regularly. During the three year warranty period, all issues are expected to be resolved by the provider. It is, however,

important that the Ministry hire and retain adequate technical staff, at competitive salaries, to operate the system.

- *PAID*. As established by Law 260/2008 and enacted by the Chamber of Deputies, PAID lost several important provisions contained in the original draft prepared under a Bank-supported technical assistance project. The main provisions dropped or modified dealt with the introduction of a small deductible and the establishment of actuarially sound premiums. In December 2010, Law 260/2008 was further amended to exempt Romanian homeowners who bought facultative catastrophe insurance from private insurers from the requirement to buy the same insurance from PAID. These three modifications to the original design have seriously undermined the financial viability of the program.
- *Seismic risk reduction.* Operation and maintenance of the retrofitted buildings will be the responsibility of beneficiaries.
- *Flood and landslides risk reduction.* The risk under this component is negligible to low, as all assets/works completed under the project have been transferred to the ANAR, which will be responsible for their operation and maintenance.

#### GEO Rating: *Negligible to Low*

*Tailing dams.* CONVERSMIN is well equipped and adequately financed, so the risk to sustainability is very low. Funds will be allocated from the state budget for remediation of tailing dams of all closed mines.

#### 5. Assessment of Bank and Borrower Performance

#### **5.1 Bank Performance**

## (a) Bank performance in ensuring quality at entry Rating: *Moderately Unsatisfactory*.

Project preparation was carried out with an adequate number of specialists who provided the technical skill mix necessary to address sector concerns. A number of alternatives were considered for project design. The Bank provided adequate resources in terms of staff weeks and budget to ensure quality preparation and appraisal. The project was consistent with the CAS and Government priorities in the sector at the time. The Bank had a consistently good working relationship with the Borrower during preparation and appraisal. To this extent, the Bank performance was satisfactory.

On the other hand, as mentioned in Section 2.1, the project design had some major flaws, which led to implementation difficulties. In light of these shortcomings, the overall quality at entry is rated moderately unsatisfactory.

#### (b) Quality of supervision Rating: Satisfactory.

The Bank's performance during implementation was satisfactory. Sufficient budget and staff resources were allocated, and the project was intensively supervised and closely monitored. The task team prepared regular aides-memoire, alerted the Government and the PMUs to problems with project execution, and facilitated remedies in a timely manner, in conformity with Bank

procedures. The Implementation Status Reports (ISRs) realistically rated project performance in terms of both achievement of development objectives and project implementation.

The task team also monitored safeguards and fiduciary compliance. The Bank's procurement and financial management staff worked with the PMU staff to explain the rules and procedures to be applied during project implementation. The task team carried out a Mid-Term Review in November 2007.

One important aspect of the Bank's performance was the continuity of the task team, including the TTL and other key sector specialists, from project inception through completion. This continuity engendered consistency, and provided expertise to help the Government resolve implementation issues.

#### (c) Justification of rating for overall Bank performance

#### Rating: *Moderately Satisfactory*.

Based on Bank performance during lending phase and supervision, as discussed in Section 5.1, overall Bank performance is rated Moderately Satisfactory.

#### **5.2 Borrower Performance**

#### (a) Government of Romania performance

#### Rating: *Moderately Satisfactory*.

As discussed in Section 2.1, at project preparation the Government had demonstrated its commitment to the project. The Government performance during preparation is thus rated **Satisfactory**.

During implementation, however, the Government's commitment fluctuated with the change in administrations, ministers, and deputy ministers. At times, the project was affected to a significant extent by delays in the provision of timely and adequate counterpart funding. These repeated temporary shortages of funding available to the project constituted one of the main causes of implementation delays and thus the need for successive extensions of the closing date.

After Romania became a member of EU, with the EU becoming a major player and the Bank being a junior player in the Government's development agenda, the Government focused more on EU-funded programs, and lost interest in Bank financing. Consequently, there was a lack of attention to timely resolution of critical issues, which also delayed implementation.

In light of the above factors, Government performance during implementation is rated **Moderately Unsatisfactory**.

Overall government performance is rated **Moderately Satisfactory**.

(b) Implementing agency or agencies performance

## Rating: Moderately Satisfactory.

Project management performance varied by component and was heavily influenced by the stability, managerial skills, and dedication of the PMU staff. The management of Components B and D performed better than other components, although high staff turnover occurred in all teams. Unlike the other three components, implementation of Component A was affected by the turnover of management, with three successive directors during project implementation. Management of Component C was also deficient, particularly in the second half of project

implementation, which delayed the decision making process, particularly with regard to pilot activities on landslides.

*Financial management*. Overall, the FM performance of the implementing agencies was moderately satisfactory throughout the project life. The PMU for Component A had adequate FM capacity, but the other three PMUs were affected by significant FM staff turnover and, at times, by lack of sufficient FM staff, so their overall FM capacity was lower. The PMUs were in compliance with the project's financial reports and auditing covenants, and generally delivered their quarterly unaudited financial monitoring reports on time, except for small delays in a few cases.

*Procurement.* The procurement rating varied by implementing agency. For example, the PMU for Component D was highly satisfactory in its procurement performance. Under Component B, the replacement for the initial procurement specialist had little understanding of Bank procedures, which delayed procurement and project implementation. Under Component C, poor contract management by the PMU, mainly due to lack of capacity, was among the main reasons for non-completion of the Landslides Pilot Area Studies consultancy contract, and for not strictly following the payment schedule under the contract for the supply of landslide monitoring equipment.

*Reporting arrangements.* All four PMUs submitted all required quarterly and annual reports in a timely manner. The status of performance indicators were incorporated in all progress reports and served as valuable input to Bank supervision mission reports.

## (c) Justification of rating for overall Borrower performance Rating: *Moderately Satisfactory*.

In light of the Government and PMUs' performance, as discussed in Section 5.2, the overall performance of the Borrower was Moderately Satisfactory.

## 6. Lessons Learned

## Project Design

In a project where many sectors and multiple ministries/agencies are involved in implementation, the project design should be simple and focused on fewer activities.

## Implementation

- It is important to establish the implementation team at the beginning of the project so that the implementation of project activities will be smoother. The PMU for Component C was established only after two years of implementation, which delayed progress on this component.
- Assigning project implementation to a Government team exclusively dedicated to the task, working within the structure of the implementing agency, ideally from the advanced preparation stage, would be highly desirable, provided that the team is not affected by changes in Government. The team's responsibilities should be clear, well defined and well known within the agency. Previous experience in managing investment programs should be a core requirement for selecting the team's technical staff and managers.
- The project benefitted from the continuity of the Bank task team from the beginning. Continuity of the task team, especially the TTL, engendered consistency, depth, and followup in the dialogue with the Government, and ensured the availability of expertise to support
the Government in analyzing issues and implementing actions as they arose during supervision. A similar level of continuity of project directors and PMU staff would have been an important factor for avoiding disruptions in implementation.

# Procurement

- A good procurement plan should be in place from the start, and should be revised and updated annually, to reflect all changes in the project implementation schedule and address any shortcomings that become apparent.
- As the Loan was denominated in US Dollars, it was exposed to significant foreign exchange fluctuation, particularly during the economic and financial crisis (2008-2009). Projects denominated in Euros did not suffer the same impact. Looking forward, loans to EU member countries might be better served if denominated in Euros. This was not common practice at the time the project was negotiated, but Euro-denominated loans may become more important in the future.

# EMIS

Because of the complexity of the software and the limited capacity of the local provider, it would have been preferable to adapt an off-the-shelf IT system to the needs of the EMIS than to develop a unique system.

# Seismic risk reduction

Multiple sources of funding for retrofitting, works, and modernization should be avoided so that the Bank does not lose control over implementation. For example, when beneficiaries contribute more than the Bank, as happened under Component B, they take it as their right to make changes in design, which is dangerous in the case of structural seismic safety investments. It is essential for the Bank to determine design criteria for functionality and modernization.

# Tailing dams

It is advantageous to have a strong agency such as CONVERSMIN to complement the Government during implementation, to ensure mutual support and cooperation. Such an agency should continue after project closure and take responsibility for the closure of mines, remediation of tailing dams, and post-monitoring of environmental factors.

# 7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners (a) Borrower/implementing agencies

Comments on the draft ICR have been received from MDRT, ANRM, and IGSU and addressed through this version of the report.

# (b) Cofinanciers

NA

# (c) Other partners and stakeholders (e.g., NGOs/private sector/civil society)

NA

# Annex 1. Project Costs and Financing

Components	Appraisal Estimate (US\$ million)	Actual /Latest Estimate (US\$ million)	Percentage of Appraisal
Strengthening Response Capacity	10.01	14.74	
Seismic Risk Reduction	63.05	56.49	
Flood and Landslide Risk Reduction	89.21	99.31	
Mining Accident Risk Reduction	13.71	4.29	
Total Baseline Cost	180.98	174.83	
Physical Contingencies	15.57		
Price Contingencies	7.09		
Total Project Costs	203.65		
Front-end fee (IBRD only)	1.50		
Total Financing Required	205.15	174.83	

# Project Cost by Component (in USD Million equivalent)

# (b) Financing

P075163 - Hazard Risk Mitigation & Emergency Preparedness Project					
Source of Funds	Type of Financing	Appraisal Estimate (US\$ millions)	Actual/Latest Estimate (US\$ millions)	Percentage of Appraisal	
Borrower		46.66	35.92	.00	
International Bank for Reconstruction and Development		143.32	138.45	.00	
P081950 - Hazard Risk Mitigation & Emergency Preparedness GEF Project					
Source of Funds	Type of Financing	Appraisal Estimate (US\$ millions)	Actual/Latest Estimate (US\$ millions)	Percentage of Appraisal	
Borrower		3.53	1.24	.00	
GLOBAL ENVIRONMENT - Associated IBRD Fund		5.48	4.30	.00	
Global Environment Facility (GEF)		7.00	5.887	.00	
International Bank for Reconstruction and Development		0.00	0.00	.00	

# Annex 2. Outputs by Component

## **Component A – Strengthening of Emergency Management and Risk Financing**

The expected outcome of Component A was strengthened institutional and technical capacity for emergency management and response functions, as well as strengthened disaster preparedness. The activities leading to the achievement of this goal consisted of: (a) establishment of the Emergency Management Information System (EMIS); (b) development of the Vrancea earthquake scenario; (c) design of the public awareness and education program; and (d) preparation of the catastrophe insurance program.

## EMIS:

- EMIS software has been developed, and operational acceptance was granted in October 2012. After the final acceptance, the system use will be expanded to all 48 sites simultaneously, including centers under the authority of the General Inspectorate of Emergency Situations (GIES), as well as other relevant agencies.
- The training of trainers was conducted for 34 participants, representing all involved institutions.

*The Vrancea earthquake scenario* has been a very useful tool utilized for several purposes, including (i) risk modeling for the Catastrophe Insurance; (ii) incorporation into the EMIS; (iii) ongoing and future training and education of emergency response professionals; (iv) earthquake response drills and exercises, such as the one carried out with all relevant institutions in 2008; (v) ongoing development of the National Earthquake Preparedness and Response Plan.

*Public awareness and education materials* were developed with project assistance, and include programs targeting school children of all ages, university students, public media, and the general population. The materials were used in several campaigns and disseminated in some counties with their own financing.

