



**United Nations Disaster Assessment & Coordination
(UNDAC)**



**Assessment and recommendations following the
Gerdec Explosions
Albania
20 March – 3 April 2008**

8 April 2008

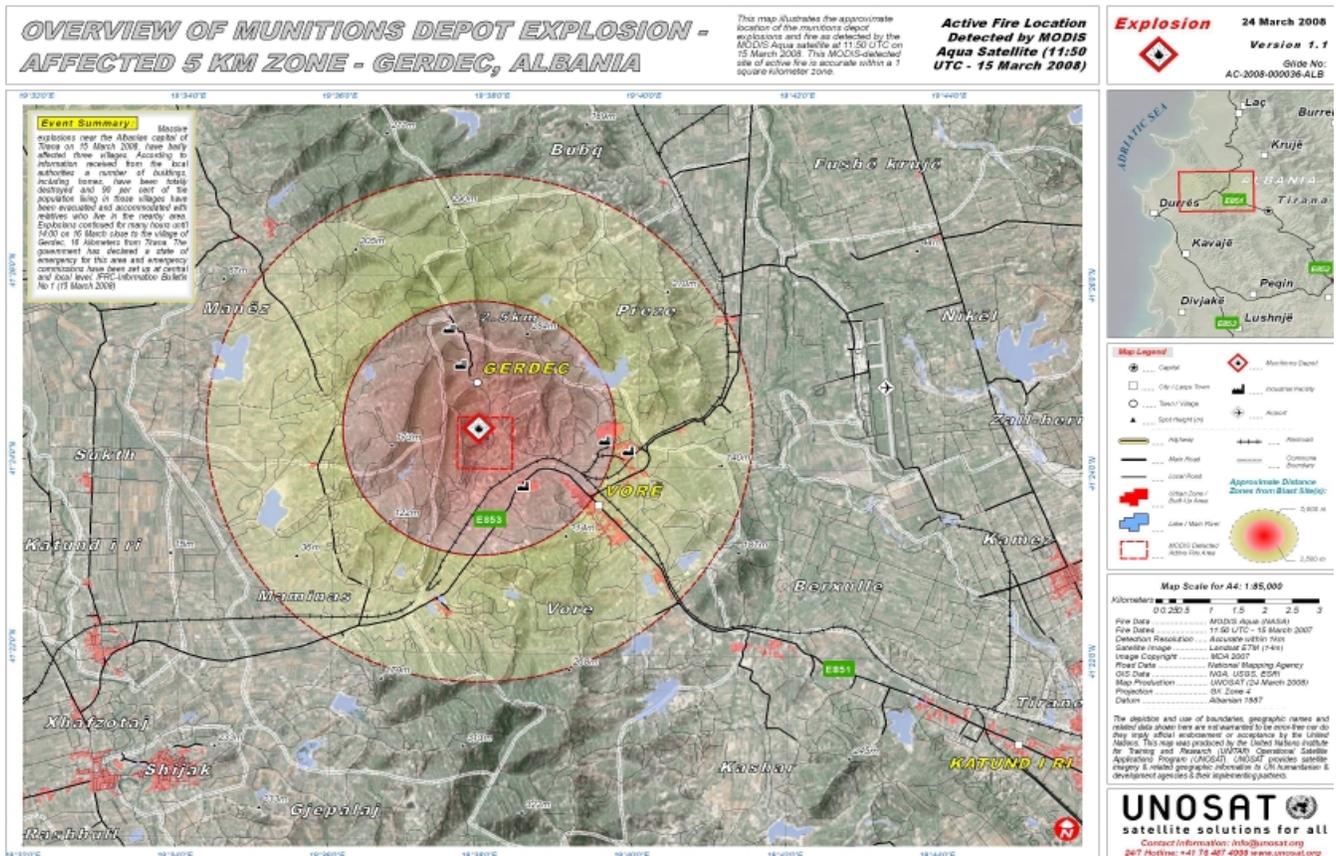
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Background Information

An explosion occurred at a munitions decommissioning facility on Saturday 15 March 2008. The factory was located in the village of Gerdec in the Municipality of Vore, approximately 15 km west of Tirana. On site, there was an ongoing program to dispose old military ordnances.

The powerful blasts sent artillery and mortar shells over nearby residential neighborhoods destroying houses and shattering windows across the villages of Gerdec, Marqinet, Marikaj and the city of Vore. Many secondary explosions continued through the night until the early hours of Sunday.

The Government declared the zone a 'Disaster Area' and advised that inhabitants would not be allowed to return until the area was deemed safe. The Durrës-Tirana highway was also closed to traffic whilst authorities assessed the situation. It was later reopened on Sunday morning when secondary explosions had diminished.



The affected area has been divided into three zones:

1. High Risk zone, centered on the explosion site – 0.8 km²
2. Medium Risk zone, contaminated with UXO - 2.7 km²
3. Low Risk zone - 12 km².

The unexploded ammunitions and shell casings dispersed throughout the surrounding areas up to 2.7 km pose a threat to the safety of the people living in the affected zones.

According to the Government of Albania (GoA) approximately 10,000 people have been affected of which 4,000 had to be evacuated from the area. 678 people have been temporary relocated to Government owned facilities and the remainder are hosted by friends and relatives.

Some of the most severely injured were evacuated to Italy, Switzerland and Greece for medical treatment. As of the 06 April 2008 information from GoA shows the following casualties:

Deaths	26 + 1 declared lost*
Injured	approx. 300

*Mol figures

According to official figures from the Agency for Legalization, Urbanization and Integration of Informal Constructions in the Republic of Albania(ALUIZNI) and the “National Housing Entity” on 30 March 2008, a total of 4,143 houses and businesses are reported damaged, with details as follows:

Destroyed	308
Heavily/partially damaged	3835

The explosion damaged also other infrastructures, such as water and power supply networks, roads, public buildings, schools, kindergartens and health centers.

Mission Objectives

During an extraordinary Security Management Team (SMT)/United Nations Country Team (UNCT) meeting held on 17 March, it was agreed that an offer of an UNDAC advisory team would be made to the GoA in order to assist the Government in coordination and support the assessment of short and medium term needs.

The deployment of the UNDAC team is in accordance with the National Civil Emergency Plan of Albania (NCEP) 2004 which states:

“The IMC [Inter Ministerial Committee] maintains a coordinating role with appropriate line ministries, departments and monitoring institutions. The IMC, National Head of Operations and Department of Civil Emergency Planning and Response will be supported by the UNDAC Team, if deployed in the country”;

And that

“For extreme scenarios, expert international assistance is potentially available via the United Nations Environment Programme (UNEP) via UNDAC. The UN Resident Coordinator facilitates their deployment on request of the government of the affected nation”.

The GoA accepted, the offer of an UNDAC mission and a team was deployed on 20 March 2008. The team was composed of expert individuals with the following tasks:

Team Leader:	Mr. Alois Hirschmugl (Austrian Armed Forces, Austria)
Deputy TL:	Mr. Steffen Schmidt (Danish Emergency Management Agency)
Information Mgt:	Mr. Jonathan Goodwill (Consultant, United Kingdom)
Environmental Expert:	Mr. Muralee Thummarukudy (UNEP, Geneva)
CMCoord Liaison:	Mr. Alessandro Pirrone (Ministry of Foreign Affairs, Italy)
Assessment/Logistic:	Mr. Per-Anders Berthlin (IntOps, Sweden)
Admin and IT Expert:	Mr. Rivo Salong (Estonia Rescue Board, Estonia)

The UNDAC Team met with the UN Resident Coordinator and the UNCT upon arrival. Based on the needs and expectations in the country, and in close cooperation with the UNCT, the following mission objectives were developed:

- to assess the overall situation with a focus on the needs;
- to evaluate the environmental impact of the explosion and provide analysis of samples of soil and ground water;
- to provide coordination support to the GoA;
- to provide the international community, UN and the GoA with short-mid- and long term recommendations.

Meetings

Several meetings were attended during the following days with the Deputy Prime Minister and IMC as well as separate meetings with the Ministry of Interior (Mol), the Ministry of Defence (MoD) and other concerned line ministries. During these meetings, focal points from each of the ministries were appointed and Mr. Alfred Olli, Civil Emergency Department, Mol, was designated as the primary focal point for the UNDAC Team.

An information exchange and coordination meeting was held with most of the EU embassy representatives, World Bank and key representatives from the international community, including Switzerland and USA in Albania.

Regular meetings and daily contact was maintained with the Civil Emergency Department, Mol. These meetings were critical in providing a forum for information sharing between the Albanian authorities and the international community.

The Office of the UN RC and the UN Development Programme (UNDP), in collaboration with the UNDAC Team assisted in strengthening the links between UN Agencies and their respective Albanian counterparts to ensure that an appropriate connection is established between on going projects and emergency related needs.

Links and information exchange were also carried out with implementing agencies such as the Albanian Red Cross and others.

Site visits were carried out with representatives from the GoA as well as visits to Prefects and Mayors of the affected municipalities of Vore and Durres. The team had follow-up meetings with the IMC and the international donor community.

During all meetings the UNDAC Team was met with a great openness and willingness from the government representatives to provide assistance.

Coordination Activities

Following the meetings and a review of the available documentation, it appeared that 5 days after the event the immediate needs were met and the coordination structures of the Albanian authorities seemed adequate to deal with the immediate incident. The emergency phase was declared over by the Mol on 24 March 2008. UNDAC Teams' capabilities to assist in coordination activities were not required.

Information was shared regularly with the NATO Euro-Atlantic Disaster Response Coordination Centre (EADRCC) and the Monitoring and Information Centre (MIC) of the European Commission.

Information Management

Team members conducted meetings as well as research on issues such as reconstruction, re-housing, environment, decommissioning of munitions and capacity building programs in Albania and the Balkan region as a whole.

Situation reports were produced when new information became available, rather than on a scheduled basis.

Minutes of meetings, situation updates, fact sheets and one page documents on priority issues were drafted and are attached to the final report.

