

# Disaster Risk Reduction in International Cooperation:

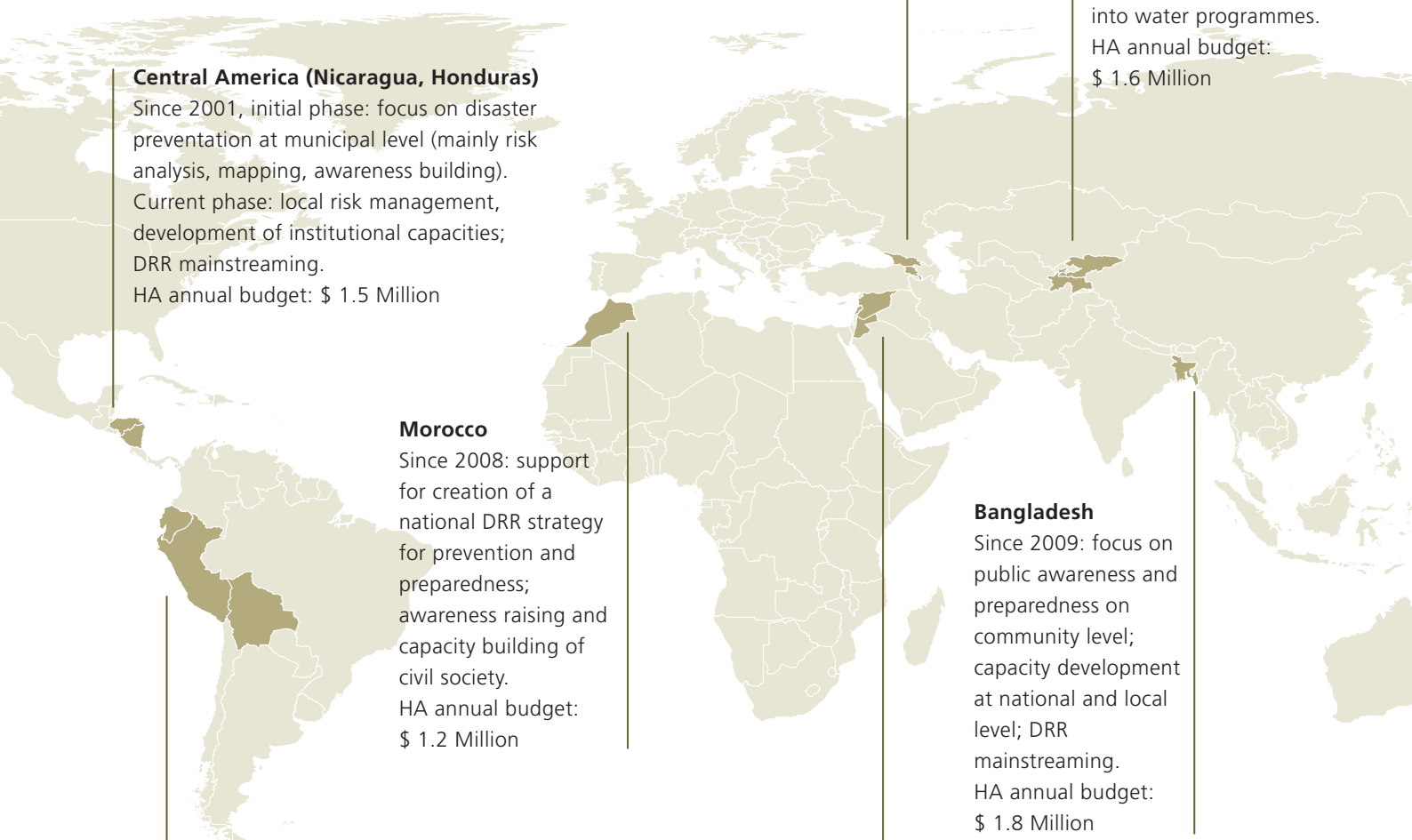
## Switzerland's Contribution to the Protection of Lives and Livelihoods



Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

Swiss Agency for Development  
and Cooperation SDC

# SDC DRR programmes and projects worldwide 2010



## Central America (Nicaragua, Honduras)

Since 2001, initial phase: focus on disaster prevention at municipal level (mainly risk analysis, mapping, awareness building).