#### Management of financial risk associated with natural disasters through insurance

- The project's catastrophe insurance component was originally conceived as a specialized program of technical assistance to support the creation of a stand-alone mandatory national catastrophe risk insurance program that could provide affordable coverage for earthquakes and flood to millions of Romanian homeowners.
- The PAID was established by Law 260/2008, but upon its enactment by the Chamber of Deputies, it lost several important clauses contained in the original draft prepared under the Bank-supported technical assistance project. The main clauses that were either dropped at enactment or modified at a later stage were those dealing with the introduction of a small deductible and the establishment of actuarially sound premium rates. In December 2010, the Law was further amended to exempt those homeowners who bought catastrophe insurance coverage from a private insurer from the requirement to buy that coverage from PAID. Together, these three important modifications to the original design of the program, which were introduced through the political process, gravely undermined its financial viability, resulting in: (a) severely underpriced catastrophe insurance products; (b) insufficient premiums to enable the program to self-finance; and (c) unchecked cut-throat competition in the price of coverage by the private insurance market. While initially the number of policies sold by the pool increased steadily, since early 2011, it has been in precipitous decline.
- As a result of the December 2010 amendment to the PAID Law, out of 5 million property catastrophe insurance policies sold currently in the Romanian catastrophe insurance market, more

than 90 percent are sold by private insurance companies in the form of an endorsement to the FLEXA (fire) policy. Unfortunately, due the lack of effective risk-based supervision, inherently political decision making process (due to its governance setup), and weak technical capacity of the CSA, the private market for catastrophe risk insurance products remains virtually unregulated. As a consequence, some private insurers engage in aggressive and unsustainable market practices, characterized by gross underpricing of catastrophe risk and inadequate risk management practices, which severely jeopardize their ability to pay claims in case of a severe catastrophe event. Based on Government data, the project team estimates that more than 3.5 million policies have been sold by insurers that are likely to face immediate insolvency if there is a major catastrophic event, leaving their policyholders with unpaid claims.

## Rating: Moderately Satisfactory

#### **Component B – Earthquake Risk Reduction**

# **Sub-component B.1** – *Retrofitting of High-Priority Public Facilities and Those Hosting High- Priority Public Services*

Under this sub-component, structural works were financed by the project, and additional works, including functionality, modernization, and rehabilitation of buildings were financed by the beneficiaries. Seismic retrofitting brought 44 public buildings to a level to withstand a 7.5 magnitude earthquake. Out of the 44 facilities selected for retrofitting:

- <u>17 facilities (38 percent) are categorized as Emergency and Disaster Response Facilities</u>, of which: (a) five are fire stations/command stations; (b) eight are disaster control and response centers; (c) two are structures ensuring public order; and (d) two are rescue centers.
- <u>14 facilities (32 percent) are categorized as Emergency Health Facilities (emergency hospitals)</u>.
- <u>10 facilities (23 percent) are categorized as Educational Facilities</u>, of which: (a) seven are higher education facilities; and (b) three are child protection centers.
- <u>3 facilities (7 percent) are categorized as Essential Public Buildings</u> (facilities essential for the administrative functioning of communities at risk after disaster).

#### Sub-component B.2 – Design and Supervision

- Twenty buildings were subject to technical review of existing designs.
- Seven technical surveys were prepared by registered technical surveyor engineers under beneficiary contracting.
- Thirty-four technical designs and 7 feasibility studies were prepared.
- Contracts for site supervision of construction works were signed for 44 facilities.

**Sub-component B.3** – Energy Sector Risk Assessment Output Indicators (revised)

• Energy Sector Risk Assessment Study (in both Romanian and English) was prepared.

#### **Sub-component B.4** – *Building Code Review*

Review of the Building Code (P100/3/2005) included:

- Review of technical solutions and their harmonization with the EU code (Eurocode), and
- Review of a chapter on new technologies for building retrofitting.

## Sub-component B.5 – Professional Training in Cost-effective Retrofitting Methods

The Handbook for Professional Training in Cost-effective Retrofitting Methods was completed, and will be used by the MDRT in preparing training sessions on cost-effective and innovative retrofitting methods for Romanian experts.

#### Rating: *Moderately Satisfactory*

#### **Component C – Flood and Landslide Risk Reduction**

#### **Sub-component C.1** – *Flood Protection Infrastructure*

Flood protection works were completed in 8 critical locations on the rivers Tarna Mare, Târnava Mică, Cibin, Bega, Slănic, Prut, Teleorman, and Vâlsan.

The project financed the following categories of capital investment:

- concrete walls;
- gabion walls;
- small concrete water falls;
- rehabilitation and construction of bottom sills;
- dikes and height increases at existing dykes;
- underpasses;
- riverbank protection;
- riverbank consolidation;
- riverbed improvement;
- supervisor's house.

#### Sub-component C.2 – Danube Riverbank Protection

This sub-component financed rehabilitation of existing flood protection structures along the Danube River, in downstream sections where flood vulnerability was very high and the dykes were endangered by the aggressiveness of the river.

Flood protection works were completed two critical locations along the Danube River's Borcea Horn: Borduşani and Făcăieni. The main works consisted of:

- bank protection;
- ground sills;
- stone dikes;

#### **Sub-component** C.3 – *Large Dams Safety*

Rehabilitation works were undertaken for four large dams (Berdu, Vârșolț, Mâneciu, and Dridu):

- construction of screen, sealing of dam body, foundation, the area between screen and water discharge;
- construction or rehabilitation of drainage system;
- rehabilitation of spillway, water discharge, dissipater and the bottom outlet channel;
- sealing or drainage drilling of the galleries;
- reshaping or rehabilitation of the evacuation channel;
- replacement or construction of pipes;
- repairing or construction of banks protection;
- construction or rehabilitation of surveyor house / dam control building;
- rehabilitation of electrical and hydro-mechanical equipment;
- bottom sills and consolidation of banks downstream dam;

- rehabilitation or installation of monitoring information system, including alarm and warning system;

#### Sub-component C.4 – Small Dams Safety

Rehabilitation works were completed for three small dams: Sânmihaiul Român, Cătămărăști, Tăria. The works included:

- construction of new spillway and access bridge over the spillway;
- stabilization of slopes;
- rehabilitation of dam crest;
- additional new bottom outlet;
- increasing elevation of dam crest;
- rehabilitation of old bottom outlet;
- rehabilitation and renewal of various structures and objects;
- de-silting of the reservoir;
- rehabilitation of the hydro-mechanical and electrical equipment;
- rehabilitation and extension of surveyor house.
- setting up the facilities and access routes to accomplish the works, from the upstream to the downstream end of the working chamber and demolition of existing weir;
- derivation of water through the lock;
- placing dam under dry conditions;
- installation of monitoring system.

*Dam Safety Panel.* Subcomponents C3 and C4 were supported by a Dam Safety Panel appointed by the Ministry of Environment and Water Management (MEWM) and accepted by the Bank. The Panel comprised a group of experts to ensure that works adhered to dam safety assurance objectives under related legislation, regulations, standards, and criteria.

*Environmental Advisory Group.* The construction activities supported by Component C (subcomponents C1, C2, C3 and C4) were guided by an environmental advisory group in addition to the local environment supervisor who implemented the Environmental Management Plan.

# **Sub-component C.5** – Landslide Pilot Area Studies and Development of Standardized Monitoring Manuals

*Pilot Landslide Monitoring.* The activity was designed for two pilot areas for which GIS maps were developed, including information on morphology, hydrogeology, land use, soil type, and soil strength. It allowed collection of data for model refinement.

*Development of Models to Predict Landslides.* Based on the data collected, the landslide risk forecasting models were developed and tested under different conditions of soil, land slopes, land cover, and rainfall. Field monitoring equipment was installed in two pilot locations (Sinaia and Sacele) with different geological and morphological conditions, and data collection started before project closing. A National Center for Landslide Monitoring was set up at the Ministry of Environment and Forests, and two local monitoring centers were established. IT monitoring equipment was also procured and installed at the three monitoring centers.

Development of Manual for Monitoring Landslides in Critical Areas, and Development of Emergency *Preparedness Systems*. A draft Manual for Monitoring was developed based on local data collected, describing the requirements for monitoring the critical landslide areas. However, the training program for local operators was not implemented, and the final version of the Monitoring Manual remained to be completed after the project.

Rating: Satisfactory

#### Component D – Risk Reduction of Mining Accidents in Tisza Basin

Achievements under this component included:

**Subcomponent D.1** – Establishment of a Baseline and Environmental Monitoring System for miningrelated impacts on streams and aquatic ecosystems, air, and soil

- A baseline survey was conducted in the Aries River basin, studying two tailings dam facilities (TDFs) hydrologically connected to the Aries River: Valea Stefancei and Valea Sesei.
- An environmental monitoring system for the Tisa Basin was designed to monitor mining-related impacts on streams and aquatic ecosystems, air, and soil.
- A workshop was conducted to train representatives of the Implementation Support Committee (Ministry of Economy and Finance, mining companies, Romanian Waters, Ministry of Management of Water and Environment) regarding the design of environmental monitoring systems and quality assurance.
- Individual monitoring system designs for seven different types of hazard risk sites were developed to be incorporated in the early warning and alarm system architecture.
- Monitoring systems for other five sites (Herepeia, Valea Muresului, Zlatna No. 1, Valea Mica No. 2, and Sfarci No. 3 TDFs) were designed by Romanian designers, and the monitoring of environmental factors (air, water, soil, stability, meteorological conditions, noise and vibrations) was carried out during the execution of works and during the warranty period.
- A fixed laboratory consisting of equipment for complex analysis of environmental factors; equipment for sample collection, preservation, and preparation of chemical and physical analysis of environmental factors, and laboratory furniture were procured. Also a mobile laboratory consisting of a vehicle; sampling and analytical equipment; laboratory consumables (glassware, reagents, laboratory paper); and training services was procured and installed in Deva, Hunedoara county.

**Subcomponent D2** – Identification of a Risk-based Priority Investment Programs for the Tisza River Catchments Area, and implementation of efficient and cost-effective hazard prevention and remediation measures in selected areas

- Topographical surveys and site investigations (providing geotechnical and geochemical data, installation of monitoring equipment, etc.) for the priority sites were completed.
- Detailed engineering designs were developed for the three sites to improve the safety and management of tailings management facilities.
- Detailed engineering designs for all mine closure and environmental rehabilitation works of Deva mine were developed.
- Prevention and remediation works for three sites (Novat, Herepeia, and Valea Muresului tailing dams) were finalized.
- Detailed engineering designs for all mine closure and environmental rehabilitation works of Zlatna mine were developed.
- Execution of prevention and remediation works for two sites (Zlatna No. 1 and Valea Mica No. 2 tailing dams) were finalized. In 2011 the execution of prevention and remediation works for Sfarci tailing dam was also finalized.

**Subcomponent D3** - Development of Engineering and Environmental Guidelines for tailings and waste facilities in the mining sector to minimize environmental risks during operation and after closure

The following engineering and environmental guidelines for tailings and waste facilities in the mining sector were developed:

- Tailings Design, Operating, and Closure Planning Guidelines
- Waste Dump Design, Operating, and Closure Planning Guidelines
- Geochemical Testing and Evaluation Protocols
- Environmental Monitoring Guidelines and Operating Procedures for Mining Industry Dams
- Ecological Response Monitoring Plan

A study tour of minerals exploration and mining activity was organized in France, Spain, and Portugal, to familiarize Romanian specialists with international best practices in the design, operation, and closure of tailing management and waste dumps facilities.