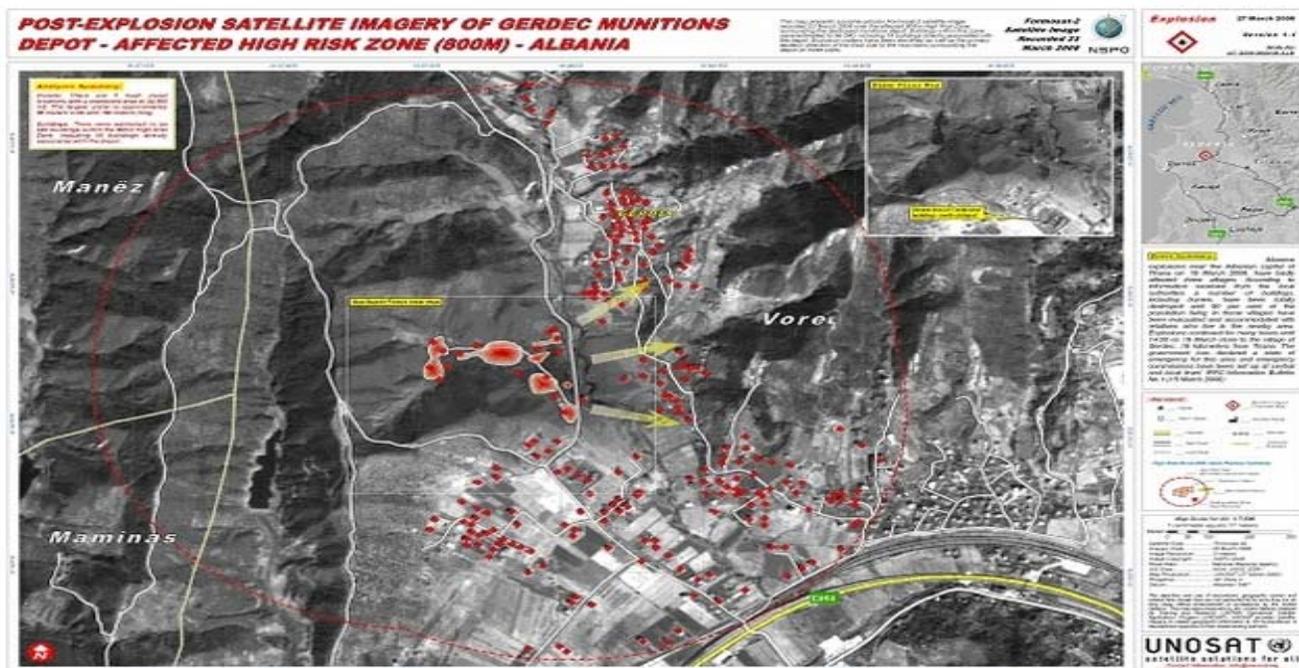
Media relations were handled by the UN RC Office. The UNDAC Team Leader was interviewed by local radio and TV broadcasting corporations. In order to ensure uniform information being disseminated, an UNDAC Fact Sheet was produced and distributed to each UNDAC member.

At the end of the mission meetings were held with all stakeholders – GoA, UNCT and the international community in order to present the findings and recommendations made by the UNDAC Team.

Assessments

The UNDAC Team participated in several joint assessments with representatives from the MoI, MoD, Ministry of Environment (MoE) and UNDP.

The objectives of the assessment missions were specifically to examine the municipal level coordination and response, the coordination between civilian and military authorities, to conduct needs and gaps analysis and impact and environmental sampling.



The various explosions scattered un-exploded ammunition over a large area. The Albanian Armed Forces (AAF) quickly responded with Explosive Ordnance Disposal (EOD) teams which were actively engaged in clearing operations. They were assisted by de-mining teams from DanChurchAid (DCA), Albanian Mine Action Executive (AMAE) and experts from the Italian Army and Sweden acting in an advisory capacity.

EOD activities were focused on clearing the surface of visible unexploded ordnances (UXOs) from the medium and low risk zones. As yet, there is no clear plan on how sub-surface clearance will be conducted in these areas.

The most heavily contaminated area is the factory at the centre of the explosions. Clearing of will require extensive planning and specialist skills. It is estimated that decontamination of the area will take 6 months or more.

Destruction of the houses around the core area varies depending on the distance from the centre, its location in relation to ground zero and the nature of the construction of the original buildings. Constructions are mainly based on bricks, concrete, wood and tiles. Asbestos was not observed in buildings, though splinters of materials looking like asbestos sheets could be spotted along the streets.

A week after the explosion it was apparent that the population was already in the process of returning to clean and repair their houses. Furthermore it was reported by the authorities that there is great pressure from the population to allow for a quick return.

Representatives from the affected families were offered tents on a short-term basis to enable them to remain close to their households. The offer of tents has been accepted by few members of the affected population.

In addition to houses, public buildings such as schools, municipal structures and clinics – including X-ray rooms and laboratories - are damaged and in need of rebuilding and refurbishing.

It was apparent that water and electricity networks were damaged and disrupted. It was, however, evident that repairs had already started. As of 26 March 2008, 50 percent of the power supply system catering for the affected area had been repaired.

Short term housing needs have been met as described in the national response section (see below), however a solution for the medium and long term housing needs is still under development. According to local authorities the estimated time for the reconstruction of permanent houses will be more than one year.

Regarding damages on public objects and infrastructure, assessments carried out from corresponding institutions (see Annex 7)

The GoA calculated the costs associated with reconstructing houses around 17 million EUR – not including the costs for infrastructure rehabilitation.

Considering how a large area has been contaminated with UXOs, it is likely that there will be new UXOs discoveries in the future. To tackle this, UXO awareness and educational material

are being produced by AMAE and the AAF. Additionally, an AAF EOD team will be on stand-by to respond to new discoveries.

It is estimated that to date Albania has approximately 100,000 tones of obsolete or surplus ammunition stockpiled in approximately 26 sites around the country, many of which are in close proximity to residential areas and present a significant danger to the population. Much of this obsolete/surplus ammunition dates back to the Second World War. It is estimated that just nine percent of the ammunition stockpile is less than 30 years old.

According to a report given to the media by the former Minister of Defense, the cost for the decommissioning of the ammunitions has been estimated around 77,8 million USD.

National Response

The NCEP of Albania was produced in 2004 and describes the details of coordination structures and mechanisms. Since 2004 the plan has not been revised even though there have been changes in line ministries' responsibilities and legislative amendments. According to the GoA the institutional and structural changes were reflected, but possibilities and capabilities that exist for their implementation are limited and support is needed.

Consequently, the coordination structures and mechanisms were implemented in an ad-hoc way, not always consistent with what detailed in the NCEP.

The IMC, was activated soon after the incident, chaired by the Deputy Prime Minister.

The AAF and civil authorities cordoned off the area and started the search for victims as soon as it was relatively safe to access zone.

Surface clearing in zone two and three is being carried out in cooperation by the AAF and EOD teams/specialists from DanChurchAid, Italy and Sweden.

Approximately 600 evacuees from the affected areas are housed in three facilities in Durres – two owned by MoI and MoD and a privately owned hotel. The remaining affected population is staying with friends or relatives in the area of Vore according to the authorities and the Albanian Red Cross.

Through the Albanian Red Cross and local authorities, food and non-food items have been made available. Furthermore, trauma counseling, teaching for primary school students and social activities for children have been provided. Secondary school students as well as evacuees who still have jobs are transported from the government facilities in Durres to and from Vore and Tirana on a daily basis.

All immediate emergency needs are catered for at the moment and all necessary relief items are available on the local market.

The Albanian Red Cross has been engaged in a sensitizing campaign for solidarity with the persons affected in Gerdes. 25 voluntaries groups were sent to help the persons injured, and their families, in the Military Hospital and the Hospital of Durres. The Red Cross has given help to issue information for persons lost, giving first aid, assessing needs, and distributing

different articles for population affected from the disaster and until the present the Albanian Red Cross has helped 552 families, 2585 beneficiaries.

The Ministry of Health (MoH) expressed the wish to receive assistance in relation to the mid- and long-term counseling needs. It is the understanding of the UNDAC Team that WHO has such capacity already available in Albania.

The MoH has strengthened the capacity of clinics in Vore – mainly by relocating human resources from the damaged clinics to the remaining ones. According to the MoH the medical treatment capacity is now at the same level as it was before the accident.

As of 27 March 2008, medical care for 17 persons is still provided in hospitals in Albania, while 19 are still being treated abroad.

The GoA, mainly through ALUIZNI, has carried out an initial damage assessment for all affected structures, refurbishing and livestock. The findings were forwarded the National Authority of Housing for economic evaluation. The evaluation was based on market prices. Discussions between the authorities and the affected population concluded that the affected population preferred to receive a cash grant for reconstruction rather than state-organized rebuilding. So far the GoA has decided to provide each affected person with 50,000 LEK (~600 USD), up to 200,000 LEK (~2500 USD) per family. A further 200,000 LEK per person and a minimum of 500,000 LEK per household will be provided for domestic supplies. A special financial contribution was made to families who lost one or more of their members. A total of 156 million LEK has been provided by the government to the affected families as of 28 March 2008.

Medium-term housing for the most vulnerable were catered for in terms of rented houses in Vore and the surroundings.

The overall impression of the team is that the Government and the Albanian Army handled the situation in a competent manner, in spite of the fact that the National Emergency Response Plan had not been fully updated or implemented in response to changes in the central administrative structure of Albania. This and the very dangerous and chaotic circumstances after the explosions meant that the immediate response did not follow a planned and exercised structure and therefore was not very coordinated.

The need for Civil and Military Coordination (CMCoord) training should be explored.

International Humanitarian Response

Immediately after the explosions international assistance was provided as follows (06.04.08):

Austria – provided 800 kg of medical supplies, dressing material, infusion liquids.

Czech Republic – Provided medical supplies.

Denmark – relocated existing in country Danish Church Aid EOD resources to the explosion site. Additionally allocated 40,000 Euro to the Albanian Red Cross for relief activities.

France - provided Antibiotic, Plasma, tents, in total 9 ton materials.

FYROM – provided medical supplies and EOD equipment.

EU Commission – 950,000 EUR pledged.

Germany – provided medical supplies and EOD equipments for AME

Greece – evacuated injured for treatment, provided medical supplies support and 5 EOD packages

Italy – provided medical supplies support and MEDEVAC for 12 injured. Additionally it has provided two EOD personnel to assess the situation with protection and detection equipment.

KFOR – provided 300 blood units

Kosovo – provided 10 EOD specialists and three support staff from the Kosovo Protection Corps.

Macedonia - provided 200 blood units and medicaments as well as EOD equipment.