Current phase: local risk management, development of institutional capacities; DRR mainstreaming.

HA annual budget: \$ 1.5 Million

## Morocco

Since 2008: support for creation of a national DRR strategy for prevention and preparedness; awareness raising and capacity building of civil society.

HA annual budget: \$ 1.2 Million

## Andean Countries

Since 2003 (initial phase Bolivia, Ecuador and Peru; currently Bolivia): focus on strengthening partners through capacity building (USAR, earthquake resistant constructions); policy dialogue at different levels; DRR mainstreaming.

HA annual budget: \$ 1.5 Million

## South Caucasus (Georgia and Armenia)

DRR programme since 2006 (individual activities since 2002): focus on preparedness of national emergency systems and flood mitigation; since 2008: policy dialogue with national and international partners; DRR mainstreaming.

HA annual budget: \$ 1 Million

## Central Asia (Tajikistan and Kyrgyzstan)

Since 2004. Current phase: DRR awareness, disaster risk management, comprehensive risk assessments. New phase from 2012 onwards: focus on DRR mainstreaming into water programmes.

HA annual budget: \$ 1.6 Million

## Bangladesh

Since 2009: focus on public awareness and preparedness on community level; capacity development at national and local level; DRR mainstreaming.

HA annual budget: \$ 1.8 Million

## Middle East (Jordan, Lebanon, Syria)

Since 2003: Capacity building, awareness raising; regional policy dialogue; DRR integration into development plans.

HA annual budget: \$ 1.5 Million

# Foreword

Today half of the world's population is under threat from the forces of nature – one fifth of the earth's surface is regularly affected by earthquakes, volcanic eruptions, floods, drought, landslides and storms. There are indications that such events are increasingly frequent. Moreover, the effects of climate change are becoming evident.

The negative impacts of such natural events affect increasing numbers of people: 6.9 billion people live on our planet today and, according to UN estimates, this number will have grown to over 9 billion by 2050. Poor and densely populated countries are particularly vulnerable to the forces of nature: existing structures can barely cope with minor events and are completely overwhelmed during major disasters. Thus the prevention and mitigation of existing risks, preparation for possible disasters and adaptation to a changing risk environment constitute life-saving and environment-sensitive measures that must assume a prominent position in comprehensive development programmes in the affected countries.

Prevention and preparedness pay off, although the direct benefit is often not immediately visible. Investments in better expertise in the areas of risk and crisis management, greater awareness among the population and the protection of life, livelihoods and assets are beneficial in the long run.

Enabling countries to attain a higher level of safety is a primary aim of the Swiss Agency for Development and Cooperation (SDC). As a logical consequence of emergency assistance, disaster prevention and preparedness constitute an explicit mandate for the Swiss Confederation's humanitarian aid, and aim to assist affected populations, save lives, alleviate suffering, and to protect the most vulnerable victims. The SDC is committed to promoting and supporting sustainable development, which helps to withstand the forces of nature and improves climatic change adaptation.

The SDC assessed the effectiveness of its DRR commitments in 2010. The assessment provides information about the resources invested by Switzerland for the reduction of risks from natural hazards, the areas in which these investments were made and the results that have been achieved. The focus on DRR is not new, Switzerland started with DRR activities abroad in the early 1980s. DRR is a highly complex, long-term undertaking that demands constant advocacy and the broad-based involvement of numerous actors. The strong involvement of national, local and international partners is indispensable to the success of DRR projects and programmes.

Local and multilateral partners have a major stake in the positive outcome of DRR activities. I would like to express my profound gratitude for their commitment and contribution to the smooth functioning of our partnerships and I thank all of our partners for their ongoing work.



Ambassador Martin Dahinden  
Director-General  
Swiss Agency for Development and  
Cooperation SDC

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# The culture of DRR in Switzerland

## Over 150 years of experience

In the wake of the 1987 floods, which caused damage in excess of USD 1.3 billion, the Swiss public and private bodies had to review their risk reduction strategies. Over 100 years earlier, recurrent disasters had resulted in the passing of robust legislation governing forest and water management. River training and reforestation as well as preparedness measures, such as local disaster management units, rescue brigades and a comprehensive insurance system were implemented consistently. Switzerland was one of the first countries to establish a National Platform on Natural Hazards (PLANAT) in 1997. As a result, the assessment of hazards and risks became operational and risk-conscious development gained in prominence. Integrative disaster risk management based on the well-known disaster risk management cycle follows the principle of subsidiarity: responsibilities are shared between the municipal (main responsibility), state and federal levels, including land and property-owners, civilian bodies and the affected residents.