**Subcomponent D4** – Development of a Regional Mine Spill Disaster Response System to address the risks posed by accidental mining spills of selected mining companies in the Tisza basin

- Seven waste management facilities belonging to three major companies operating in the Tisa Basin that posed a high risk of accidental failures were chosen as pilot project sites for establishment of a regional mine spill disaster response system for the Tisa Basin.
- A Code of Practice on the preparation and implementation of emergency response plans was prepared.
- An environmental assessment was conducted, as part of the risk assessment.
- Water sampling and environmental monitoring designs for the seven sites were prepared, for integration in emergency response plans.
- Based on environmental assessment and environmental monitoring designs, system architecture for early warning and alarming systems was prepared for the seven sites: installation of equipment and communication systems at the main data centers; technical installations on TMF sites for measurement of seepage levels, flow rates, and water quality; installation of camera system, warning systems, and communication systems).
- Training programs on mining disaster management and preparedness with concerned stakeholders and public authorities was organized during October-November 2009 in the following counties: Hunedoara, Alba, Maramures.
- An ecologic accident simulation exercise was organized as part of the 5<sup>th</sup> Task Force Meeting in September 2010 for Valea Sesii Tailing Management Facility, Alba county.

**Subcomponent D5** - Development of a Regional Policy of Cooperation in the management of tailings and waste facilities in the Tisza and Danube basins

A Task Force was established in year 2005 which provided:

- Reviews of failure modes, and of effects analysis process and standards, in connection with the high-risk spots identified for remedial action under the project;
- Comments on environmental and engineering risk assessment s
- Monitoring of the accident simulation exercise and assessment of responses
- Review of remediation measures for all identified risk-based priority investments under the project

Rating: *Satisfactory* 

# Annex 3. Economic and Financial Analysis (including assumptions in the analysis)

## 1. Introduction and background

This section presents the economic analysis of the flood control and dam safety projects implemented. The analysis is based on the actual costs and the expected benefits from the investment based on probabilistic estimates of the benefits. The results, the Net Present Values (NPV), Benefit cost ratio (B/C), and the Internal Rates of Return (IRR) are presented and are compared to the ex-ante estimates arrived at the time of project development and presented in the Project Appraisal Document (PAD).

## 2. Methodology

Separate methodologies were followed for the dam safety projects and the flood mitigation projects and are presented below:

## 2.1 Dam safety projects

The project feasibility studies and the site visits to the project areas show that in the absence of dam repair there is a high probability of dam failure in the near foreseeable future. In the absence of repair, even if the remaining life span cannot be clearly assessed, it is reasonable to assume that the probability of a failure in the structures of the dam is increased due to a major flood event. Hence, the assumption is that investment in dam safely provides benefit in the form of avoided damages and this is the basic premise in the estimation of project benefits in this analysis. Thus it follows that:

- Benefit (Option "Dam safety investment") = Avoided Damage (Option "Dam safety investment")
- Avoided Damage (Option "Dam safety investment") = Total Damage (Option "Do Nothing") Damage (Option "Dam safety investment")

The typical life of the dam without the project (do nothing option) is 25 years. As the time progresses the probability of dam failure increases and the value of risk of damage increases and the loss of ability of supplying water supply and hydropower diminishes. Hence the value of loss of function goes up, to \$18 million in the case of Dridu dam. A typical dam safety/loss function is presented in Figure 1. If the dam is strengthened the life of the functionality is increased to almost 50 years and the probability of loss of functionality will increase as it gets closer to 50 years shown by the red line. Then the net difference of the blue line and the yellow line in figure 1 is the project benefits.



Figure 1 Typical dam Safety/loss of functionality Assessment

The damages/benefits are calculated considering a probabilistic function representing failure of the dam, under the present conditions and with the project investment through the life span of the dam. The benefit streams/avoided damages are discounted over the project period to compute the present value of the benefit streams. The following measures of project worth are computed and presented:

- The Net Present Value (NPV), the present value of net benefits from stream of benefits and costs;
- Discounted Benefits versus discounted costs;
- The Internal Rate of Return (IRR), which is the discount rate at which project's net present value equals zero'
- The Benefit Cost Ratio (B/C), as the profitability index; and
- Benefits per unit of investments.

# **2.2.1 Flood Mitigation Projects**

As in the case of dam safety projects, the benefits from flood mitigation/defense projects (dykes) were computed at the damages avoided due to the project compared with total damages in the case of the do nothing option. Thus the benefit from the flood mitigation project becomes:

- Benefit ("with flood mitigation investment") = Avoided Damage (Option "with flood mitigation investment")
- Avoided Damage (Option "flood mitigation investment") = Total Damage (Option "Do Nothing") Damage (Option "with flood mitigation investment")

"Damages" and "Avoided Damages" were calculated using "Loss/Probability – curves" as shown in the following figures. The threshold value from which floods cause damages was estimated by the responsible design group (damages = zero). Damages caused by a flooding with an infinitesimal rate of return are calculated automatically in the models of the economic assessment (assets of "annual average damages" for different options).



Figure 2: Assessment of "Total Damage" ("Do nothing"-option



Figure 3: Assessment of "damage" and "avoided damage" ("do something"-option, e.g. protection against flooding with a probability of 5%)

Damages are transformed into "Average Annual Damages" and then discounted over the calculated lifetime. Finally the required Figures of merit (Net Present Value, Damage [Internal Rate of Return and Benefit-Cost – Ratio) are calculated by using Net Present Values of damages and costs and presented in the "summary" spreadsheet.

# **Overall Evaluation**

# **Investment Cost Comparison**

The actual costs were all revised to 2012 dollars based on inflation rates provided by the World Bank which also agree with the IMF figures of inflation See Table 1. Overall cost of the flood control increased 33%. The Dam safety sub project costs increased by 22% and overall cost increased by 23%.

# Table 1 Conversion of Nominal Costs to Constant Costs 2012

	Total Costs in \$	
Flood protection Infrastructure	Current cost	2012 costs
TARNA MARE	1,343,591.00	1,770,091.62
TARNAVA MICA	1,973,743.00	2,490,437.29
CIBIN	4,612,802.00	5,956,976.97
BEGA	3,123,352.00	3,918,761.84
SLANIC	7,750,202.00	9,766,178.86
PRUT	1,833,471.00	2,356,926.55
TELEORMAN/	13,378,930.00	16,834,447.23
VALSAN	2,138,553.00	2,817,155.23
BORDUSANI-FACAIENI	1,776,941.00	2,323,763.76
Sub total	37,931,585.00	48,234,739.36
Large and small Dams Safety	Current cost	2012 costs
BERDU	2,557,087.00	3,245,242.95
VARSOLT	21,152,194.00	25,827,987.98
MANECIU	12,018,306.00	15,132,320.49
DRIDU	9,648,260.00	10,829,634.22
SANMIHAIU ROMAN	1,423,520.00	1,565,117.31
CATAMARASTI	1,310,050.00	1,685,373.72
TARIA	3,804,344.00	4,781,721.88
	51,913,761.00	63,067,398.56
Total Costs	89,845,346.00	111,302,137.92

# Comparison of Nominal ICR Costs with PAD Costs for the sub projects Implemented<sup>3</sup>

The incremental costs when compared with the appraisal incremental costs show that costs have considerably increased by as much as 28%.overall. The flood control infrastructure had increased by 79% while the dam costs had increased by only 12%. The cost increase seemed to be less for the dams compared to the PAD estimates because the elements for dam safety had been studied more thoroughly and the costs are clearer to define. The cost increases in some of the flood control scheme are much higher than the PAD and it can only be blamed on "Apele Romane" for not working out these costs in detail during the appraisal especially for the Bank mission. Despite this, the overall costs only increased by 30%.

# Table 2 Appraisal Nominal Economic Costs and ICR Costs (in \$000)

<sup>&</sup>lt;sup>3</sup> The PAD included 13 dam safety projects but only 7 were implemented and on flood protection the PAD included 12 flood control sub-projects but only 10 were implemented. The comparison of costs is with only sub-projects implemented

Flood protection Infrastructure on rivers and Danube	ICR Costs nominal	Appraisal costs	Cost Increase
TARNA MARE	1344	661	81%
TARNAVA MICA	1974	2090	-16%
CIBIN	4613	1778	132%
BEGA	3123	2020	38%
SLANIC	7750	3856	79%
PRUT	1833	1046	57%
TELEORMAN/	13379	6236	92%
VALSAN	2139	1064	79%
BORDUSANI-FACAIENI	1777	122	1200%
Sub total	37,932	18,873	79%
Large and small Dams Safety			
BERDU	2557	2034	12%
VARSOLT	21152	18060	5%
MANECIU	12018	6235	72%
DRIDU	9648	9320	-8%
SANMIHAIU ROMAN	1424	2210	-42%
CATAMARASTI	1310	825	42%
TARIA	3804	3804.3	-11%
Sub total	51913	42488.3	9%
Design and supervision		9060	
Total	89844	70421.3	28%

\\* Design costs included in the individual item costs to obtain %

# Benefits and Net Benefits Values Incremental Benefits Comparison

The benefits were estimated with the risk reduction for both flood mitigation schemes and for dam safety system which reduce the risk of flooding, water supply and power production. Benefits for dam safety projects will come from increased life of the dam and reservoir to maintain the benefits of both flood risk reduction and also water supply maintenance and a small amount of hydropower production. The computed benefits compared with the benefits computed at appraisal are shown in Table 3.

The forecasted incremental economic benefits during the appraisal were converted to constant 2012 dollars using the inflation factors given by the World Bank for Romania. These factors are similar to those used by the IMF. The discount rate used was also the same as at the appraisal of 12%. When incremental discounted benefits are compared using 2012 constant values the ICR discounted benefits increased by 9.7%. The flood control benefits increased by 73% while the dam safety benefits decreased by 1.9%. The flood control benefits increased substantially also because of two new sub projects Slanic and Valsan and due to increased benefits. The benefits

increased substantially 73.7% indicating that the flood control projects are showing significant more benefits recently not due to the additional projects but because of the concentrated rainfalls and flooding has been more pronounced due to global warming in many areas including the S.E. European Countries. It should also be noted for investments of \$111 million (see Table1) the economic benefits are \$345 million-this 300% of benefits for the flood control and dam safety.