OSCE – pledged 15,000 EUR for the reconstruction of the clinic in Gerdec.

Rumania - provided 6 medicine boxes and 50 blood units.

Sweden – provided 1 EOD expert.

Switzerland – provided 260 kg of medical supplies (special dressing material, ointments, infusion liquids) and MEDEVAC for 3 burnt persons (plus 1 accompanying) to clinical university hospitals; offered expertise in environmental analysis, HAZMAT team; pledged in the long term support for housing and public building rehabilitation (schools)

USA – offered immediate emergency medical supplies within hours of the explosion to area hospitals and 50,000 USD from USAID to support the Albanian Red Cross relief operation in addition to providing EOD specialists.

United Nations – The UN team in Albania offered the Government the assistance of an UNDAC team; WHO supported the Ministry of Health in setting up and coordinating the post trauma counseling. UNDP deployed two staff working with AMAE to support the coordination efforts of the clearance effort.

Other institutions such as the World Bank are considering offering assistance for the mid- and long-term reconstruction, mainly covering risk and vulnerability analysis and risk reduction.

From the injured people hospitably treated abroad Italy assured transport and medical treatment for 6 persons, Turkey for 1 person and Switzerland for 2 persons injured.

Different countries and organisations provided aid to the Albanian Red Cross:

- From the appeal of the International Red Cross Federation has been guaranteed the fund of 85.000 EURO.
- From the Danish Embassy 40.000 EURO.
- From USAID the donation of 50.000 USD.
- From the Greek Red Cross donation in different materials.
- From the Red Cross of Montenegro the donation in different materials.
- From the German Red Cross a contingent with albumins to the necessities of hospitals.

Environment

The environmental assessment examined the immediate, medium and long term issues associated with the incident. The review was based on interviews with associated individuals, field visits and sampling.

The area around the factory is currently a safety hotspot. However, even after all the ammunitions have been removed, the area should be considered an environmental hotspot. Destruction of buildings and vegetation has created large quantities of solid wastes which need to be cleared and managed. The factory was located on the slope of a hill and drains directly into a small stream. Environmental contaminants from the site are currently draining directly into the river.

There was little understanding among the community or local administration about the nature of the operations being carried out in the factory, its associated risks and certainly its possible environmental risks.

Local government should be assisted, as a matter of priority, with identification of a suitable location for storage and demolition of debris.

The possibility to maximize recycling lies in reusing the demolition debris as construction materials in order to minimize additional quarrying. .

As an interim measure, direct run off of water/sediments from the accident site to the river should be prevented by the construction of bund walls.

A program to increase the awareness of local communities on the risks associated with the industrial activities ongoing in their neighborhoods and appropriate response measures should be promoted countrywide.

Currently there is no organized waste management or landfills in the impacted villages.

The heavy metal analysis has now been completed. Higher levels of mercury, arsenic or lead were not found. The analyses did find copper and iron, but not at dangerous levels. Strips of explosive chemicals (nitrocellulose) were found in the soil samples.

The actual explosive analyses results are attached to this document and will also be send directly from UNEP to the Ministry of Environment (See Annex 3).

Funding and Appeals

As the immediate emergency phase was closed relatively fast, it was decided not to apply for CERF funding and not to launch a Flash Appeal.

However, it results clear that financial support, especially for the rebuilding of houses and infrastructure as well as the decommissioning of the remaining ammunition, will be needed.

Rebuilding of houses	15 million EUR
Rebuilding schools	564.000 EUR
Recovery Health sector	91.000 EUR
Reconstruction of Electricity	224.000 EUR
Infrastructure reconstruction (Water supply, roads, ..)	5 million EUR
Recovery for the green and forests	332.000 EUR
Proposed environmental actions (by UNEP)	9,2 million EUR
Decommission of ammunition	Estimated 50 million EUR (500 EUR/ton)

It is of the utmost importance for the GoA to advise the international community on the national entity that will be responsible for the coordination and management of the international assistance in the aftermath of the explosions. In particular, whether this will be the Mol or the Department of Strategy and Donor Coordination (DSDC) under the Council of Ministers.

Moreover, the Government should clarify whether financial contributions to the GoA should be made through the existing structures using the line ministries – e.g. Mol for the rebuilding of houses; the Ministry of Public Works and Transport for infrastructure rehabilitation or the Council of the Region of Tirana and the Municipality of Vora for projects they have.

A disbursement mechanism should be established and should include an audit from an acknowledged impartial partner – e.g. International Organisation of Supreme Audit Institutions (INTOSAI).

Conclusion and recommendations

It is apparent that the immediate short term needs have been catered for by the Albanian authorities. Consequently, our recommendations concentrate on the medium and longer term needs.

Based on previous studies and analyses carried out by UNDP and DFID in 2004, the Ministry of Interior of Albania and the UNDAC teams' findings, four outstanding priority areas have been identified for the attention of the government with possible support from the international community and the UN. Some of these areas have already been discussed in previous studies but have never been operationalised.

An overall audit and tracking system should be established by the GoA for the potential financial contributions from the international community.

1. Immediate clearing of UXOs in the three identified zones

Obviously the remaining UXOs pose a threat to the returning population and will continue to do so until the entire area has been thoroughly searched. Initial surface clearing is underway and it is reported that sufficient EOD resources are currently in country to achieve this objective. Concerns remain over the capacity of EOD resources to complete sub-surface clearance activities. It is important that all parties produce and disseminate effective UXOs awareness and education materials so that the affected population is sufficiently warned of the dangers of accidentally finding subsurface ammunition if moving back. The GoA should be aware of its responsibility of handling future casualties and damage from explosions of sub-surface ammunition once the residential area is declared safe.

The explosion epicenter remains heavily contaminated and will require at least 6 months to render it safe. In this period it is strongly recommended that a safety zone of at least a 1,000 meter be established to avoid further loss of lives should there be further explosions.

Recommendations:

- **That surface clearance activities in the low and medium risk zones continue with the available resources.**
- **That a plan to deal with sub-surface UXO be developed and implemented including a plan on how to deal with eventual casualties from sub-surface ammunition explosions.**
- **That a clear plan is developed to secure and clean the explosion epicenter.**
- **That comprehensive UXO awareness and education to be produced and disseminated and the population is sufficiently warned of the potential danger of the subsurface ammunition.**
- **That the site to be treated as potentially contaminated until a detailed environmental sampling is conducted.**

2. Decommissioning of surplus/obsolete ammunition

Over the past several years, Albanian authorities have received assistance in the disposal and demilitarization of ammunition stockpiles from several international donors and organizations. With this assistance the Albanian authorities have made significant progress in dealing with this excess/surplus stock of ammunition, including the destruction of Albania's anti-personnel mine (APM) arsenal consisting of approx 1.6 million items and the destruction of a further estimated 100,000 tones of surplus and/or obsolete ammunition.

Ammunition control is included in the UN small arms process and as such it was included in the definition of 'small arms and light weapons' in the report of the 1997 UN Group of Governmental Experts (GGE) on small arms. However, ammunition was not included within the scope of the 2005 UN Instrument on Marking, Recordkeeping and Tracing. Partly in response to this, the UN has established a GGE on surplus ammunition, which is scheduled to meet and report back to General Assembly by December 2008.

The 2008 GGE on Ammunition was established in response to a UN General Assembly Resolution adopted in 2006 that aims to address problems arising from the accumulation of surplus, conventional ammunition stockpiles.

The Albanian MoD has requested the UNDAC mission to carry out an assessment of the existing ammunition stockpiles. While not feasible within the mission's scope, this assessment remains an urgent priority. The UN Resident Coordinator is looking forward to the request from the Government to proceed with UN expertise in this area.

The Albanian authorities have also requested additional international assistance in dealing with the ongoing issue of disposing of surplus ammunition stockpiles.

Albania will continue to depend on further donor support and expertise in order to fully demilitarize remaining stockpiles of surplus and/or obsolete ammunition.

Recommendations:

- **That the international community explore ways to offer further support to the Albanian authorities - expertise in EOD and Ammunition Storage, planning and safely conducting EOD operations at Unexploded Ordnance (UXO) contaminated sites, Logistic Ammunition Disposal operations and the rationalization and establishment of safe ammunition storage.**
- **That the possibility of setting up a Trust Fund Project in the NATO Maintenance and Supply Agency (NAMSA) demilitarization program should be explored.**
- **That the international community should consider financial support for the disposal of surplus and/or obsolete ammunition.**
- **That UNMAS or a similar UN specialized service deploy an expert to assist the Albanian authorities in assessing surplus ammunition stockpiles throughout the country.**

3. Sustainable Reconstruction and Rehabilitation of Housing and Infrastructure

The GoA has carried out an initial damage assessment on all affected structures and is preparing a draft reconstruction and rehabilitation plan. During discussions between the authorities and the affected, it has been concluded that the affected population preferred to receive a cash grant for reconstruction rather than state-organized rebuilding. In these discussions the affected population stated that they, as far as possible, prefer to rebuild their homes at their former location and not to be relocated to an alternative site.

There is a need for temporary accommodation during the period of reconstruction; however more consideration is needed in relation to the alternatives. There have been requests for pre-fabricated temporary shelters. Locations for temporary shelters have also been discussed among the local authorities in Vore, but have not yet been decided.

According to local authorities, the estimated time for the reconstruction of permanent houses will be more than one year. The GoA announced that there is a need for financial support for the reconstruction.

Issues that need to be considered and included in any reconstruction and rehabilitation plan include:

- Reconstruction should be thoroughly linked with livelihood assistance.
- Reconstruction must include studies on infrastructure issues such as water supply though most of the affected houses are relying on water from wells and there are indications that the quality of groundwater in the area has been adversely affected.
- Pre-fabricated temporary shelters are generally considered to be expensive, and once temporary shelters are established there is little incentive to finalize the reconstruction of permanent houses.
- Linking the plan with the existing expertise and knowledge of IOM, UNHCR and other organizations present in Albania.
- A clear description of the system that will be used by the GoA to monitor the support to individuals for re-housing must be included.
- There is an existing project, supported by EC titled "Integrated Development Plan for Tirana and Durres Area" that the plans for rehabilitation should be closely linked to.