Thanks to a highly dedicated population, e.g. through the Swiss Solidarity organisation, the principles of prevention and intervention have proven their efficiency from the 19<sup>th</sup> century until today.

## Swiss agencies working abroad

Switzerland's century-long experience in managing hazards and risks and the lessons learned from the disasters of the past 25 years are available to share with many partner countries:

— Government agencies, among them the Federal Office for the Environment (FOEN), the Federal Department of Defence, Civil Protection and Sports (DDPS) and others, collaborate closely with partner organisations in the areas of prevention, mitigation, and preparedness. Scientific institutions<sup>1</sup> provide knowledge and expertise, mainly in the field of risk assessment and monitoring. The insurance sector provides solutions in this field. A number of Swiss NGOs implement specific disaster risk reduction projects in various countries.



— The SDC and the State Secretariat for Economic Affairs (seco) are the government agencies responsible for the implementation of Switzerland's development cooperation and humanitarian aid. Many projects implicitly aimed at reducing risks have been implemented in both the southern hemisphere and the post-Soviet states over the past decades. DRR is one of the four strategic fields of SDC's Humanitarian Aid. The specific approach of „prevention and preparedness“ (now re-named „DRR“) incorporates targeted DRR programmes as well as support for the mainstreaming of DRR into development. Humanitarian Aid maintains a group of professional experts called „Environment and DRR“.

— Within the SDC, the Global Programme Climate Change and the Water Sector are convergent with DRR. The fact that DRR and Climate Change Adaptation follow similar trajectories is increasingly acknowledged. SDC Global Cooperation department maintains strong ties with institutions involved in DRR, including the World Bank and United Nations Development Programme (UNDP). The DRR network facilitates the exchange of knowledge and experience between professionals abroad and at headquarters.

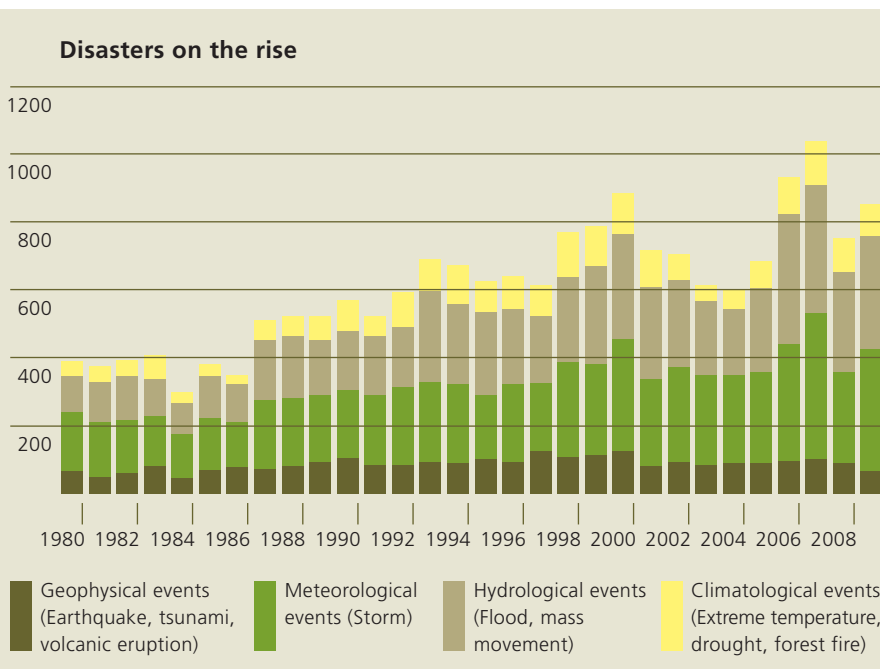
Check dams and reforested areas installed in the late 19<sup>th</sup> century to reduce the risk of debris flows in an alpine torrent  
Location: Lammbach, Schwanden, Switzerland  
Photo credit: M. Zimmermann