Flood protection Infrastructure on rivers	Appraisal discounted	Apprasial. Discounted	ICR Discounted	
and Danube	benefits	benefits 2012	Benefits 2012	Benefit %+/-
TARNA MARE	1042.0	1325.0	3451.0	160.4%
TARNAVA MICA	3876.0	4928.8	7340.0	48.9%
CIBIN	4612.0	5864.7	10752.0	83.3%
BEGA	5151.0	6550.1	5151.0	-21.4%
SLANIC	-	-	15031.0	-
PRUT	4250.0	5404.4	8038.0	48.7%
TELEORMAN/	19071.0	24251.2	26358.0	8.7%
VALSAN	-	-	7733.0	-
BORDUSANI-FACAIENI	-	-	72.8	-
Sub total	38002.0	48324.3	83926.8	73.7%
Large and small Dams Safety				
BERDU	16682.0	20266.1	18211.0	-10.1%
VARSOLT	82890.0	100698.9	100762.0	0.1%
MANECIU	71858.0	87296.6	87847.0	0.6%
DRIDU	33092.7	40202.6	39906.0	-0.7%
SANMIHAIU ROMAN	6463.8	7852.5	4617.0	-41.2%
CATAMARASTI	2212.9	2688.3	2576.6	-4.2%
TARIA	6081.0	7387.5	7358.0	-0.4%
Sub total	219280.4	266392.6	261277.6	-1.9%
Total	257282.4	314716.9	345131.6	9.7%

Table 5 Appraisal and ICK Discounted Denemis (000 8 3	Tał	ble 3	Appraisal	and ICR	Discounted	Benefits	(000's \$
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### **Benefit Costs Ratios and Net Benefit Comparison**

Table4 shows a comparison was made for ICR values of all the discounted costs (incremental investments plus O and M) and the discounted benefits and the net present values. The investment costs were provided by the ICR Mission and the O & M costs were based on costs provided estimated on the sub-project and it varied from 1.5% to 5% of the investment costs. These were estimated in detailed during the appraisal (labor, materials, repair needs, etc) and updated using the escalation figures for the ICR. The Benefit Cost ratio in the appraisal compared with the ICR computed values are also shown in Table 4. It should be noted that the total discounted costs (capital and O & M) are \$103.9 million (see Table 4) while the discounted benefits are \$345.1 million. The ratio of costs to benefits is about 1: 3.4 which means that for every 1\$ of investment we get \$3.4 benefits. The net present value of the whole project is estimated at \$242.9 million dollars.

Flood protection	IncrementalP				
Infrastructure on rivers	CR PV Costs &	Discounted			
and Danube	0 &M	Benefits	ICR NPV	ICR B/c	Appraisal B/C
TARNA MARE	1995.0	3451.0	1456.0	1.7	1.6
TARNAVA MICA	2928.0	7340.0	4412.0	2.5	1.9
CIBIN	5091.0	10752.0	5661.0	1.7	2.6
BEGA	4520.0	5151.0	631.0	1.5	2.6
SLANIC	7363.0	15031.0	7668.0	2.0	
PRUT	2287.0	8038.0	5751.0	3.5	4.1
TELEORMAN/	18021.0	26358.0	8337.0	1.5	3.1
VALSAN	2916.0	7733.0	4817.0	2.7	
BORDUSANI-FACAIENI					
Sub total	45121.0	83854.0	38733.0	1.9	2.6
Large and small Dams					
Safety					
BERDU	3581.0	18211.6	14630.7	4.6	8.2
VARSOLT	27543.0	100728.0	73185.0	3.7	4.6
MANECIU	15223.0	87847.0	72624.0	5.8	11.5
DRIDU	6742.0	39906.0	33164.0	6.1	3.6
SANMIHAIU ROMAN	1062.0	4619.0	3557.0	2.8	2.9
CATAMARASTI	1603.0	2576.6	973.6	1.6	2.7
TARIA	3074.0	7358.0	4284.0	2.4	1.6
Sub total	58828.0	261246.2	202418.3	4.4	
Total	103949.0	345100.2	242287.5	4.3	6.1

## **Table 4 Comparison of Discounted Costs and benefits**

The benefits cost ratio declined from 6.1 to 4.3. There seem to be so many variations in the individual sub-projects that it is difficult to predict why this decline occurred. The Appraisal B/C ratios seem to be more erratic than the ICR figures which seem to be consistent. A B/C ratio of 1.9 for flood control and that for dam safety of 4.3 is very consistent with B/C worked out internationally. Flood control generally has fewer benefits due to flood risk reduction compared to the investments.

# **Comparison of Economic Rate of Returns**

Detailed computations were worked out and an appraisal comparison is shown in table 5. Overall the IRR decreases by 31.7% from Appraised values to the ICR values for the flood control while the dam safety values drop 15.3%. A detailed evaluation of why the IRR values changed is given in Table 6. Most of the declines are due to cost increases but sometimes there are declines in benefits.

The ICR rate of return for the flood control projects averaged about 19.4% is a very good rate of return. The overall rate of return declined from 28.4% at appraisal to 19.4%. The highest IRR was 25.5% for Slanic subproject and lowest was for Teleormann subproject of 11.2%.

For the dam safety the overall IRR was 22.4% and it declined from the appraised value of 26.5% and the decline was a 15.4%. This decline is less because the benefits are for not only flood control, water supply and for a small hydropower component and are more stable. <u>These benefits are also easier to assess throughout the project implementation period. Again the IRR of 22.4% is a very healthy rate of return for this component</u>

Flood protection			
and Danube	ICR IRR	Appraisal IRR	Difference %
TARNA MARE	16.0%	22.0%	-27.3%
TARNAVA MICA	22.5%	29.4%	-23.5%
CIBIN	12.3%	17.7%	-30.5%
BEGA	12.2%	40.0%	-69.5%
SLANIC	25.5%		
PRUT	25.4%	42.3%	-40.0%
TELEORMAN/	11.2%	19.0%	-41.1%
VALSAN	30.0%		
BORDUSANI-FACAIENI			
Sub total	19.4%	28.4%	-31.7%
Large and small Dams Safety			
BERDU	21.4%	27.0%	-20.7%
VARSOLT	25.0%	22.0%	13.6%
MANECIU	20.7%	33.0%	-37.3%
DRIDU	28.0%	30.0%	-6.7%
SANMIHAIU ROMAN	25.0%	16.0%	56.3%
CATAMARASTI	14.5%	31.0%	-53.2%
TARIA	18.5%	25.0%	-26.0%

# Table 5 IRR Comparison ICR values with Appraisal Values

# Table 6 Evaluation of IRR Changes

Flood protection Infrastructure on rivers and	Difference in Base	
Danube	IRR	Why different IRR
		Cost Increase of 103% , period of constrution increased 2 to 4 yearsand benefits increased
TARNA MARE	-6%	141%
TARNAVA MICA	-7%	Late start of the project can explain some of the changes
CIBIN	-5%	Project cost was increased by 159%
BEGA	-28%	Cost Increase of 54% and benefits decline 20%
SLANIC	N/a	New Project introduced
		IRR drops almost 17 percentage points because the costs 75% and counterbalanced by an
PRUT	-17%	increase of benefits of 47%. B/c cratio actually increases
		Costs have increased 115% and discounted benefits only 10% and hence the lower rate of
TELEORMAN/	-8%	IRR
VALSAN		No appraisal results as this project was introduced after appraisal
BORDUSANI-FACAIENI		No computation done during appraisal becaue of lack of data
Large and small Dams Safety		
BERDU	-6%	Cost Increase of 25.7% and benefits decline 13%%
VARSOLT	3%	Cost increase is 17% but increased benefits
MANECIU	-12%	Difference is due to huge cost increase
DRIDU	-2%	There is a slight drop in IRR due to extreme delays in the project implementation
SANMIHAIU ROMAN	9%	The project IRR increased due to 29% reduction in cost and benefits dropped 41% but not f
CATAMARASTI	-17%	Huge cost increase and that is why the IRR declined by 16.5%
		PCR costs were higher by 25% and were delayed but the benefits were the same. Costs
TARIA	-7%	drove down the IRR by 6.5%

# **Economic Unit benefits for Investments**

The investments for flood control and dam safety can often be valued by examining the net returns for every dollar invested. The net returns for each dollar invested is shown in table 7 and are 3.32 for the ICR estimate and 6.06 for the Appraised estimate. Appraisal values seem to be overestimated. The flood control projects have unit benefit estimates from \$3.25 down to \$1.14 for every dollar invested. The returns depend very much of how much earlier investments have been done previously so that new projects now cannot get as much returns. These figures are similar to figures worked out for China and many South Asian Countries where flood are very prevalent.

		ICR Results		
Flood protection	IncrementalP			Appraisal
Infrastructure on rivers	CR PV Costs &	Discounted	Benefits per \$1	Benefits per
and Danube	0 &M	Benefits	invested	\$1 inv
TARNA MARE	1995	3451	1.73	1.58
TARNAVA MICA	2928	7340	2.51	1.85
CIBIN	5091	10752	2.11	2.59
BEGA	4520	5151	1.14	2.55
SLANIC	7363	15031	1.56	
PRUT	2287	8038	3.51	4.06
TELEORMAN/	18021	26358	1.46	3.06
VALSAN	2916	7733	3.25	N/a
BORDUSANI-FACAIENI				
Large and small Dams Safety				
BERDU	3580.95	18211.63	5.09	8.20
VARSOLT	27543	100728	3.66	4.59
MANECIU	15223	87847	5.77	11.52
DRIDU	6742	39906	5.92	3.55
SANMIHAIU ROMAN	1062	4619	4.35	2.92
CATAMARASTI	1603	2576.6	1.61	2.68
TARIA	3074	7358	2.39	1.60
Total	103948.95	345100.23	3.32	6.06

# **Table 7 Benefits for Unit of Investment**

For dam safety the unit benefits are much higher from a low of \$1.66 to \$5.92 per unit of investment. These values are more realistic than the appraisal values.

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

The budget for Component D of about \$12.50 million was utilized for three different broad categories: (i) construction works and goods; (ii) consulting services fir analyses, designs and advice; and (iii) project administration. Even if only considering only the results of one subcomponent, D2, that deals with direct, linear risk reduction for seven TMF with a tailings volume of approximately 50 Mill m3, the utilization efficiency of the investment is considerable: Conservatively a failure risk of 1 % per un-remediated facility and year may be assumed, meaning that there would be one major accident every 100 years on every facility. For seven facilities the individual risks would be added to a total of 7%, or 7 accidents per 100 years.

Experience from the TMF failures at Aurul TMF (Baia Mare Mine) and Novat TMF (Baia Borsa Mine) suggests that – under very conservative assumptions – about 50,000 m3 of contaminated waters, and 10,000 m3 of contaminated tailings may be expected to be released per given accident. The actual numbers for the above quoted accidents were twice as high. This would thus amount to a total of 350,000 m3 of contaminated waters, and 70,000 m3 of toxic tailings released into the environment over a period of 100 years, from the sites remediated by the project.

The environmental and socio-economic cost of such accidents is hard to estimate, but data from the Baia Borsa Accident suggest, that the direct economic damage on fisheries, tourism, drinking water as well as the required immediate repair remediation cost were in an order of magnitude of about 10-20 Million USD. The long term impact on biodiversity, fish stocks, drinking water resources, agricultural land may easily double this amount. Using only the numbers for immediate damage the total for a 100 year period would be 70-140 Mill USD, or between 0.7 and 1.4 Mill USD per year. Thus, looking at it from this angle the amortization of the investment for Component D (12.50 Million USD) would take between 9 and 18 years only.

An additional, yet harder to quantify impact on risk reduction will be caused by the insights and information gained under sub-component D1. (Establishment of a Baseline and an Environmental Monitoring System), as well as the more strategic activities and interventions carried out under D.3 (Engineering and Environmental Guidelines for Tailings Dams and Waste Facilities), D.4 (Regional Mine Spill Disaster Response System) and D.5 (Promoting Transboundary Cooperation). The improved capabilities for monitoring, analysis, risk assessment, emergency planning, early warning, communication and the cooperation between national emergency response units will have a long term and far-reaching positive impact, that will reduce risks significantly beyond the direct interventions under sub-component D2.

Of the project cost about \$1.35 million was used for project management, which is only 10.8% of the project budget, and can be considered remarkably low.