Recommendations

- **That the GoA develop a rehabilitation and reconstruction plan for the medium and long term housing needs, including waste management.**
- **That the international community explores ways to support any reconstruction and rehabilitation plan taking into consideration the proposed environmental actions from UNEP (see annex 3).**

4. Capacity building of the National Civil Emergency Response mechanisms including revision of the NCEP.

Albania has developed a national disaster management plan with the support of UNDP and DFID in 2004, and the plan is considered to be a comprehensive one. Unfortunately the plan has not been updated since the latest changes in the central administration of Albania. Certain parts of the plan were followed – especially at the municipal level. According to the GoA the institutional and structural changes were reflected, but possibilities and capabilities that exist for their implementation are limited and support is needed.

The plan could serve as a platform for the improvement of the response system in Albania. However, there is a lack of capacity and training in disaster risk management and policy implementation at the government level. Private sector participation in disaster reduction is also not adequate.

Some of the challenges faced by Albania civil emergencies mechanisms are:

- setting up an integrated communication, early warning and notification system;
- improvement of response capacities at the local level;
- establishing, strengthening and supporting structures for planning, monitoring and operations;
- enhancing capacities of staff at all levels;
- enhancing emergency and trauma treatment capabilities in the health system at all levels;
- community training systems.

The institutional structure for disaster management needs strengthening at the national,, regional and municipal levels. National disaster funds are very small compared to the potential economic and fiscal damages that may be caused by large disaster events in Albania.

Mid- and long-term capacity building of the Albanian Civil Protection system should be based on existing evaluations, assessments and project proposals as well as integrating knowledge from on-going regional activities and studies. For an overview of these, see annex 4.

Since previous initiatives and recommendations have not been operationalised, an implementing body must be identified, established and made sustainable at the highest possible level to deal with the issue.

Of particular importance is the up-coming World Bank project proposal: **Albania - Disaster Risk Mitigation and Adaptation Project component 1(Annex 2).**

Recommendations:

- **The NCEP of Albania needs to be updated and strengthened to reflect changes in legislation and central administration structure, taking in to consideration the**

Concept Paper (18 Measures for strengthening the National Civil Emergency Service System) developed by the Civil Emergency Directorate General.

- **The Albanian Red Cross and other civil society entities and organizations should be integrated in the response system.**
- **An UN short-term position could be considered to support the Albanian Government in this process.**

Acknowledgements

The UNDAC Team would like to express its gratitude to the former Deputy Prime Minister Mr. Gazmend Oketa for making it possible for the team to access all involved Albanian key players from the Albanian central administration. The UNDAC Team would especially like to thank the General Director of the Civil Emergency Directorate General, Mr. Alfred Olli and Mr. Bujar Kapllani.

Line ministries proved to be extremely willing to share information which contributed immensely to the work of the UNDAC Team.

The openness and cooperation of the Resident Coordinator, Ms Gülden Türkoz-Cosslett, the UN Country Team and their staff was highly appreciated by the UNDAC Team. The UNDAC team recognized that the one UN pilot project most likely added value to the good interaction.

Ambassadors from EU countries as well as Switzerland and the USA kindly shared their knowledge and ideas for which the UNDAC Team is very grateful.

Annexes

1. Abbreviations and UNDAC contacts
2. World Bank: Albania - Proposed Disaster Risk Mitigation and Adaptation Project (DRMAP)
3. Explosions at the Gerdec munitions decommissioning facilities in Albania – environmental examination and recommendations
4. Extract of Regional studies and programmes from CMEP and DPPI
5. Links and references
6. Meetings attended
7. Damages on public objects and infrastructure, assessments carried out from corresponding institutions

ABBREVIATIONS

AAF EOD	Albanian Army Forces Explosive Ordnance Disposal
ALUIZNI	Agency for Legalization, Urbanization and Integration of Informal Constructions in the Republic of Albania
AMAE	Albanian Mine Action Executive
APM	Albanian anti-personnel Mine
APELL	Awareness and Preparedness for Emergencies at Local Level
CERF	Central Emergency Response Fund
CMCoord	Civil Military Coordination
DCA	Danish Church Aid
DSDC	Department of Strategy and Donor Coordination
DPPI	Disaster Preparedness and Prevention Initiative
GGE	Governmental Expert
EADRCC	Euro-Atlantic Disaster Response Coordination Center
EOD	Explosive Ordnance Disposal
EU-MIC	European Commission - Monitoring and Information Center
GoA	Government of Albania
HAZMAT	Hazardous Material
IMC	Inter-Ministerial Committee
IOM	International Organization of Migration
INTOSAI	International Organization of Supreme Audit Institutions
ISDR	International Strategy for Disaster Reduction
MoD	Ministry of Defense
MoE	Ministry of Environment
MoH	Ministry of Health
Mol	Ministry of Interiors
NCEP	National Civil Emergency Plan of Albania
NAMSA	NATO Maintenance and Supply Agency
NCEP	National Civil Emergency Plan
OSOCC	On-Site Operational Coordination Center
SMT	Security Management Team
UN	United Nations
UNCT	United Nations Country Team
UNDAC	United Nations Disaster Assessment Coordination
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNHCR	United Nations Humanitarians Committee of Refugees
UNMAS	United System Mine Action Service
UN RC	United Nations Resident Coordinator
UXO	Unexploded Ordnance

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Annex 2

Republic of Albania -

Proposed World Bank Disaster Risk Mitigation and Adaptation Project (DRMAP)

PROPOSED PROJECT COMPONENTS

1. It is proposed that the project could include below described components and activities. Further prioritization in the course of project preparation will be required between the potential activities basing on more detailed costs estimates.

Component 1: Disaster Risk Management and Preparedness (about US\$5 million)

The objective of this component is to strengthen the capacity of government institutions to manage hazard risks and respond to disasters.

2. Based on discussions and together with the relevant agencies, the mission agreed with the government that the project would support building capacity in emergency response through provision of necessary equipment, and strengthening disaster risk mitigation planning.

Sub-Component 1.A. Strengthening Disaster Risk Mitigation Planning and Emergency Management. Under this sub-component, the project will provide assistance to the following critical activities:

- *Development of the National Disaster Risk Management Strategy and Investment Program.* The development of the strategy will involve bringing together all relevant sectors to jointly identify hazard risks and mitigation measures. The purpose is to formulate a prioritized set of key investments in mitigation and adaptation, which could potentially be supported later in the follow-up phase of the project.
- *Legislative Framework.* The government is currently initiating revisions to the Law on Civil Emergency Services of 2001. The project will provide assistance to the development of a new organizational structure for disaster management and completion of the underlying regulatory framework.
- *Public Awareness and Education.* The proposed project will support raising awareness by development of school curricula tailored for disaster risk preparedness and teaching students on how to act in emergencies. Experience from other countries shows that the introduction of disaster awareness to school curricula greatly contributes to overall public understanding on what actions to take before, during and after an emergency.

Sub-component 1.B. Enhancement of Emergency Response Capacity

18. The objective of the sub-component is to strengthen the capabilities of emergency management organizations to respond to disasters and enhance coordination between emergency response agencies.

- *Emergency Response Equipment.* Support will be provided to the purchase of equipment (e.g., fire engines, personal protective equipment, search and rescue tools for specialized response units) for at least one model fire station in Tirana.
- *Improvement of Existing Emergency Operations Center.* Support will be provided for the procurement of equipment (e.g., computers, video displays, communication equipment, etc.) for the national operation center.
- *Feasibility Studies for Establishment of 112 System and Emergency Communications System.* The project will assist in the development of a feasibility study for the creation of an integrated emergency call system, known in Europe as “112.” The support will also be extended to a feasibility study on emergency communications, particularly a radio communications system.
- *Development of Emergency Response Procedures.* Based on the planned revisions of the organizational structure for emergency management, the component will support the development of detailed emergency response procedures to enable prompt and effective interventions in catastrophic events.
- *Exercises and Training for First Responders.* Following the development of operational procedures, the project can finance assistance to organizing exercises, monitoring them and provision of recommendations on corrective actions. The exercises should include all relevant emergency response services, such as civil protection, fire brigades and medical personnel.

Component 2: Strengthening of Hydro-meteorological Services (about US\$2 million)

19. The objective of Component 2 is to support disaster risk reduction through provision of accurate hydro-meteorological forecasts and services tailored to the needs of disaster risk managers in weather-sensitive sectors.

20. Albania faces intrinsically challenging forecast issues. As Albania’s geographic position decrees, precipitation is highly variable from week to week, and from year to year, in the winter months, and can occasionally take the form of very damaging flood events that may form rapidly. Albania’s economy is sensitive to weather and to variability in precipitation, given the importance of agriculture, hydropower and fishery. Albania’s capacity to forecast weather is constrained by the currently depreciated state of the national weather and hydrological monitoring network and by deficient telecoms capacity to deliver data for support of daily forecasting. Nevertheless, Albania has several important assets. In the first place, among its forecasters are teams with very strong scientific backgrounds, who will be able to make good use of a modernized network and rapidly assimilate new techniques when the opportunity arises. Second, Albania has long climate records in some areas (albeit often interrupted) that will help enable it to provide high-quality climatological services.

21. In Albania’s circumstances, significant disaster risk reduction could be achieved through upgrading the capacity to deliver services relevant to risk management: accurate and timely forecasts of severe weather, hydrological forecasts including forecasts of flooding,

preparation of “fire weather” indices for the forestry services, drought monitoring in support of bulletins disseminated by the Ministry of Agriculture, marine forecasts, and models of the dispersion of pollutants in air and water. To achieve these goals, investments are proposed that would meet three objectives:

Sub-component 2.A. Increasing Accessibility of Data

22. This subcomponent would assure that data gathered becomes accessible in a timely way. It would include investments in telecom links to assure delivery to Tirana collected at monitoring stations, re-establishment of robust telecommunication links between Tirana and regional/global data sharing exchange systems, quality-checking of data, digitization of historical data, establishment of a data management system to make present and past data available, and a website to make data and forecasts available. It could include re-invigoration of a calibration laboratory at Tirana headquarters unless arrangements can be made for calibration through cooperation with the national hydrometeorological services of nearby countries.

Sub-component 2.B. Upgrading the Monitoring Network

23. This subcomponent would assure that data available to Albania’s forecasters for disaster risk mitigation is adequate for its purpose. To that end, it would include procurement of measuring instruments needed for Albania’s network of hydro-meteorological monitoring stations, an upper-air sounding station, and a satellite dish to enable the use of satellite data in snow casting storms. It may include procurement of a buoy to measure sea conditions in Durres Harbor. Radar for nowcasting of storms in Tirana would be desirable.