<sup>1</sup> E.g. Federal Institutes of Technology in Zurich and Lausanne, Universities of Bern, Zurich, Lausanne and Geneva and various universities of applied science

# Disasters on the rise – a concern for development

The incidence and severity of „natural“ disasters has increased throughout the world. In recent years the cost of the economic damage caused by such disasters has remained at around USD 200 billion per year. Approximately 200 million people are affected each year. These figures have increased dramatically in the last three to four decades. Many factors account for the dramatic rise in economic damage: population pressure, increased land use of hazardous areas associated with high-cost investments, urbanisation, environmental change and, last but not least, climate variability and climate change.

in Uganda, China, and Pakistan have not only caused immense suffering and losses, they have also shone a spotlight on significant shortcomings in the area of disaster risk reduction – in spite of all the efforts made by the international community. Natural disasters must be considered as “development killers” which hamper progress towards the fulfilment of the Millennium Development Goals (MDG). Development gains can be wiped out by a single disaster and the poor are hit hardest. However, disasters must also be considered as „development failures“: disaster risks accumulate through inappropriate development interventions; non-adapted human behaviour alone can turn a natural event into a disaster. Concerted efforts in the area of disaster risk reduction are, therefore, imperative.



Hydro-meteorological events mainly accounted for the increase in the number of natural disasters over the last 30 years.

Source: Münchener Rückversicherungsgesellschaft, Geo Risks Research, NatCatSERVICE

Over the past seven years, the tsunami in the Indian Ocean, Hurricane Katrina, earthquakes in Pakistan, Haiti and Chile, and floods and landslides



School building demolished by the October 2005 earthquake.

Location: Chham, Muzaffarabad District, Azad Jammu Kashmir, Pakistan  
Photo credit: M.Zimmermann

## The International Strategy for Disaster Reduction (ISDR) defines disaster risk reduction as:

„The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.“

## Behind this definition lies the simple overall goal of DRR:

Less damage in terms of human and economic losses and less endangered livelihoods from future natural events.

DRR is a thematic sector in itself. Despite the fact that DRR has often been linked to disaster management rather than development for historical reasons, it is an integral component of sustainable development. Development agencies have been working on reducing vulnerability and increasing resilience for decades. However, it is only in recent years that a more systematic approach has been adopted. Switzerland follows an integrated approach to disaster risk reduction: this requires in-depth knowledge of the prevailing risks (including climate change issues), addresses all stakeholders concerned, applies mitigation, response and recovery mechanisms equally, and is aligned with the principles of sustainability.

# Towards the Hyogo Framework for Action

Prior to the launch of the International Decade on Natural Disaster Reduction (IDNDR, 1990-1999) by the United Nations, the interest in DRR was not very strong. At the end of the decade, the IDNDR secretariat became a permanent UN structure known as the International Strategy for Disaster Reduction (ISDR). Since its inception, Switzerland has provided support for the ISDR secretariat in the form of core financial contributions (approximately USD 1 million per year). Furthermore, Switzerland has seconded senior programme staff and proposed the establishment of and chaired the ISDR Donor Support Group with likeminded nations. Geneva became a DRR hub in the course of the evolution of the ISDR.

At the end of 2004, events took a dramatic turn with the Indian Ocean tsunami, which occurred just three weeks before the World Conference on Disaster Reduction was due to open in Kobe (Hyogo, Japan) on 18 January 2005. The overwhelming consequences of the tsunami catastrophe, which received enormous world media coverage, gave an unexpected boost to the Kobe Conference and led to the approval by 168 nations of the Hyogo Framework for Action (HFA) 2005-2015, which bears the subtitle „Building the Resilience of Nations and Communities to Disasters“. As chair of the Drafting and Main Committees, Switzerland was heavily involved in the shaping of the Hyogo Framework for Action.