# **Overall Economic Evaluation and Conclusions**

Overall evaluation is the project implemented has maintained its benefits despite cost increases and has a healthy rate of return of 19.4% for flood component and 22.4% for the dam safety components; benefits cost ratio of 4.3 for the whole project; and the benefit are \$3.32 for every dollar invested. Hence the project has achieved all the targets required and reduced the risks due to flooding and dam safety by about \$345 million. In addition the net present value of the project is \$242 million.

# Annex 4. Bank Lending and Implementation Support/Supervision Processes

Names	Title	Unit	Responsibility/ Specialty
Supervision/ICR	·		·
Adriana Maria Eftimie	Mining Spec.	SEGOM	
Alessandro Palmieri	Lead Dam Specialist	OPCQC	
Ana Maria Ihora	Program Assistant	ECCRO	
Bogdan Constantin Constantinescu	Sr Financial Management Specialist	ECSO3	
Camelia Iulia Gusescu	Program Assistant	ECCRO	
Cesar Niculescu	Environmental Specialist	ECSS3	
Cristiana Zirimis	Program Assistant	ECCRO	
Eric N. Peterson	Consultant	ECSPE	
Eugene N. Gurenko	Lead Financial Sector Specialist	FCMNB	
Gabriela Doina Manea	Resource Management Analyst	HRSRM	
George Alexandru Moldoveanu	Information Assistant	ECCRO	
Ibrahim Sirer	Senior Procurement Specialist	ECSO2	
Jolanta Kryspin-Watson	Operations Officer	ECSS6	
Joseph R. Goldberg	Consultant	C3PDR	
Keith W. McLean	Lead Social Development Specialist	WBISG	
Luiz Gabriel Azevedo	Lead Water Resource Specialist	ECSSD	
Rita E. Cestti	Senior Rural Development Specialist	OPCQC	
Wael Zakout	Country Manager	MNCYE	
Wolfhart Pohl	Senior Environmental Specialist	ECSS3	

# (a) Task Team Members

# (b) Staff Time and Cost

Stage of Project	Staff Time and Cost (Bank Budget Only)				
Cycle	No. of staff weeks	USD Thousands (including travel and consultant costs)			
Lending					
FY04	37.20	182.33			
FY05					
FY06					
FY07					
FY08					
FY09					
FY10					
FY 11					

Stage of Project	Staff Time and Cost (Bank Budget Only)		
Cycle No. of staff USD Thousands (inclu- weeks consultant costs)		USD Thousands (including travel and consultant costs)	
FY 12			
Total:			
Supervision/ICR			
FY04			
FY05	23.88	73.68	
FY06	31.32	109.12	
FY07	46.43	134.68	
FY08	41.70	188.22	
FY09	29.91	119.50	
FY10	32.25	139.28	
FY 11	26.02	87.31	
FY 12	13.85	67.78	
Total:			

# **Annex 5. Beneficiary Survey Results**

# **Results of the Stakeholders' Survey**

Component A: Strengthening of Emergency Management and Risk Finanicng Capacity Componenta A: Intărirea Capacității de Răspuns la Situațiile de Urgență EMIS/SMISU (Emergency Management Information System/ Sistemul de Management Informațional al Situațiilor de Urgență)

#### 1) Do you know about the Project /Aveți cunoștință despre Proiect?

Yes/ Da	No/Nu
44	4

2) How did you learn about the Project? Cum at aflat despre Project?

At	From the Media or Internet/	From the local	Other/ Altele
workplace/	Prin intermediul	authorities/ De la	
La locul de	mijloacelor media sau pe	autoritățile locale	
muncă	Internet		
36	5	1	2

3) Have you been involved in activities carried out through the Project?/ Ați fost implicat în activități desfășurate în cadrul Proiectului?

Yes/ Da	No/ Nu
31	17

4) Did you learn about the Emergency Management Information System (abbreviated EMIS in English and SMISU in Romanian)?/ Ați aflat de Sistemul de Management Informațional al Situațiilor de Urgență (SMISU) creat în cadrul Proiectului?

Yes/ Da	No/Nu
44	1

5) Do you consider the EMIS application to be a useful instrument for emergency situation management specific to Romania ? / Considerați aplicația SMISU un instrument util pentru gestionarea situațiilor de urgență specifice României?

**a**) at national level/ **la nivel național**:

Yes/ Da	No/Nu	I don't know/ Nu știu
46	0	2

**b**) at local level/**la nivel local**:

Yes/ Da	No/Nu	I don't know/ Nu știu
45	1	

6) Do you think that EMIS will efficiently contribute to collecting, analysing and integration of data in real time among agencies for emergency situation management agencies and the central and local competent authorities? / Considerați că SMISU va contribui în mod eficient la colectarea, analiza și integrarea datelor în timp real între agențiile de management al situațiilor de urgență și autoritățile centrale și locale competente?

Yes/ Da	No/Nu	I don't know/ Nu știu
36	5	7

7) Do you think that the inter-connection of EMIS application with the 112 application is a useful and necessary functionality? / Considerați că inter-conectarea aplicației SMISU cu aplicația 112 este o funcționalitate utilă și necesară?

Yes/ Da	No/ Nu	To a great extent/	Not at all/	I don't know/
		In mare măsură	Deloc	Nu am cunoștință
41	2	5	0	0

8) Do you consider that EMIS application should be a dynamic application in such way that can later on be developed according to the needs specific to other institutions that would require EMIS implementation?/ Considerați că aplicația SMISU ar trebui să fie o aplicație dinamică in așa fel incât să poată fi dezvoltată ulterior, în funcție de cerințele specific altor instituții care ar solicita implementarea SMISU?

Yes/ Da	No/ Nu	To a great extent/	Not at all/	I don't know/
		In mare măsură	Deloc	Nu am cunoștință
38	3	7	0	0

9) Taking into account the substantial investment in the information system, do you consider necessary and useful the use of EMIS application not only in case of catastrophic events, but also in daily (routinely) activity of the institutions involved?/ Având în vedere investiția substanțială în sistemul informatic considerați necesară și utilă folosirea aplicației SMISU nu numai în caz de evenimente catastrofice ci și în activitatea zilnică (de rutină) a instituțiilor implicate?

Yes/ Da	No/ Nu	To a great extent/ In mare măsură	Not at all/ Deloc	I don't know/ Nu am cunoștință
27	10	10	0	1

10) Do you consider that the system adequately integrates all the sources of data relevant for emergency situation management?/ Considerați că sistemul integrează în mod adecvat toate sursele de date relevante pentru managementul situațiilor de urgență?

Yes/ Da	No/ Nu	I don't know/ Nu știu
35	7	6

11) How do rate the Project's importance for Romania?/ Cum calificați importanța Proiectului pentru România?

Very important/	Important	Medium	Not important/	Not useful/
Foarte important		Importance/ De	Neimportant	Inutil
		importanță medie	_	
21	23	1	0	0

12) Do you think that the project should be replicated in a similar Government program? /Considerați că Proiectul poate fi un model de aplicat pe scară largă într-un program guvernamental similar?

Yes/ Da	No/Nu	I don't know/ Nu știu
32	2	14

Component A: Strengthening of Emergency Management and Risk Financing Capacity Componenta A: Intărirea Capacității de Răspuns la Situațiile de Urgență PRAC (Romanian Program for Catastrophic Insurance /Programul Român de Asigurare la Catastrofe)

1. Do you have a mandatory house insurance policy? Aveți o poliță de asigurare obligatorie a locuinței?

Da/Yes	Nu/No
24	3

**2.** Does the PRAC insurance meet your insurance needs in case of catastrophic events (flood, earthquake and landlsides)?

Asigurarea oferită prin PRAC satisface nevoile dvs. de asigurare în caz de catastrofe (inundații, cutremure și alunecări de teren) ?

Yes/Da	No/Nu	More or less/Oarecum
17	1	8

**3.**Do you consider that the PRAC insurance is affordable? **Considerați că prima de asigurare platită către PRAC este accesibilă?** 

Yes/Da	No/Nu
26	0

4. Please indicate how was your experience in purchasing PRAC products? Vă rugăm să apreciați experiența dvs. în privința achiziționării produselor PRAC:

a. It was easy to purchase/A fost uşor de achiziționat - 20

- **b.** It was difficult to purchase/**A fost dificil de achiziționat -**
- 5. Do you think that PRAC insurance should be mandatory? Considerați ca asigurarea PRAC trebuie să fie obligatorie?

Yes/Da	No/Nu	I don't know/Nu știu
24	1	2

0

6. Please rate from 1 to 5 (1= very poor, 5 = very good) the information campaign to inform the population of the need and benefits of the mandatory house insurance.
Cum apreciati pe o scala de la 1 la 5 (1 = foarte slabă, 5 = foarte bună) calitatea campaniei de informare a populației cu privire la necesitatea și beneficiile asigurării obligatorii a locuinței?

1-0 responses
2-3 responses
3-10 responses
4-11 responses
5- 3 responses

7. Do you consider PRAC mandatory insurance to be a useful risk management instrument for the community? / Considerați că asigurarea obligatorie PRAC este un instrument util de management al riscului pentru comunitate ?

Yes/ Da	No/ Nu	I don't know/ Nu știu
27	1	0

8. Is there a current efficient mechanism though which house owners can be fined for not closing an insurance policy?/ Există în prezent un mecanism eficient prin care proprietarii care nu încheie asigurarea obligatorie pot fi amendați?

Yes/ Da	No/ Nu	If No, when do you extect this to be introduced? / Dacă nu, atunci când vă așteptați ca acesta să fie introdus
12	15	4

9. Do you think that the risk insurance against natural disasters should be mandatory? / Considerați că asigurarea contra riscurilor din dezastre naturale trebuie să fie obligatorie?

Yes/ Da	No/ Nu	I don't know/Nu știu	
23	3	3	

Thank you for your time /Vă mulțumim pentru timpul acordat completării chestionarului.

Component B: Componenta B: Seismic Risk Reduction Reducerea Riscului Seismic  Do you know about the Component B: Earthquake Risk Reduction within the Project? Aveți cunoștință despre Componenta B: Reducerea riscului seismic din cadrul Proiectului?

Yes/ Da	No/ Nu
	_
91	5

2) How did you learn about the Project?/Cum ați aflat despre Proiect?

At the workplace/ La locul de muncă	From the media or the Internet/ Prin intermediul mijloacelor media sau pe Internet	From the Local authorities/ De la autoritățile locale	From the central authorities/ De la autoritățile centrale	Other/ Altele
73	6	7	11	1

3) Did you feel unsafe in the building before retrofitting?/V-ați simțit în nesiguranță în cladire înainte de consolidare?

Yes/ Da	No/ Nu	I don't know/ Nu știu	
56	36	6	

4) Do you feel safer after the building was retrofitted?/Vă simțiți în siguranță mai mare după consolidarea clădirii?

Yes/ Da	No/ Nu	I don't know/ Nu știu	
68	3	2	

5) How do you think about the length of time taken for strengthening and modernizing the building?Cum apreciați durata execuției lucrărilor de consolidare și modernizare a clădirii?

Quite short /Destul	Reasonable	Long / Lungă	Very Long /	I don't know / I don't
de scurtă	Rezonabilă		Foarte lungă	answer/Nu știu/Nu răspund
8	54	9	2	4

6) To which extent the current activities of your institution were affected during the building retrofitting?/În ce măsură au fost afectate activitățile curente ale instituției pe perioada realizării consolidării și modernizării clădirii?