Sub-component 2.C. Developing Capacity to Prepare Forecast Products Tailored to Disaster Management

24. This subcomponent would comprise software, training and computing resources necessary to enhance disaster-related weather services, such as: weather forecasts providing severe weather alerts at higher resolution and longer lead time; long-lead-time alerts concerning flood conditions and snow cover based on forecasts of precipitation, facilitating pre-placement of civil protection infrastructure; fire weather warnings; road weather alerts; marine hazard warnings; and frost/drought alerts for agriculture. Upgraded flood forecasting and preparation of a dispersion model indicating the likely direction of travel of contaminants in air and water would require development of corresponding models. Certain services would be worked out more cost-effectively if undertaken in cooperation with agencies in neighboring countries. For example, marine forecasting to reduce economic losses and loss of life in the Adriatic could be worked out jointly with Croatia, especially through its marine forecasting center in Split. Drought forecasting and climate change projections could be developed via cooperative endeavors with centers in Ljubljana and Belgrade respectively.

25. Since in Albania, apart from the IEWE (organization representing the hydromet services in the World Meteorological Organization (WMO)), there are two other agencies involved in weather monitoring and forecasting (see Annex III). These are the Military Weather Services and the National Air Traffic Agency. All those three agencies should come together to agree on the prioritization of the investments to be supported under the proposed project.

Component 3: Development and Enforcement of Building Codes (about US\$0.5 million)

26. The objective of this component is to reduce seismic risk through development and better enforcement of building codes.

27. Albania has one of the highest seismicity ratings in Europe. Considering that many of Albania's buildings have not been built to construction standards, the impact of earthquakes on the built-in environment is a major concern. To mitigate earthquake risk in Albania, this component will support the development of new building codes harmonized with European standards and their enforcement. It will also support the development of a program to certify and license design engineers.

28. In order to reduce seismic risk the proposed project will support the following:

- *Building Code Development.* This sub-component will provide assistance for the review of building code legislation currently under consideration, focusing on applicable earthquake design requirements. It will also provide assistance for the adoption of EU codes in Albania.
- *Licensing of Engineers.* This sub-component will provide assistance in development of a system to certify, license and review licenses for design and supervision engineers.
- *Training of Engineers.* This sub-component may also support training of engineers in the new, revised building code.

Component 4: Catastrophe Insurance (about US\$2 million)

29. The main objectives of the proposed insurance component of the Loan are three-fold: (i) to provide the Albanian homeowners and SMEs with access to affordable and reliable catastrophe insurance products that currently do not exist in the local market; (ii) enable the government of Albania to reduce its fiscal exposure to natural disasters by transferring its implicit financial responsibility for private losses to the private insurance market; (iii) give a boost to the development of the Albanian non-life insurance market.

30. It is envisaged that the successful implementation of this component will result in a major increase in catastrophe insurance penetration in Albania, where currently only 1 out of 100 homes is insured against the risk of natural disasters.

31. Southeast Europe Regional Catastrophe Insurance Facility. The Catastrophe Insurance component of the project entails the creation of the Southeast Europe Regional Catastrophe Insurance Facility (SEERCIF), which Albania will join as a founding shareholder and member. The facility will be owned by the participating countries of the SEE region, whose representatives will form its Board of Governors.

32. While owned by member states, the facility will be managed by a private insurance services company that will be selected through a competitive and open tender. Distribution and claims settlements will be carried out through locally licensed insurance companies, which will receive insurance commissions for their distribution and claims settlement services.

33. The facility will offer innovative low cost catastrophe insurance products to homeowners and SMEs, which currently do not exist in the traditional insurance market.

34. Albania's expected equity contribution. The original equity capital of the facility is currently estimated at \$35 million. While the exact equity contributions for each member country will be determined based on the number of countries eventually joining the program and the projected volumes of gross premium written in each country, the original contribution of Albania is currently estimated at USD 1.5-2 million. It is envisaged that the government can recoup its original equity contribution to the facility by selling its stake to private investors at a multiple of book value in 5-10 years time.

35. Insurance component costs. The insurance component will finance the following activities:

- *Public Information and Awareness Campaign – US\$0.7 million.*
Carried out by a professional public relations firm, the campaign will promote the insurance products offered by the facility and raise the insurance awareness among businesses and individuals.
- *Government Membership Equity Contribution to the Facility – US\$1.5- 2 million.*
The government equity contribution to the facility can be either directly financed by the government budget or alternatively funded under the proposed Disaster Risk Mitigation and Adaptation Loan.

Component V: Deferred Drawdown Option (about US\$30 million; IBRD)

36. The government has also an option of having access to the contingency funding in a form the Catastrophic Risk Deferred Drawdown Option (Cat DDO) instrument. The proposed Cat DDO will address the country's liquidity needs in the aftermath of natural catastrophes. The availability of the Cat DDO is contingent upon acceptance of the introduction of the new instrument by the Bank Board of Directors which is expected by next month. The new instrument will serve as a flexible and prompt financial tool to address risks to which the country is prone, including natural hazard risks. The proposed Cat DDO will not be included in the Country Assistance Strategy (CAS) lending envelope.

37. The maximum amount of Cat DDO funding constitutes 0.25 percent of the national GDP of the country, which in the case of Albania will be about US\$30 million. The use of funds, i.e., its drawdown, is contingent upon the following: (i) implementation by the government of the disaster risk mitigation program; and (ii) declaration of a national state of emergency in accordance with a process that is acceptable to the Bank.

38. The proposed conditions of the Cat DDO are summarized in Annex I.

REGIONAL ASPECTS

39. The activities discussed in the context of the SEE regional cooperation in the fields of catastrophe insurance, hydrometeorology and early warning, and emergency preparedness and response will be supported through other bilateral and international donors, such as the EU. Consultations with SEE countries, the EC and relevant governments are ongoing.

DISCUSSED IMPLEMENTATION ARRANGEMENTS

40. Project implementation will be streamlined within the structures of four key government agencies which will carry out activities under the components falling under their respective mandates. These will be: Ministry of Interior for Component 1; IEWE for Component 2; MOPWTT for Component 3; and MOF for Components 4 and 5. Being the key entity responsible for disaster management in the government of Albania, the Ministry of Interior will be the leading implementation agency for the project.

PLANNED PREPARATORY ACTIVITIES

41. With the counterpart agencies, the mission discussed next steps in project preparation and agreed that the following will be undertaken:

- The Ministry of Interior will send to the Bank the draft Law on Emergency Management for review and comments;
- The GDCE will prepare detailed list of items that are proposed to be supported by the project and their estimated unit cost; by February 15, 2008;
- The MPWTT will prepare a detailed list of items that are proposed to be supported by the project and their estimated cost; by February 15, 2008;
- Bank consultant will visit Albania in February of 2008 to review with the counterpart agencies and agree on specifics and costs of the proposed activities;
- IEWE should consult other relevant forecasting agencies, i.e., the Synoptic Service (Military Weather Services) and the National Air Traffic Agency to prioritize list of proposed investments under Component 2, which should also lead to the division of responsibilities between those entities in the area of weather forecasting; by February 28, 2008.
- The IEWE will prepare a more-detailed design of Component 2 alternatives in the areas of drought forecasting, hydrological forecasting and other special forecasts, reviewing key options; by February 28, 2008.
- The IEWE will prepare an estimate of the cost of operations and maintenance to enable prioritization among proposed information products (e.g., severe weather warnings, hydrological forecasts/flood warnings, forest fire alerts, frost and drought alerts); February 28, 2008.
- The IEWE will explore detailed terms of cooperation with neighboring centers for preparation of specialized alerts; by February 28, 2008.
- The next Bank mission to pre-appraise the project will be carried out in March 2008.

Appendix A of Annex 2

DETAILED DESCRIPTION OF CATASTROPHE INSURANCE (COMPONENT 4)

The main objectives of the proposed insurance component of the Loan are three-fold: (i) to provide the Albanian homeowners and SMEs with access to affordable and reliable catastrophe insurance products that currently do not exist in the local market; (ii) enable the government of Albania to reduce its fiscal exposure to natural disasters by transferring its implicit financial responsibility for private losses to the private insurance market; (iii) give a boost to the development of the Albanian non-life insurance market.

It is envisaged that the successful implementation of this component will result in a major increase in the catastrophe insurance penetration in Albania, where currently only 1 out of 100 homes is insured against the risk of natural disasters.

Component Design

Southeast Europe Regional Catastrophe Insurance Facility The Catastrophe Insurance component of the project entails the creation of the Southeast Europe Regional Catastrophe Insurance Facility (SEERCIF), which Albania will join as a founding shareholder and member. The facility will be owned by the participating countries of the SEE region, whose representatives will form its Board of Governors.

While owned by member states, the facility will be managed by a private insurance services company that will be selected through a competitive and open tender. Distribution and claims settlements will be carried out through locally licensed insurance companies, which will receive insurance commissions for their distribution and claims settlement services.

The facility will offer innovative low cost catastrophe insurance products to homeowners and SMEs, which currently do not exist in the traditional insurance market. These products will include:

- (i) a stand-alone catastrophe insurance coverage for damages to property and contents caused by such natural perils as earthquake, flood, and possibly landslides. The policy could be bought separately from a homeowners policy from locally licensed insurance companies participating in the program.
- (ii) a stand-alone catastrophe insurance coverage for financial losses sustained by small and medium size businesses due to (i) business interruption; (ii) damages to business equipment and (iii) damage to owned business premises as a result of earthquake, flood (and, possibly, landslides).

The insurance products provided by the facility will be actuarially priced and have no government capital subsidies involved. The premium rates charged by the facility will vary based on the location of insured risks and their vulnerability to natural disasters. It is envisaged that due to its ability to diversify risk regionally, realize economies of scale and due

to cost efficient organization of its operations, the insurance products offered by the facility will be priced competitively.

The facility's' earnings will be used to build its catastrophe reserves and hence increase its financial resilience. It is envisaged that the facility will not pay dividends in the first 5 years of operations.

Albania's expected equity contribution. The original equity capital of the facility is currently estimated at \$35 million. While the exact equity contributions for each member country will be determined based on the number of countries eventually joining the program and the projected volumes of gross premium written in each country, the original contribution of Albania is currently estimated at USD 1.5-2 million. It is envisaged that the government can recoup its original equity contribution to the facility by selling its stake to private investors at a multiple of book value in 5-10 years time.