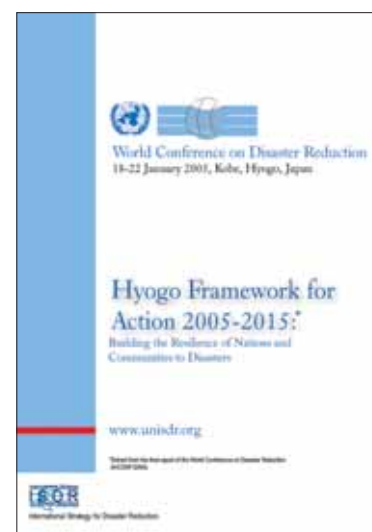
*“Switzerland has been a key player in the International Strategy for Disaster Reduction and Hyogo Framework for Action from the outset. The SDC and the Swiss National Platform for Natural Hazards (PLANAT) have undertaken a number of initiatives to ensure that the international community recognizes that investments in disaster risk reduction can lessen the impacts of disasters, and that prevention is preferable to response. As the host of the Global Platform, Switzerland has played a strong advocacy role in making risk reduction everyone’s business and in advancing the ISDR agenda as a relevant framework for the humanitarian, development, environment and climate change constituencies.”*

Margareta Wahlström, Special Representative of the UN Secretary-General for Disaster Risk Reduction

## Priorities for Action

- 1: Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation
- 2: Identify, assess and monitor disaster risks and enhance early warning
- 3: Use knowledge, innovation and education to build a culture of safety and resilience at all levels
- 4: Reduce the underlying risk factors
- 5: Strengthen disaster preparedness for effective response at all levels

[www.unisdr.org/hfa](http://www.unisdr.org/hfa)





# Prevention pays off



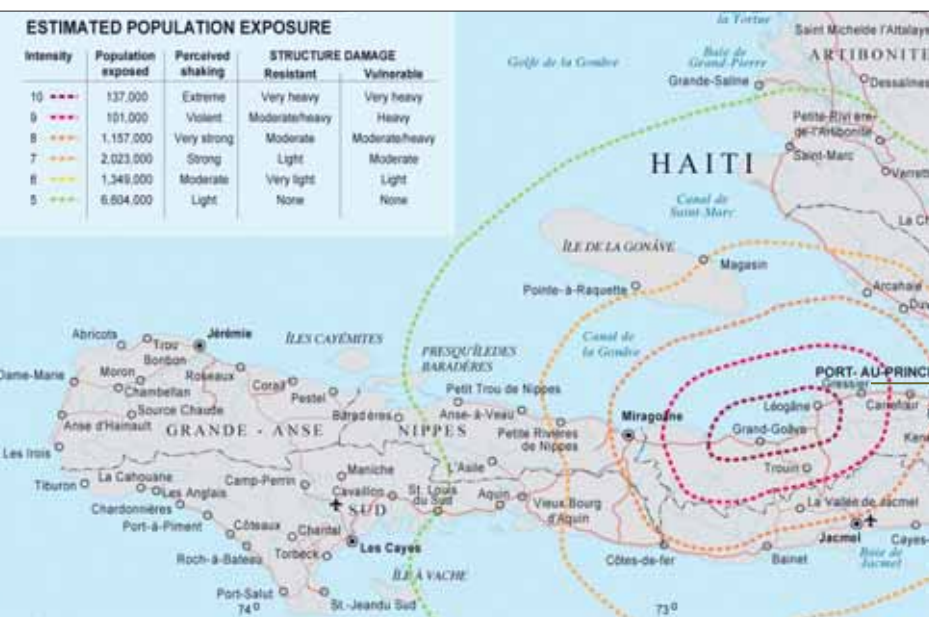
## Haiti 2010: The Ecole de Lasalle school building withstood the earthquake

The Lasalle school in the municipality of Gressier, which is located near the epicentre of the earthquake of 12 January 2010, was rehabilitated between July and October 2009. The rehabilitation work included the reinforcement of an existing building through seismic and storm-proof design, using locally available resources.

Following the earthquake of January 2010, the SDC developed an even more effective design for schools in urban and suburban zones strongly exposed to seismic hazards and hurricanes. The design is adapted to local architectural and structural standards and takes the locally available resources and economic constraints into account. SDC's pragmatic approach contributed to the credibility of the SDC vis-à-vis the line ministries. The SDC was the first foreign organisation to receive authorisation to build two pilot school buildings in October 2010.

Despite its location approximately 10 km north of the epicentre, this recently renovated school building only suffered minimal damage in the earthquake. A UN assessment team estimated that between 40-50% of the buildings in Gressier were destroyed.