To a great extent/	Moderately/	Relatively small/
Mare	Moderată	Relativ mică
12	50	13

7) How do you qualify the work conditions created after retrofitting and modernization of the building?/Cum calificați condițiile de lucru create în urma consolidării și modernizării clădirii?

Better/ Mai bune	Satisfactory /Satisfăcătoare	Just like before/ La fel ca înainte
64	5	1

8) What do you appreciate more, building safety or modernization?/Ce apreciați mai mult, siguranța clădirii sau modernizarea acesteia?

Safety/	Modernization/	Both/ Ambele	None/ Nici una	
Siguranța	Modernizarea			
7	2	69	1	

9) Are you familiar with the Project financing modalities with respect to both the retrofitting and modernization?/Cunoaşteți modalitățile de finanțare a Proiectului atât cele privind consolidarea, cât și cele privind modernizarea?

Yes/ Da	No/ Nu
(if yes, kindly further answer to	(if No, kindly proceed to question 13/
questions 10, 11, 12/ vă rugăm	vă rugăm treceți la întrebarea 13)
răspundeți mai departe la întrebările	
10, 11, 12)	
45	31

10) How do you consider the financial contribution within the Project for the retrofitting works related to the total cost of investment?/ Cum apreciați contribuția financiară în cadrul Proiectului pentru lucrările de consolidare, raportată la costul total al investiției?

Insufficient/Insuficientă	Adequate/ Adecvată	I don't know/Nu știu
14	49	2

11) How do you appreciate the collaboration with the Project financiers – the World Bank and the Government of Romania?/Cum apreciați colaborarea cu finanțatorii Proiectului – Banca Mondială și Guvernul României?

Very good/ Foarte bună	Good/ Bună	Satisfactory/ Satisfăcătoare	Insufficient/ Insuficientă	Poor/ Slabă
37	21	4	0	0

12) How do appreciate the transparency of the procurement and financial procedures applied during the investment (from design to works execution)?/Cum apreciați transparența procedurilor de achiziții și financiare aplicate pe parcursul derulării investiției (proiectare – execuție lucrări)?

bună		Satisfăcătoare	Insuficientă	
34	17	6	1	0

# 13) How do you rate the Project's importance for Romania?/Cum calificați importanța Proiectului pentru România?

Very important/ Foarte important	Important/ Important	Average Importance/ De importanță medie	Not important/ Neimportant	Not useful/ Inutil
65	27	4	0	0

**14**) Do you consider the Project to be a Model that can be scaled up in a similar Governmental Program?

# Considerați că Proiectul poate fi un Model de aplicat pe scară largă într-un program guvernamental similar?

Yes/ Da	No/ Nu	I don't know/
89	1	Nu știu 6

Component C: Componenta C: Flood and Landslide Risk Reduction

ta C: Diminuarea Riscului Inundațiilor și Alunecărilor de Teren

#### 1) Do you know about the Project?/Aveți cunoștință despre Proiect?

Da/Yes	Nu/No
64	0

#### 2) How did you learn about the Project?/Cum ați aflat despre Proiect?/

At the	From the Media or Internet/Prin	From the local	Other/Altele
workplace La	intermediul mijloacelor media sau	authorities/De la	
locul de muncă	pe Internet	autoritățile locale	
30	6	23	10

3) How would you rate the risk to which your community was exposed before the works were done through the Project associated with the safety of the dam nearby and exposure to floods?/Cum apreciați riscul la care era comunitatea expusă înainte de realizarea lucrărilor din Proiect asociat cu siguranța barajului / cu expunerea la inundații?

Major	Semnificativ/Significant	Neimportant/Not	Nu știu/I don't
		important	know
38	24	2	0

# 4) Was your locality in which you live/work affected by floods: /A fost localitatea în care locuiți/lucrați afectată de inundații în:

În fiecare an/Each year	Cel puțin o dată la cinci ani/At least once in 5 years	O dată la zece ani/Once in 10 years	O dată la douăzeci de ani/Once in 20	Nu știu/Nu răspund/I don't know/don't
			years	answer
15	20	6	10	9

5) How much did the Project contribute to reducing the population's vulnerability to floods?/ Cât de mult a contribuit Proiectul la reducerea vulnerabilității populației la inundații?

Foarte mult/Very much	Mult/A lot	Deloc/Not at all/A little
40	22	2

6) How would you rate the quality of works carried out through the Project? /Cum apreciați calitatea lucrărilor executate în cadrul Proiectului?

Foarte bună/	Bună/Good	Mediocră/Moderate	Slabă/Poor	Foarte slabă/
Very good				Very poor
35	26	1	0	1

7) How would you rate the Project's importance for Romania?/Cum calificați importanța Proiectului pentru România?

Foarte important/ Very important	Important	De importanță medie/ Medium	Neimportant/ Not important	Inutil/ Useless
		importance		
40	22	2	0	0

8) Do you think that the Project could be a model to apply on a large scale though a similar Governmental program?/ Considerați că Proiectul poate fi un model de aplicat pe scară largă într-un program guvernamental similar?

Da/Yes	Nu/No	Nu știu/I don't know
62	2	0

Component D -	
Componenta D	_

Risk Reduction o f Mining Accidents in Tisza Basin Diminuarea riscului accidentelor miniere în bazinul Tisei

#### 1) Do you know about the Project?/ Aveți cunoștință despre Proiect?

Yes/ Da	No/ Nu
11	0

2) How did you learn about the Project?/ Cum ați aflat despre Proiect?

At the	From the Media or the	From the local authorities/	Other/ Altele

workplace/	Internet/ Prin intermediul	De la autoritățile locale	
La locul de	mijloacelor media sau pe		
muncă	Internet		
8	1	2	0

3) How would you rate the risk to which your community was exposed before the works were done through the Project associated with the safety of tailing dams and to exposure to pollution agents due to water pollution accidents? Cum apreciați riscul la care era comunitatea expusă înainte de realizarea lucrărilor din Proiect asociat cu siguranța depozitelor de steril din apropiere și cu expunerea la deversări accidentale de poluanti?

Major	Significant/	Not important/	I don't	I don't know/
	Semnificativ	Neimportant	know/Nu știu	Nu am cunoștință
1	9	0	0	1

4) Was your locality in which you live/work affected by any water pollution accidents? /A fost localitatea în care locuiți/lucrați afectată de deversări accidentale în ?

Each Year/ În	At least once in 5	Once in 10 years/	Once in 20	I don't know/Don't
fiecare an	years/ Cel puțin o	O dată la zece ani	years/ O dată la	answer/ Nu știu/Nu
	dată la cinci ani		douăzeci de ani	răspund
1	1	1	4	4

5) How much did the Project contribute to reducing the population's vulnerability to water pollution accidents? /Cât de mult a contribuit Proiectul la reducerea vulnerabilității expunerii comunității la deversări accidentale de agenți de poluare?

Very much/ Foarte mult	A lot/ Mult	Not at all/ Deloc
5	6	0

6) How would you rate the quality of works carried out through the Project? /Cum apreciați calitatea lucrărilor executate în cadrul Proiectului?

Very good/	Good/ Bună	Moderate/ Mediocră	Poor/ Slabă	Very Poor/
Foarte bună				Foarte slabă
8	3	0	0	0

7) How would you rate the Project's importance for Romania? / Cum calificați importanța Proiectului pentru România?

Very important/	Important	Medium Importance/	Not important/	Useless/Inutil
Foarte important		De importanță medie	Neimportant	
5	6	0	0	0

8) Do you think that the Project could be a model to apply on a large scale through a similar Governmental Program? / Considerați că Proiectul poate fi un model de aplicat pe scară largă întrun program guvernamental similar?

Yes/Da	No/Nu	I don't know/ Nu știu
9	0	2

# Annex 6. Stakeholder Workshop Report and Results

N/A

# Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR

This Report is prepared for purposes of the Implementation Completion Report (ICR) in accordance with World Bank procedures.

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. Since the usual pattern has been that the Bank is asked for 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 to reducing vulnerability to multiple natural hazards.

The project included four components, each addressing a specific risk falling under the authority or responsibility of different public authorities, which were entrusted with the implementation of the specific activities. In the following, the project achievements, risks, and lessons learned are presented together, for the entire project.

# 1. PROJECT OUTCOME/ACHIEVEMENTS

## Component A: Strengthening of Emergency Management and Risk Financing Capacity

This component had two main objectives:

A.1 Strengthened institutional and technical capacity for emergency management and emergency response through upgrading communication and information systems

#### Achievements:

- The equipment, infrastructure, standard software, and custom software were procured and installed in 48 emergency operations centres (EOCs), which improved their technical capacity for emergency management and emergency response. The EOCs were interconnected through an integrated management information system designed to improve decision makers' ability to monitor and respond to emergencies in real time. The project also provided training of EOCs staff.
- The communication management system will be partial assured by a voice communication system integrated with the informational management system (EMIS). It will initially be implemented in seven EOCs, with the possibility of expansion to the national level if funds become available to procure the necessary equipment. The existing software and licenses are already sufficient for a national system.

A.2 Reduce the government's contingent liability due to natural disasters by transferring highly concentrated catastrophe risk to the insurance industry.

#### Achievements:

- Catastrophe financial risk transfer was realized through enactment of the Law on the Compulsory Insurance of Dwellings against Earthquakes, Landslides or Flooding.
- Increasing awareness of the benefits of the mandatory insurance of dwellings against natural disasters.
- During its first year, the Romanian Catastrophe Insurance Program (PAID) concluded **791,728** mandatory policies, distributed as follows:

Per type of the	482,151 mandatory policies for	<b>309,577</b> mandatory policies
building	Type A	for Type B
Per type of region	485,158 mandatory policies in	<b>306,570</b> mandatory policies in
	urban region	rural region

#### **Component B: Earthquake Risk Reduction**

The main objectives of this component were to assist the Government in reducing the vulnerability of high-priority technical and social infrastructure, mitigating the costs of damage from earthquakes, and preserving national cultural property. The investments in mitigation and emergency preparedness measures will have positive long-term effects on central and local government budgets by reducing losses and damage to public and private assets as result of the catastrophic events. These expenditures often are not fully accounted for in the budget planning process and have had to be accommodated from other categories in an ad hoc manner. The project also contributed to <u>fiscal savings</u> by reducing the costs of reacting to disasters when they do occur.

These objectives were achieved through two main types of activities:

B.1 An investment program, which included:

- <u>Preparation of designs</u> for retrofitting and modernization of 34 buildings, and review of existing designs (prepared prior to project commencement) for 20 buildings.
- <u>Retrofitting of 44 public facilities</u> to a level that allows them to withstand a 7.5 magnitude earthquake; this also allowed for <u>modernization/rehabilitation</u> of the facilities to ensure full functionality after the retrofitting works ended. Despite the cumbersome financing arrangements that made the implementation more difficult and challenging, the <u>general rehabilitation (structural and functional) of the public facilities is considered a comprehensive and positive approach</u>, leading to a positive outcome of the project and a high level of satisfaction of the beneficiaries. The beneficiaries highly appreciate the quality of working conditions and quality of services created after retrofitting and modernization/rehabilitation of the buildings.
- <u>Supervision of construction for 44 facilities</u>, to assure compliance with the engineering designs.