Regulatory framework. It is envisaged that the facility will be established in Vienna, Austria and regulated by the Office of the Austrian Insurance Supervisor. Taking advantage of the recently adopted EU regulation on the provision of financial services that allows a financial services company established and regulated in one EU country to offer services in any other country of the EU as well as in EU accession countries without being subject to the local regulation, the facility will offer its insurance products in all countries of SEE region. In the case of Albania, the facility will enter into a by-lateral agreement with the Albanian Insurance Commission that will replicate the terms and conditions envisaged under the EU Financial Services Regulation. Under the envisaged agreement, the insurance products of the facility will be admitted into the Albanian insurance market on terms similar to those enjoyed by the facility in the EU countries.

Expected government policy actions. The ability the SEERCIF to considerably increase catastrophe insurance penetration among homeowners and SMEs in the SEE markets will depend on the policy support of participating member states. Hence, countries' membership in the facility will be contingent upon their commitment to adopt a policy framework conducive for the operation of SEERCIF in each respective market. While the exact list of required policy actions will vary from country to country, it is envisaged that the key policy measures to be adopted by the participating states may include, but not limited to:

- (i) requesting mortgage lenders (through appropriate regulatory requirements) to require catastrophe insurance from borrowers for the full value of financed properties in disaster prone areas for the duration of the loans;
- (ii) insuring with the facility all government owned housing stock against the risk of natural disasters;
- (iii) limiting the amount of post-disaster aid to a small fraction of the average insured limit of SEERCIF insurance policy in the domestic market;
- (iv) making availability of post-disaster aid contingent upon availability of SEERCIF insurance;

- (v) investing in domestic public information campaigns to raise the disaster risk awareness among the population and explain the benefits of catastrophe insurance;
- (vi) admitting the insurance products of the facility into the local insurance market;
- (vii) providing all necessary logistical and technical support to facility's consultants to ensure expeditious and successful completion of individual country risk assessments (see below).

Feasibility work. The launch and successful operation of the facility is conditioned upon the completion of extensive technical feasibility studies, the costs of which will be fully covered by grants provided by international donors. Among the key elements of this feasibility work are country specific risk assessments which will enable the facility to price the risks in different countries actuarially. As part of facility membership obligations, member countries will be expected to provide all necessary data, logistical and technical support as well as office space to the consultants that will be carrying out this work.

Institutional arrangements. To discharge its membership obligations, the government of Albania will be expected to form an inter-ministerial working group on disaster insurance consisting of representatives of Ministry of Finance, Insurance Regulatory Commission, the National Bank, and other relevant government agencies. The members of Commission will become the main project counterparts. The Chairman of the Commission will represent the country on the Board of Governors of the facility.

Insurance component costs. The insurance component will finance the following activities:

- Public information and awareness campaign.
Carried out by a professional public relations firm, the campaign will to promote the insurance products offered by the facility and raise the insurance awareness among businesses and individuals.
- Government membership equity contribution to the facility.
The government equity contribution to the facility can be either directly financed by the government budget or alternatively can be funded under the proposed Disaster Risk Mitigation and Adaptation Loan.

Appendix B of Annex 2

OVERVIEW OF HYDROMET SECTOR¹

Benefits of Hydromet Services. As forecasting skill has improved, economic sectors have continually developed the value of the new information. The safety of global **aviation** is fully dependent on weather information for safety and optimization. **Agriculture** makes use of many types of weather information: daily forecasts, extended forecasts, seasonal – whether of temperature, wind, or precipitation, to avert the need for re-sowing of crops washed away by rain, re-application of expensive chemicals blown away by the wind, crops rotting, crops drying, and crops destroyed by frost. **Water resources management** has a growing dependence on weather forecasting to drive hydrological forecasting. **Power generation and distribution** gains in optimality from every increment of forecast skill, whether forecasts of temperature or precipitation, whether they are hourly or seasonal. Environmental **air quality** regulations are more easily complied with when winds and atmospheric conditions are known. **Road transport** in winter is hindered by hazards that are mitigated more cost-effectively when they are better predicted. Better forecasting supports better **emergency preparation**, emergency warning systems, flood zoning, flood insurance, and water management under drought circumstances. **Forests** are better managed when “fire weather” is forecast. **Insurance** companies offer more services at lower cost where weather information is reliable and good forecasts are disseminated. **Construction** is dependent on site-specific climatological data, and when underway it makes use of wind forecasts and forecasts of extreme temperature conditions. **Oil and gas extraction** is more cost-effective when forecasts covering the fields are reliable. **Public health** is increasing its use of seasonal and long-time-scale climate forecasts to improve the effectiveness of public health interventions and to anticipate the impact of climate-sensitive diseases.

Relevance of Forecasting to Disaster Management. Every country in ECA undergoes weather damage from severe events that could be mitigated with better forecasting. Forecasting enables emergency management teams to be put in place, mitigation measures prepared, evacuation undertaken. According to UNISDR, up to 35 percent of flood damage can be mitigated in light of flood warning²; in the U.S., as little as one hour of lead time can result in a ten percent reduction in flood damages³. But public surveys undertaken within ECA within the scope of this study showed that forecasts of severe weather events in ECA’s IDA clients provide little lead time. In three surveyed IDA countries, 25 to 50 percent of respondents found out about severe weather on the day it occurred, compared to six percent in the United Kingdom. During field work conducted within the scope of this review in the commune of Dajç in Shkodra region, an inhabitant of the area that remembers the flood of 2003 stated: “We understood about the flood only in the moment when water entered in our houses.”⁴ Weather events are different from country to country, and so these statistics do not necessarily refer to similar events, but available data suggests a strong need for accurate and effective warnings of severe weather events.

¹ Based on the *Weather and Climate Services in Europe and Central Asia; Regional Review*; World Bank, 2008

² *Guidelines for Reducing Flood Losses*, UN ISDR. 2004

³ *Use and Benefits of the National Weather Service River and Flood Forecasts*, U.S. NOAA – NWS. May 2002.

⁴ Center for Economic and Social Studies (CESS) (2007). *Albania Public Opinion Survey – Severe Weather Warning (SWW)*. Study undertaken for the World Bank.

Capacity Requirements – Basic Forecasting, Nowcasting, Transboundary Data.

Management of severe weather emergencies requires first of strong basic forecasting, the capacity to forecast temperature, precipitation and wind in the short and medium term (one to seven days) at high accuracy and spatial resolution. Beyond basic forecasting, disaster management has an incremental concern for accurate “nowcasting” – forecasting over the period 0 to six hours. Nowcasting makes use of radar, upper-air sounding, stream gauge data (ideally reporting automatically in real time), capacity to undertake national weather and hydrological modeling capacity at high resolution and rapidly, and effective telecoms linking the national network of weather stations to headquarters. Forecaster workstations are required to enable forecasters to assemble information, analyze it and present tailored and updated forecasts rapidly.

Finally, some disaster management issues, such as forest fire and pollution, make critically important use of satellite data.

Prerequisites for Benefit – User-Tested Dissemination. Upgraded capacity to forecast severe weather will have no benefit if alerts are not effectively disseminated. In the surveys of severe weather warnings just noted, respondents considered the importance of better accuracy in alerts, longer lead time, various channels of dissemination, clearer visual formatting, and more directive advice to accompany warnings. A few key findings follow:

- Most people receive warning of severe weather from commercial television if at all.
- Even where people do not think that weather forecasts are reliable, they still attend to them closely, are interested and respond to them.
- There is a strong demand for warnings that are more accurate and provide more lead time.
- There is a strong interest in warnings supplemented by advice on how to handle the upcoming weather and its expected effects on transport.

In addition to provision of severe weather warnings, other disaster management services can be provided by NMSs: support for land use planning and zoning, support for development of national disaster strategies, and support for climate change adaptation among others.

Table1. ECA NMHS Capacity in Key Areas

(data from 2005 country profiles, updated)

Country	Subregion	Operational LAM tailored to national airspace	Launch at least one radiosonde daily	Operating at least one met radar	NMHS assessment of adequacy of telecoms
Serbia	SEE	1	1	1	1
Croatia	SEE	1	1	1	1
Bulgaria	SEE	1	1	1	0
Macedonia	SEE	1	1	1	0
Albania	SEE	0	0	0	0.5
Montenegro F	SEE	1	0	0	1
Bosnia	SEE	0	0	0	1
Russian Federation	Russia	1	1	1	1
Ukraine	EuCIS	0.5	1	1	1
Belarus	EuCIS	0.5	1	1	1
Moldova	EuCIS	0.5	0	0	1

Armenia	Cau	0	1	1	0.5
Azerbaijan	Cau	0	1	1	0
Georgia	Cau	0.5	0	1	0
Uzbekistan	C Asia	0	0	1	0.5
Kazakhstan	C Asia	0	1	0	0
Tajikistan	C Asia	0	0	0	0
Turkmenistan	C Asia	0	0	0	0
Kyrgyz Republic	C Asia	0	-	-	0

LEGEND

LAM score: 1 denotes operational LAM tailored by NMHS; 0 for no LAM; 0.5 for other cases. See Annex 4.2, Table 1.

Radiosonde score: 1 denotes scheduled launch of 1 radiosonde daily, even if it does not occur or is not shared.

Radar score: 1 denotes for operation of a met radar by the NMHS.

Telecoms score: From NMHS description of adequacy of telecoms, indication that telecoms are substantially adequate (1); indication that telecoms are significantly deficient (0); other cases (0.5). See Annex 4.2, Table 2.

Hydrometeorology in Albania Albania is a country where meteorological and hydrological hazards have a great impact on the environment and economic activities. Floods, strong winds, droughts, heavy rains, avalanches are frequent and destructive phenomena. Agriculture is one the most important sectors of the economy, contributing more than 24% of GDP and 58% of employment in 2004. Agricultural production is very depended on weather conditions, yield fluctuations are $\pm 40\%$ for corn, $\pm 50\%$ for olives, $\pm 30\%$ for fruits. Energy sector is also very important as it accounts for about 10% of GDP. Albania is almost exclusively reliant on hydropower production. Unfavorable weather conditions affect the amount and seasonality of flow in most rivers, which in turn affect the amount of electricity production and the timing of power generation. It is estimated that 20% reduction in natural water runoff causes a reduction in power generation of 60%, whereas a 20% increase gives an increase in generation of 40%. Transport (10% of GDP), construction (9% of GDP) and tourism are major economic sectors which are weather dependent. Assessment of economic losses from the extreme weather events gives a range of USD 32-42 million (2000 prices) which is close to one percent of GDP (see also Chapter Five).