# B.2 Institutional strengthening

- <u>Promoting innovative seismic strengthening methods</u> (base isolation and energy dissipation dampers) which were used to designing the retrofitting works for the General Inspectorate for Emergency Situation, command unit, in Bucharest and the City Hall Iasi.
- <u>Preparation of the Energy Sector Risk Assessment Study</u> for the Ministry of Economy, Trade and Business Environment.
- <u>Technical support for review of the new Building Code (P100/3)</u>, including provisions for seismic retrofitting of existing buildings using innovative, cost-effective technologies.
- Preparation of a <u>Handbook for "Professional training in innovative and cost-effective retrofitting</u> <u>methods</u>" for MRDT's on-going use in preparing training sessions on cost-effective and innovative retrofitting methods for Romanian experts.

# **Component C: Flood and Landslides Risk Reduction**

The activities supported by this component were designed to reduce flood and landslide risks in the most vulnerable rural and urban communities through construction of new flood protection infrastructure, improved safety of large and small dams, and development of models to predict landslides based on monitoring of critical natural factors. To achieve these objectives, two approaches were used:

# C.1 Investment program for construction of new flood protection infrastructure and dam safety, which included:

• <u>Flood protection infrastructure at 10 sites located along Danube and internal rivers</u>, including construction or rehabilitation of concrete and gabion walls, small concrete waterfalls, bottom sills, dikes, culverts; as well as river bank protection and consolidation, and riverbed improvement. More than 43,500 people are now protected against floods in these locations.

• Enhancing safety of large and small dams through construction of screens; sealing of dam body, its foundation, and the area between the screen and water discharge; construction or rehabilitation of drainage system; rehabilitation of spillway, stilling basin, and bottom outlet and its canal; grouting; sealing or drainage drilling of inspection galleries; rehabilitation of electrical and hydro-mechanical equipment; bottom sills and river banks rehabilitation downstream of the dam; rehabilitation or installation of monitoring and information system, including alarm and warning system; construction or rehabilitation of surveyor house/dam control building. Seven large dams and three small dams benefitted, and more than 222,700 people living downstream of these dams are now protected against the risk of dam failure.

*C.2 Consultant studies for landslide monitoring and emergency response,* including development of mathematical models for landslide risk forecasting, procurement and installation of monitoring equipment in two pilot locations, and development of a Manual for Landslides Monitoring and Emergency Preparedness for use in pilot and possible additional locations.

## Component D: Risk Reduction of Mining Accidents in Tisza Basin

The main outputs expected from this component were hazard prevention and mitigation measures implemented in the Tisza Basin, to reduce risk of accidental spills of mining pollutants. Emergency preparedness and effective environmental monitoring capacity were established, and trans-boundary collaboration on water resources management was strengthened. Specific achievements include:

*D.1 Risk-based priority investment programs* to reduce risk of mining accidental spills of pollutants in the Tisza Basin, which included:

- <u>Preparation of a comprehensive inventory</u> of tailing dams facilities and waste dumps facilities and <u>risk assessments procedure</u>, followed by high priority site risk classification and identification of the risk reduction measures for every critical site
- <u>Implementation of efficient and cost-effective hazard prevention and mitigation measures</u> in six high risk tailings facilities in the Tisa Basin through preparation of detailed engineering designs and environmental monitoring system designs reviewed by a independent technical Panel of Experts in tailings dam safety, topographical surveys and geotechnical and geochemical site investigations, installation of monitoring equipment, execution of hazard prevention and remediation works, execution of water passive treatment systems, monitoring of the environmental factors (air, water, soil, stability, meteorological conditions, noise and vibrations) during the execution of works at 6 tailing dam facilities and during warranty period and sites supervisions of executed works.

*D2. Institutional strengthening* for emergency preparedness and establishment of effective environmental monitoring capacity, through:

- <u>Preparation of environmental monitoring system design</u> in the Tisa Basin for mining related impacts on streams and aquatic ecosystems, air and soil
- <u>Procurement and installation of a fix and mobile laboratory</u> for sample collection, preservation and preparation of chemical, physical chemical and complex analyses of environmental factors
- <u>Development of a comprehensive mine specific information technology-based environmental</u> <u>monitoring and decision support system</u> to facilitate the administration of the environmental procedures within the mining sector and ensure the storage and easy access to the environmental and mining technical information, capable of reporting ongoing environmental impacts, and able to detect and timely report emerging hazard conditions, in a form capable of supporting an effective emergency planning and response system
- <u>Development of 10 engineering and environmental guidelines</u> for tailings and waste facilities to minimize environmental risks during operation, closure and post-closure in the mining sector

- <u>Development of Financial Guarantee Regulations</u> for rehabilitation of the land affected by the mining operations
- <u>Development and implementation of the Regional Emergency Preparedness and Response System</u> through development of Internal and External Emergency Response Plans, a code of practice, environmental assessment, development of the design and partial infrastructure for early warning and alarming systems and organizing an ecologic accident simulation exercise with trans-boundary cooperation
- <u>Providing various specific training programs, including study tours</u> for almost 130 stakeholders and public authorities.

# D3. Development of a regional policy of cooperation in the management of tailings and waste facilities in the Tisza and Danube basins through:

- <u>Establishment of a Regional Task Force</u> to review failure modes and effects analysis process and standards in connection with the high-risk spots identified for remedial actions
- <u>Promote dialogue of Romania experts and institutions on basin-wide cooperation with other riparian</u> <u>countries</u> on the management and safety of tailing dams facilities in the Tisa and Danube basins through participation of around 20 Romanian specialist to various international conferences/workshops/seminars

# 2. FACTORS AFFECTING IMPLEMENTATION

#### **Component A: Strengthening of Emergency Management and Risk Financing Capacity**

- Because of the lack of necessary resources from the Loan and local contribution, and the lengthy process of amending the Loan Agreement, implementation of the AC-2 and AC-9 sub-components was delayed.
- Opposition from the insurance industry caused delays in the process of approving the Law on the compulsory insurance against earthquakes, landslides, or flooding.
- A factor that negatively affected the completion of EMIS was the poor collaboration among the contractor, the PMU, and the General Inspectorate for Emergency Situations.
- The PMU operated for a period of 2-3 years with fewer staff than required to maintain its functions effectively, as stipulated in the Loan Agreement, which led to lower performance.

#### **Component B: Earthquake Risk Reduction**

#### Project preparation stage

- The project was insufficiently prepared in terms of not identifying or including rehabilitation and modernization works along with retrofitting works, as required by national legislation, in order to ensure the full functionality of the buildings after the completion of the retrofitting.
- The project did not foresee the consequences of Romania's accession to the European Union in 2007, involving substantial changes in norms/technical regulations for design and execution of the works, as well as increased construction costs.

#### Project implementation stage

- Depreciation of the Loan currency against the local currency (RON) by 35 percent during 2005-200 led to a decreased value of most local contracts.
- The complexity of the designs and their poor preparation led to a longer than anticipated review process and continual design modifications.

- The long procurement process for consultant services and works contracts led to the low interest of capable local and international contractors in participating in tendering.
- Lack of beneficiaries' preparedness for project implementation (slow and bureaucratic process to allocate funds, lack of technical capacity, delays in handing over the sites) led to delays in investments and sometimes to cancellation of the procurement process by the PMU.
- The project lacked adequate funding in 2009-2012, following the economic and financial crisis, resulting in implementation delays.

#### Component D: Risk Reduction of Mining Accidents in Tisza Basin

During year 2006, the legal arrangements which were currently in place did not allow NAMR to use the project funds to finance remediation works at the tailings facilities and waste dumps belonging to the mines under the administration of the Ministry of Economy and Commerce. This situation sprung from the chance in the legal status of NAMR: at the project formulation NAMR was under the coordination of Ministry of Economy and Commerce, and after one year it become under coordination of Prime Minister Office and thus, the use of NAMR project funds would be in conflict with Law of Public Finance. NAMR initiated an Emergency Ordinance for changing the Ratification Law of the Loan Agreement assigning NAMR the right of special administration over the project sites in December 2007. The Government restructuring from April 2007 caused a delay in Emergency Ordinance process of approval.

Another problem that slowed down Project implementation starting from year 2009 till 2012 was related to the lack of available funds and timely supply of the necessary funds from the Government share, as under the economic and financial crisis Government imposed limited funds allocation to the implementing agencies.

#### 3. TRANSITION ARRANGEMENTS FOR SUSTAINING PROJECT ACHIEVEMENTS AFTER CLOSURE

#### **Component A: Strengthening of Emergency Management and Risk Financing Capacity**

- The main beneficiary of EMIS will identify the financial resources to extend the standard software licenses after the warranty period, or to include those licenses in the Government agreement with Microsoft.
- To ensure proper maintenance of the EMIS, the beneficiaries may contract outsourced maintenance services.
- An amendment to the Law on compulsory catastrophe insurance has been sent to the Chamber of Deputies; the amendment would eliminate the exemption for individuals or legal entities with voluntary (optional) catastrophe insurance.

#### **Component B: Earthquake Risk Reduction**

- The complementary rehabilitation and modernization works contracted under the project and financed with beneficiaries' funds will continue under MRDT management. For these works, protocols regarding the execution of the investment sub-projects have been signed between the MRDT, as special administrator of the facilities, and all respective beneficiaries, as co-financers.
- The innovative seismic strengthening methods developed under the project are being used by the Romanian engineering society.
- Experts of the Ministry of Economy, Trade, and Business Environment are fully committed to using the Energy Sector Risk Assessment Study developed under the Project.

- The new Building Code (P100/3) for retrofitting of existing buildings is in force.
- MRDT will use the Handbook for Professional Training in Innovative and Cost-effective Retrofitting Methods" in preparing training sessions on cost-effective and innovative retrofitting methods for Romanian experts.

### Component D: Risk Reduction of Mining Accidents in Tisza Basin

- This goal was successfully achieved, and many project activities will be continued by Ministry of Economy, ANRM, CONVERSMIN, and local authorities.
- As a result of the project, the Government, local authorities, and the public are now fully conscious of the benefits of reducing environmental risks in the mining sector.
- The Government now has the capacity as well as the commitment to adhere to EU requirements regarding dam safety and emergency response to accidental pollutant spills.
- Based on findings, leasson learned, good practice measures diseminated by the project, SC CONVERSMIN SA, a state-owened company overseen by the Ministry of Economy, has already finalized the rehabilitation works of 20 high risk TDFs, and works are in execution for another 25 high-risk TDFs, with funds allocated from the State budget.
- CONVERSMIN has taken over the sites remediated under the project and assumed responsibility for long-term their monitoring and maintenance.
- CONVERSMIN established 3 Regional Monitoring Centers, in Bucovina, Baia Mare, and Deva with project funding. The Bucovina Center was equipped using Phare funding, and the Deva Center was equipped using project funding. In these centers, post-closure environmental monitoring of the mines will be continued for many years, in conformity with EU requirements.
- An IT-based environmental monitoring and decision support system has been installed and is operational, and staff have been trained in its use, at each regional center and at CONVERSMIN headquarters.
- The State budget will fund CONVERMIN's expansion of the early warning and alarm system to all high-risk sites.
- Training (accident simulation exercises) based on the project-funded External and Internal Emergency Response Plans has increased the capacity of local authorities to respond to emergency situations.

#### 4. RISKS FOR SUSTAINABILITY

#### **Component A: Strengthening of Emergency Management and Risk Financing Capacity**

- There is a risk that continuing financial constraints could lead to the emigration of personnel qualified to work with or manage the EMIS, resulting in insufficient capacity to maintain and further develop the system.
- There is a risk of insufficient funds to renew annual licenses for the EMIS; the Government's agreement with Microsoft ensures renewal for only a limited period.
- Unless the exemption from compulsory insurance for individuals and legal entities is overturned, there is a risk that PAID will conclude fewer mandatory policies and face possible bankruptcy. An additional risk is that private insurance companies issuing voluntary policies may have insufficient resources to pay the large claims for catastrophic events.

#### **Component B: Earthquake Risk Reduction**
- There were insufficient beneficiary funds to finalize rehabilitation and modernization of the retrofitted buildings before the project ended.
- The beneficiaries lacked the technical capacity to implement the project-specific activities.
- Political instability (Government change) may adversely affect the pace of implementation of the remaining modernization works.

# Component D: Risk Reduction of Mining Accidents in Tisza Basin

- The risk for sustainability is very low, as the main project achievements will be continued by SC Conversmin SA, a state owened company under coordination of Ministry of Economy, once the project is over
- The Government, through the "Mining Strategy for years 2012 2035", is committed to provide the necessary funding to improve safety of high risk tailings dams and waste dump facilities, to operate and maintain the monitoring system on the long-term, to prepare for preventing, responding and mitigating emergency situation

# 5. BANK PERFORMANCE

# Component A: Strengthening of Emergency Management and Risk Financing Capacity

The Bank ensured quality at entry and supported implementation through appropriate supervision during the project. Quality at entry and of supervision, averaging two supervisory missions per year, was rated satisfactory. The Bank showed flexibility in administering and adapting the project design when necessary.

# **Component B: Earthquake Risk Reduction**

The Bank's performance during implementation was satisfactory. Sufficient budget and staff resources were allocated, although as Component B became more complicated and difficult, more support would have been helpful. The Bank team conducted two supervision missions per year and a mid-term review mission.

# Component C: Flood and Landslides Risk Reduction

The Bank's performance during supervision was highly satisfactory. The involvement of all Bank officials connected with the project had a positive effect on coordinating the work of PMU staff, relations with relevant authorities, and solving implementation challenges. The PMUs had the support and guidance of the Task Team Leader, Environmental Specialist (who advised on Bank safeguard procedures), Lead Financial Sector Specialist, Financial Management Specialist, Operations Officer, Procurement Analyst, and Financial Management Analyst.

# Component D: Risk Reduction of Mining Accidents in Tisza Basin

Supervision by the Bank was timely, frequent, and technically sound. Bank staff were very supportive of PMU decisions, and provided timely technical advice, especially on risk reduction works for TDFs safety and rehabilitation. There was excellent communication between the Task Team Leader for GEF financing, the Task Team Leader for Loan financing, PMU staff, and NAMR management. There was also excellent support from Bank's Procurement Specialist, who reviewed and approved procurement documents quickly, often in one day. A highly qualified Bank consultant, further GEF task manager, provided valuable support during project implementation. During execution of the project, the Bank team held regular meetings with stakeholders to keep them apprised of the project's performance.

# 6. BORROWER'S PERFORMANCE

# **Component A: Strengthening of Emergency Management and Risk Financing Capacity**

- The Ministry of Public Finance ensured that funds were available and disbursements were made in a timely manner. The project did not suffer from counterpart funding problems. PMU personnel were deeply involved and dedicated to the project, determined to solve the problems that occurred in project implementation in order to be able to reach the project objectives. However, many PMU staff trained in Bank procedures left before the end of the project, and were replaced by others not familiar with Bank procedures. This resulted in poor collaboration between the Ministry's legal specialists and the PMU, beneficiaries, and suppliers involved in EMIS implementation, leading to lower quality of and delays in implementation.
- EMIS is nevertheless a unique and complex system created to collect, analyze, and share real-time data among emergency management agencies and key public officials at the national, regional, and local levels.
- The project developed material for the education and public information sub-component and put in place a coherent budget for the program. The PMU transferred the copyrights for the material to the beneficiary.

# **Component B: Earthquake Risk Reduction**

The Borrower's performance during the implementation of the project was rated satisfactory.

#### a) Government performance

- The numerous changes in Government and subsequent numerous shifts in leadership of MRDT (7 Ministers and 7 Secretaries of State) led to administrative, legal, and financial problems in implementation. With every change, the new officials needed time to become familiar with the project. This created discontinuities in decision-making processes and led to lack of cohesion in the strategy vision. One of the major consequences of this was reduced funding for implementation during the project's final three years (2010-2012). Considering the increased difficulty of the Component B, more support would have been needed from the line ministry.
- A Project Steering Committee was established to supervise project implementation and coordination among all project implementing agencies.

#### b) Implementing Agency Performance

The PMU in MRDT had good performance in terms of commitment and dedication, especially considering the increased volume and complexity of activities (procurement, technical, financial, management) carried out by PMU specialists following the decision to increase the beneficiaries' complementary investments.

#### Component D: Risk Reduction of Mining Accidents in Tisza Basin

- The Government's ownership and commitment were demonstrated by the creation of the high-level Project Steering Committee and the Project Management Unit (PMU) to support project implementation.
- There were some delays in the availability of counterpart local funds beginning in 2009, which slowed down project implementation.
- During implementation, the good relationship between the Ministry of Economy's PMU and CONVERSMIN promoted synergies among related activities. Further, both the Ministry of Economy and CONVERSMIN strongly supported establishment of the Regional Monitoring Center and the IT Environment System to help ensure the sustainability of project outcomes.

- Because of changes in national government, NAMR, which was responsible for Component D, suffered from numerous shifts in leadership (6 NAMR presidents), resulting in poor continuity and the need for extensive briefings for new senior officials. The last four NAMR presidents were strongly supportive. PMU staff were clearly engaged and committed to the developmental objectives of the project. During implementation, the PMU benefitted from the support of qualified Bank procurement and financial staff. The participation of PMU staff in training courses on the World Bank's standard procedures improved their professional skills. Good financial management was secured, following the audit reports. The cooperation with the World Bank specialists involved in project was very good.
- PMU-NAMR prepared quarterly reports highlighting the project progress for monitoring and supervision.

# 7. LESSONS LEARNED

# **Component A: Strengthening of Emergency Management and Risk Financing Capacity**

- It is necessary that at least one member of PMU is involved in project preparation.
- It is necessary that the PMU is in place at the approval date and before starting the procurement process to allow time for training of PMU staff. Procurement should not start until six months after the PMU staff is complete.
- The organizational chart of the PMU needs to be correlated with the institutions involved in or affected by project implementation.
- The PMU staff should include a legal expert from the Ministry's legal department, trained to work with World Bank procedures.
- Consultancy contracts should provide for termination in the event that the consultant's performance does not meet expected quality standards.
- Direct access to a decision maker is very important for the PMU's performance. For example, PMU MAI benefitted from the fact that the decision maker for the project, the State Secretary, was also the coordinator of the General Inspectorate for Emergency Situation and also vice president of the National Committee for Emergency Situations.
- The project costs estimated at design stage have been exceeded during implementation because of unrealistic estimation made in the Feasibility Study, depreciation of Loan currency, delays in Project activities implementation;
- Public education and information programs cannot be put into force without proper planning and budgeting. Further, such programs need to be tested on target groups and their feedback incorporated the programs are implemented.

#### **Component B: Earthquake Risk Reduction**

#### Project design

- More attention should be paid to technical aspects at the design phase, with a view to identifying and including all categories of works and their sources of financing.
- It is important to pay attention to national norms in the construction field.
- To envisage the norms and the legal framework at the Project design stage in order to be applicable during the project implementation.

# Implementation:

- It is necessary for the PMUs to have more decision-making authority so implementation is not dependent on a very slow and centralized decision-making process in the ministry;
- It is necessary to promote simultaneous investments for retrofitting and rehabilitation/modernization of buildings to ensure that they are fully functional.

# **Procurement:**

- Consultancy contracts should require adherence to deadlines regarding timely delivery of services.
- It may be necessary to adjust the formula in works contracts as a result of increasing manual labor costs (e.g., after EU accession).
- It is important that procurement for different activities be carried out in the proper sequence.
- To shorten the procurement process, the World Bank's no objection (NO) to procurement decisions should be allowed.

# Financing:

Works contracts should include provision for 15 % in contingency costs.

# Other lessons:

- The PMU needs to have a strong, experienced manager familiar with Bank procedures to ensure achievement of project objectives on time and at the expected quality.
- This type of hazard risk mitigation and emergency preparedness project should continue. The beneficiaries see it as a model project that could be scaled up, building on new hazard risk data, risk mitigation techniques, and other project outputs.

# Component D: Risk Reduction of Mining Accidents in Tisza Basin

- To ensure project success, commitment of the main stakeholders needs to be in place at all levels.
- Maintain close coordination with the Implementation Support Committee (interested stakeholders) to ensure the quality and relevance of project deliverables and avoid any duplication of activities.
- Rubinia Acacia, the trees planted on all sites remediated under the project, have a high rate of survival and growth, and can be used successfully at other remediation sites.
- An understanding of international practices (best available techniques) for tailings dams/waste dumps development, operation, and closure on the part of designers, mine operators, contractors, and engineers is crucial for reducing the risk of mining accidents.
- Component D project results can be replicated worldwide.
- Continuity of the PMU staff responsible for project oversight, management, and implementation is a key factor in project success.
- Including penalties in consultancy contracts is necessary to prevent delays in the delivery of services.

# Annex 8. Comments of Cofinanciers and Other Partners/Stakeholders

N/A

# **Annex 9. List of Supporting Documents**

- Project Implementation Plan
- Project Appraisal Document for Romania: Hazard Risk Mitigation and Emergency Preparedness Project (HRMEP) dated April 19, 2004 (Report No: Report No: 28217 RO)
- Aide Memoires, Back-to-Office Reports, and Implementation Status Reports.
- Project Progress Reports.
- Borrower's Evaluation Report dated November 2012

\*including electronic files

# **Annex 10: Calculation of Weighted Rating**

# Table 1Before Restructuring

Comp		Withdrawn	Ratings		Weighted
Comp.	Loan Amount	from Loan			Rating
Α	12,474,000	5,240,665	MU	2.5	0.21
	8%	42.0%			
В	56,928,000	30,417,421	MS	3.7	1.40
	38%	53.4%			
С	74,960,000	63,631,238	S	5	2.50
	50%	84.9%			
D	5,638,000	2,710,676	MU	2.7	0.10
	4%	48.1%			
TOTAL	150,000,000	102,000,000	MS		4.21
		68.0%			

# Table 2

		Before	After	Overall
		Restructuring	Restructuring	
1	Rating	Moderately	Satisfactory	
		Satisfactory		
2	Rating value	4	4	
3	Weight (%	68%	32%	
	disbursed			
	before/after			
	restructuring)			
4	Weighted	2.72	1.60	4.32
	value (2 x 3)			
5	Final rating			Moderately
	(rounded)			Satisfactory

Value for each rating: *Highly Satisfactory*=6, *Satisfactory*=5, *Moderately Satisfactory*=4, *Moderately Unsatisfactory*=3, *Unsatisfactory*=2, and *Highly Unsatisfactory*=1