Albania faces intrinsically challenging forecast issues. As Albania's geographic position decrees, precipitation is highly variable from week to week, and from year to year, in the winter months, and can occasionally take the form of very damaging flood events that may form rapidly. Albania's economy is sensitive to weather and to variability in precipitation, given the importance of agriculture, hydropower and fishery. Albania's capacity to forecast weather is constrained by the currently depreciated state of the national weather and hydrological monitoring network and by deficient telecoms capacity to deliver data for support of daily forecasting. Nevertheless, Albania has several important assets. In the first place, among its forecasters are teams with very strong scientific backgrounds, who will be able to make good use of a modernized network and rapidly assimilate new techniques when the opportunity arises. Second, Albania has long climate records in some areas (albeit often interrupted) that will help enable it to provide high-quality climatological services.

Three hydrometeorological agencies in Albania have tasks related to disaster risk reduction. **First**, the Institute of Energy, Water and Environment (IEWE) has the mandate to provide early warning of severe weather in support of the Civil Emergency Directorate of the Ministry of the Interior. As well, IEWE operates specialized weather stations that, *inter alia*, support hydrological modeling, study of marine hazards and air quality, preparation of agrometeorological bulletins relevant to drought management, and could support analysis of

climate trends. In the past, IEWE has designed construction standards incorporating climatology (the effects of wind stress, temperature, and so on). **Second**, Military Weather Services has the mandate to provide early warnings to the military, and to provide Albania's official weather forecasts. To that end, it operates basic weather stations that report daily. This service operates 24 hours/day, 7 days/week, and tapes weather forecasts for state radio and television. **Third**, is the National Air Traffic Agency supplies forecasting in support of the International Airport. Despite the narrowness of the audience for aviation forecasts, such forecasts require knowledge of the upper atmosphere not only at the airport but over Albanian airspace. Accordingly, this agency has an interest in effective monitoring nationwide, especially for upper-atmosphere sounding, an expensive task that would support fulfillment of all three agency mandates.

While the aviation forecast task is readily distinguishable, the distinction between the other two agencies' tasks is more complex. Past technology may have lent itself to a distinction between routine daily monitoring and forecasting versus specialized efforts, but today the agencies' different approaches are converging, and comprise complementary aspects of a forecasting effort that addresses national needs. Operating separately, these agencies are each data-short, possess some but not all skills needed to support public needs, and benefit from the support of different partners in international cooperation. But in a cooperative future, the climate stations of IEWE could very readily and usefully be adapted for continuous reporting; on the other hand, the official forecasts of the Military Weather Service could usefully incorporate delivery of more-resolved, longer-term model-based forecasts tailored to support the different regions and regional economies of Albania, from agricultural to marine, forecasting for snow-bound mountains and flood-prone plains, to support effective hydropower production, fire suppression, environmental protection, and the safety of road and rail transport. A joint effort would combine these agencies' considerable strengths to great effect.

An agreement between all three agencies seems to be desirable in order to lay the groundwork for cost-effective improvements in forecasting for the national interest.

In Albania's circumstances, significant disaster risk reduction could be achieved through upgrade of capacity to deliver services relevant to risk management: accurate and timely forecasts of severe weather, hydrological forecasts including forecasts of flooding, preparation of "fire weather" indices for the forestry services, drought monitoring in support of bulletins disseminated by the Ministry of Agriculture, marine forecasts, and models of the dispersion of pollutants in air and water.



Explosions at the Gerdec munitions decommissioning facilities in Albania – environmental examination and recommendations

Background

On Saturday 15 March 2008, at approximately 12.30 noon, a serious explosion occurred at a military ammunition depot in Gerdec, near Vore village (14 kilometers from Tirana). The accident occurred during an ongoing programme to destroy old military ordnance. Many secondary explosions continued through the night. Thousands of artillery shells, mortar shells, grenades, and small arms ammunition litter the area. Some of the unexploded ordnance, dating from World War II, was scattered up to a 5km radius from the explosion site. There is a stock of some 130,000 tonnes of 40-50 years old ammunition in dumps around the country. Destroying the ammunition has been identified as a serious problem

The area of Vore village and the surrounding area support approximately 10,000 residents. The area is declared a 'disaster area' by the military. Some 4,000 residents living in the area were evacuated and offered shelter in state-owned resorts near Durres port.

An environmental expert from UNEP was deployed to the location, along with the United Nations Disaster Assessment and Co-ordination Mission.

Scope of the Assessment

The environmental assessment was based on site visits and discussions with people involved in the response to the crisis. It was clear that the site had significant quantities of range of ammunition prior to its explosion as demonstrated by the power of the blast and the remaining quantities of ammunition left at site. Samples of soil and run off water were taken for analyses to study the gravity of the issue.

Due to the sensitivities associated with the issue, it was not possible to meet anybody who was knowledgeable about the precise activities which were ongoing at the site, the type of ammunition and chemicals which were present at the site prior to explosion. Also as the center of the explosion (Ground Zero) is still strewn with un-exploded ordnances which could explode any time, detailed sampling was not advisable. The recommendations given are therefore based on the visual observations, limited sampling and taking a pre-cautionary approach to the issue.

Environmental Issues

The epicenter of explosion is still littered with 100s of pieces of exploded and unexploded ordnances which has not been sterilized. It is certain that there is chemical contamination in the area from explosives residues, heavy metals and propellants. However, the extent of such contamination can only be ascertained after the area has been cleared of the immediate safety risks.



In addition to the immediate ground zero zone, areas within about 100 meters around is also littered with ammunition residues on the upper side of the hill. On the lower side, heavy rain is causing the soil from ground zero to run off into the agricultural fields, possibly contaminating the same.

The explosions have destroyed up to 800 houses fully or partially. This will create demolition debris which needs proper handling. Currently there is no organized waste management or landfills in the impacted villages. Unless it is created, the waste will be dumped in any open area.

Construction is mainly based on bricks, concrete, wood and tiles. Asbestos was not observed in buildings though splinters of materials looking like asbestos sheets could be seen in the street. This needs further investigation.

The shock wave and probably heat destroyed vegetation in the area immediately surrounding the ground zero. This is a small area however.

Results of Sample Analysis

The sampling was undertaken with a view to investigate the following possible contamination;

1. Explosive residues
2. Propellant residues
3. Contamination of soil from heavy metals used in the shell
4. Potential presence of phosphorous at the site from weapons

Three sample of soil were collected for analyses. Two samples from the middle of the explosive zone and one a background sample about 500 meters from the center.

Results are presented in Appendix I and II. The key findings are;

1. Residues of propellant nitroglycerine were mixed with soil and metal pieces in the samples from ground zero. This shows that there is still unburnt propellants in ground zero adding to the safety risk
2. The predominant explosive at the site was Tri Nitro Toluene (TNT)
3. Traces of explosive RDX (Hexogen or cyclotrimethylene-trinitramine) was also present in the samples
4. The phosphorous levels detected were comparable to background levels, indicating there was no phosphorous related contamination at site.



Recommendations for Immediate Follow up

1. The sampling results showed the presence of both TNT and Nitroglycerine at the ground zero. The site should therefore be treated as contaminated and a very comprehensive environmental site assessment should be undertaken. This can only be done once the safety hazards from unexploded ordnances are removed.
2. In the meanwhile, a small earth bund to be built around the ground zero to ensure that the potentially contaminated soil does not run off into the nearby agricultural fields and to the nearby river.
3. The wells from the nearby houses should be sampled periodically to verify if there is movement of contaminants through the ground water
4. A central location should be identified for collecting all the demolition debris.
5. Recycling to be encouraged, including looking at options of creating aggregates/sand from further crushing of the debris
6. If chemical analyses from the soil indicate contaminants, further urgent follow up action to restrict the contaminant migration will be recommended

Recommendations for Medium Term Follow up

1. As soon the ground zero area is fully made safe, a comprehensive site assessment should be undertaken to identify the nature and extent of soil and ground water contamination.
2. Based on the results of such assessment a decision has to be taken on clean up of the site and making zoning restrictions in the ground zero and adjacent areas for human habitation/agriculture
3. As there are reports of other municipalities in Albania which faces similar threat, an awareness programme for the community on the safety risks and response planning for local authorities would be appropriate.



Costing of the Proposed Interventions

SI #	Proposed Action	Cost Estimate in US\$
1	Creating a bundwall around ground zero to prevent soil run off	200,000
2	Establishing landfill to receive and recycle demolition debris	1,000,000
3	Monitoring of groundwater in the nearby houses and river	100,000
4	Detailed contaminated site assessment of ground zero	1,000,000
5	Clean up of the contaminated soil at ground zero, if needed	10,000,000
6	Awareness campaign among communities on risks posed by UXOs	250,000
7	A capacity building programme for local authorities for responding to technological emergencies	2,000,000
	Total Estimate	14,450,000 US \$

Bachema AG
Analytische Laboratorien

Objekt: Sprengstoffabrik Albanien
Auftraggeber: UNEP
Auftrags-Nr. Bachema: 20081470

Probenbezeichnung	G0-L	G0-R	Background (BG)			
Proben-Nr. Bachema	7668	7669	7670			
Tag der Probenahme	22.03.08	22.03.08	22.03.08			

Probenparameter						
Angelieferte Probemenge	kg	<1,5	<1,5	<1,5		

Physikalisch-chemische Parameter						
Trockensubstanz (105°C)	%	79.2	83.3	85.0		

Elemente und Schwermetalle						
Kalium (gesamt) XRF	mg/kg TS K	17500	17100	16700		
Phosphor (gesamt) XRF	mg/kg TS P	460	440	630		

Organische Parameter						
GC-Fingerprint		s. Anhang	s. Anhang	s. Anhang		

Sprengstoffe						
1,3-Dinitrobenzol (TS)	µg/kg TS	<100	<100	<1		
1,3,5-Trinitrobenzol (TS)	µg/kg TS	<100	403	1		
2,4-Dinitrotoluol (TS)	µg/kg TS	117	149	2		
2,6-Dinitrotoluol (TS)	µg/kg TS	<100	<100	<1		
2,4,6-Trinitrotoluol (TNT) (TS)	µg/kg TS	17200	69700	67		
2-Amino-4,6-Dinitrotoluol (TS)	µg/kg TS	364	884	9		
4-Amino-2,6-Dinitrotoluol (TS)	µg/kg TS	386	1420	13		
2,4-Diamino-6-Nitrotoluol (TS)	µg/kg TS	<100	<100	<1		
2,6-Diamino-4-Nitrotoluol (TS)	µg/kg TS	<100	<100	<1		
Tetryl (TS)	µg/kg TS	<100	<100	<1		
Hexogen (RDX) (TS)	µg/kg TS	284	239	<1		
Octogen (HMX) (TS)	µg/kg TS	<100	<100	<1		
PETN (TS)	µg/kg TS	<100	<100	<1		
Nitroglycerin (TS)	µg/kg TS	<1000	<1000	<10		
EGDN (TS)	µg/kg TS	<1000	<1000	<10		
Diphenylamin (TS)	µg/kg TS	8340	<100	<1		
N-Nitrosodiphenylamin (TS)	µg/kg TS	3040	<1000	<10		

Externe Analysen						
Kohlenstoffgehalt (CHNS)*	%	1.00	1.70	1.90		
Wasserstoffgehalt (CHNS)*	%	0.90	0.80	0.60		
Stickstoffgehalt (CHNS)*	%	0.20	0.20	0.20		
Schwefelgehalt (CHNS)*	%	0.024	0.099	0.082		

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(Wasser,
Boden, Abfall).
Akreditiert nach
ISO 17025/STS
Nr. 084

Spiez Laboratory, 02.04.2008

Order : UNEP Albania (UA-2008-13)

Soil Samples : Gerdez; 22.03.2008

Samples GO-L, GO-R, Background

Element Screening Analysis

(EPA 3051 - Leaching)

Sample /Element	Concentration / mg/g		
	GO-L	GO-R	BG (background)
V	50	52	38
Cr	120	130	91
Mn	775	759	729
Fe	35100	33100	21900
Co	24	26	21
Ni	134	149	118
Cu	65	86	36
Zn	68	154	51
As	6	6	5
Sr	32	66	52
Y	26	25	30
Cd	<2	<2	<2
Sb	<2	<2	<2
Ba	88	121	72
La	18	17	14
Ce	45	42	37
Hg	<2	<2	<2
Pb	26	43	17
U	<2	<2	<2

Remark

Uncertainty of the result (p = 0.95) : ± 20%

Annex 4

A number of regional activities and initiatives are already in place or being implemented in Albania:

CMEP

Civil Military Emergency Preparedness Council (CMEPC): The Civil Military Emergency Preparedness Council, previously known as the Civil Military Emergency Planning Council for South Eastern Europe (CMEPC SEE), was formalized in 2001, with the participation of Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Slovenia, Romania and Turkey. Bosnia and Herzegovina is chairing the Council this year (2007); and Serbia and Montenegro are presently observers, and are likely to become members by the end of the year. The objective of the Council is to act as a consulting and coordinating body for regional cooperation in disaster management. The Council advocates for the development of common standards and procedures to be used by all the nations of the SEE region for planning and response to regional disasters and emergencies. Focusing on transboundary cooperation, the Council has drafted an agreement for facilitating border crossing procedures during emergency. The Council envisages developing and maintaining emergency, response and GIS databases for the region. The GIS database will include such elements as the roads, railways, gas pipelines and airports. The Council aims to open emergency operating centres in all the member countries, and to develop an emergency information network.

Disaster Preparedness and Prevention Initiative (DPPI)

One of the main tasks of DPPI SEE is to bring the participants' political strategies in line with one another, to coordinate existing and new initiatives in the region and, thereby, to help avoid unnecessary duplication of work. The objective of the DPPI SEE is to:

Strengthen good neighborly relations and stability through the exchange of information, lessons learnt and best practices in the field of disaster management.

Enhance cooperation among DPPI SEE partners in view of European Union enlargement and the process of Euro-Atlantic integration for SEE countries.

Support and encourage countries in the region to develop, adopt and/or enforce state-of-the-art disaster emergency legislation, regulations and codes designed to prevent and mitigate disasters in line with guidelines and common practices accepted in the international community.

In July 2005, DPPI SEE was transferred to a regional office in Sarajevo. On 24 September 2007 in Zagreb, government representatives of Albania, Bulgaria, Croatia, Macedonia, Montenegro, Moldova, Romania and Slovenia signed a Memorandum of Understanding (MOU) on the institutional framework of DPPI SEE.

World Bank and International Strategy for Disaster Reduction (ISDR)

the World Bank and the UN/ISDR secretariat, in collaboration with the European Commission, the Council of Europe (EUR-OPA) and Council of Europe Development Bank, the World Meteorological Organization and other partners, are jointly supporting the initiative called, until recently, SEEDRMI, or the South Eastern Europe Disaster Risk Management Initiative. This effort has now changed its name to the South Eastern Europe Disaster Risk Mitigation and Adaptation Initiative (SEEDRMAI). SEEDRMAI aims at reducing the vulnerability of the countries of South Eastern Europe to the risks of disasters. This initiative will form the

foundation for regional and country-specific investment priorities (projects) in the area of early warning, disaster risk reduction and financing, and thereby catalyze additional investments in risk mitigation by national governments, the Council of Europe Development Bank and by World Bank sectoral lending. SEEDRMAI focuses on: (i) hydrometeorological forecasting, data sharing and early warning; (ii) coordination of disaster mitigation, preparedness and response; and (iii) financing of disaster losses, reconstruction and recovery, and disaster risk transfer (disaster insurance). The initiative will build on the cooperation already existing in the region, and will complement and consolidate the activities promoted by the European Union, the Council of Europe, the United Nations, the Stability Pact, the Disaster Preparedness and Prevention Initiative, and CMEPC to promote more effective disaster mitigation, preparedness and response.

Similarly, covering the focus areas III and I of the SEEDRMAP, there are two other upcoming publications "Mitigating the Adverse Financial Effects of Natural Hazards on the Economies of South Eastern Europe: A Study of Disaster Risk Financing Options" and "Strengthening the Hydrometeorological Services in South Eastern Europe".

Annex 5

Links and references

National Civil Emergency Response Plan

UNDAC

<http://ochaonline.un.org/Coordination/FieldCoordinationSupportSection/UNDACSystem/tabid/1414/Default.aspx>

Sphere project

www.sphereproject.org/

Albania – Disaster Risk Mitigation and Adaption Project

<http://web.worldbank.org/external/projects/main?Projectid=P110845&Type=Overview&theSitePK=40941&pagePK=64283627&menuPK=64282134&piPK=64290415>

APELL

<http://www.uneptie.org/pc/apell/>

NAMSA

http://www.namsa.nato.int/demil/namsa_e.htm

Annex 6

Meetings conducted

20 March	21 March	22 March
UN Resident Coordinator	Vice Prime Minister	Mayor of Vore
UN Country Team	GoA line Ministries	Command post Albanian Armed Forces
	Embassies and IO:s	Danish Church Aid
	Ministry of Interior	Local and Regional authorities in Durres
	Ministry of Defence	
	UN Resident Coordinator	

25 March	26 March	27 March
UN Country Team	Albanian Red Cross	Ministry of Public Works and Transport
	Ministry of Education	National Agency for Housing
	Ministry of Health	
	Agency on Legalisation, Urbanization and Integration of Informal Zones (ALUIZNI)	

UN Resident Coordinator	Vice Prime Minister	Mayor of Vore
UN Country Team	GoA line Ministries	Command post Albanian Armed Forces
Albanian Red Cross	Embassies and IO:s	Danish Church Aid
Ministry of Education	Ministry of Interior	Local and Regional authorities in Durres
Ministry of Health	Ministry of Defence	Ministry of Public Works and Transport
Agency on Legalization, Urbanization and Integration of Informal Zones (ALUIZNI)		National Agency for Housing

Annex 7

Damages on public objects and infrastructure, assessments carried out from corresponding institutions*:

- From the assessment carried out, from the Ministry of Education, regarding damages caused on schools the damage is calculated 68 million ALL as below:
 - Damages caused on school objects in Tirana is calculated 37 million ALL.
 - Damages caused on school objects in Durres is calculated 31 million ALL.

- From the assessment carried out, from the Ministry of Health, regarding the health system, it is resulted that the financial value for their recovery is 11 million ALL, detailed as below:
 - Damages caused on health facilities are 6.5 million ALL.
 - Damages caused on furniture are 2 million ALL.
 - Damages caused on health equipments are 2.5 million ALL.

- From the assessment carried out from the Albanian Corporation Electricity for the sector of energetic the total evidence of the damages is 27 million ALL detailed as follow:
 - Distribution network (high tension pylons, isolators, wire), in the amount of 16 million ALL.
 - Electricity grids in the amount of 11 million ALL.

- From the assessment regarding operational forces and some information for the area clearing operational forces:
 - Every day, in the operation zone, there have been working about 500 forces, out of these: 70 Albanian EOD forces, 24 EOD forces from the AMAE Danish private companies, 13 EOD forces from the Kosovo Protection Troops, 93 security forces, 100 search and rescue forces, 130 supporting forces and 70 State Police forces.
 - Operational forces in terrain have been involved in search - rescue operations, transporting people, giving medical treatment, humanitarian assistance and there were stockpiled and transported 1450 unexploded shells, 300 detonators, 1170 hectare of land in the area affected has been searched and 1180 houses have been controlled and cleared.

- From the assessment carried out from the Ministry of Public Works, Transport and Telecommunication, regarding damages on infrastructure and needs for the recovery of the affected areas, the total amount is 593 million ALL detailed as follow:
 - Considering damages, to recover water supply system it is needed 180 million ALL.
 - Considering damages, to recover canal networks in the area damaged it is needed 150 million ALL.
 - Considering damages, to recover road system it is needed 63 million ALL.
 - Considering the construction of the solid materials depositing facility, houses damaged, excluding the cost where this facility shall be build, it is needed 200 million ALL.

- From the assessment carried out from the Ministry of Environment Forests and Water Administration the evidence for the recovery of the area, regarding the green and forests it is needed 40 million ALL.

*(Source: Mol)