Location: Gressier, Haiti, on 17 January 2010  
Photo credit: C. Umbertini



Gressier, Haiti: Location of the Ecole de Lasalle close to the epicentre

Map data sources: United Nations Cartographic Section; United States Geological Survey



# SDC Guidelines on DRR – a response to the Kobe process

In 2007 the SDC approved Guidelines on Disaster Risk Reduction in response to the priorities outlined in the Hyogo Framework for Action. These guidelines cover disaster risks emanating from natural hazards and reaffirm DRR as an important dimension of sustainable development. They underscore the need to consider all possible risks and hazards when designing sustainable programmes and projects. The guidelines set three priorities:

- selectively mainstream DRR within the SDC’s programmes and projects
- implement targeted DRR programmes
- support international DRR developments

In August 2007, the SDC identified seven pilot countries in which its DRR Guidelines were to be systematically integrated into development and humanitarian programmes during the 2008-2009 pilot phase. These countries were: Bangladesh, Georgia, Mali, Mongolia, Nicaragua, Peru and Tajikistan.

Targeted DRR programmes were implemented in all countries, with the exception of Mali and Mongolia. At the end of the pilot phase, effectiveness assessments to evaluate the SDC’s contribution to DRR were carried out in all seven countries (plus Bolivia linked to Peru, and Armenia linked to Georgia, which were additionally included).

## DRR effectiveness assessments: methodological approach

In the seven pilot countries an assessment of DRR effectiveness was carried out by a team of DRR experts. They analysed the effectiveness of the overall programme and of individual projects on the basis of four impact domains: (i) awareness building; (ii) capacity development; (iii) policy development; (iv) specific risk reduction. The main sources of information were site visits and interviews with beneficiaries and implementing partners.

The evaluation of the effectiveness of DRR measures is critical: effects would be seen if considerably less damage is observed following a new event than in case of absence of DRR measures. For instance, the effect of disaster-proofing could be observed in Haiti and in Pakistan. In the absence of a new event, reduced risks can be used as (proxy) indicators. Some case studies included a cost effectiveness and cost benefit analysis. The impact pathway method was used to demonstrate effectiveness in cases in which the quantitative calculation of risk reduction was not possible.

In addition to the evaluation of the five targeted DRR programmes, the mainstreaming process in all seven country offices was also assessed. The Tearfund methodology with the following six key areas was used: 1) policy; 2) strategy; 3) geographical planning; 4) project cycle management; 5) external relations; 6) institutional capacities.

### Impact pathway

Project	Outputs	Outcomes	Impact
Seismic monitoring network Tajikistan	<ul style="list-style-type: none"> <li>– Stations installed</li> <li>– Personnel trained</li> <li>– Seismic service established</li> <li>– Institutions linked</li> </ul>	<p><b>Immediate outcome</b> Immediate information about earthquakes:</p> <ul style="list-style-type: none"> <li>– Improved disaster management</li> <li>– Effective response</li> </ul> <p><b>Subsequent outcome</b> Reduced damage during future earthquakes, for example:</p> <ul style="list-style-type: none"> <li>– Fewer collapsed houses</li> <li>– High dams resisted impact</li> </ul>	<p><b>Years later...</b> Information about the seismicity, for example:</p> <ul style="list-style-type: none"> <li>– Building codes (earthquake-resistant building)</li> <li>– Adapted infrastructure (design of high dams)</li> </ul>

# Summary of SDC's commitment to Disaster Risk Reduction

## Key insights

The relevant regions or countries experienced recurrent disaster losses or face high potentials for catastrophic events. The assessment of the effectiveness of SDC's DRR activities has demonstrated that Swiss efforts in this field are warmly welcomed by local partners. The assessments also revealed that these activities are complex: on one hand, the responsible agencies register a clear demand for DRR; on the other, however, convincing people of the usefulness of preventive measures remains challenging and requires long-term commitment. In this respect, the SDC must focus more on the so-called side-effects of DRR which include, for example, improved livelihoods, better energy supplies and other direct benefits. Because the SDC runs both development cooperation and humanitarian projects, the organisation has sufficient capacities and experience to focus efforts on DRR as a model approach to bridge development cooperation and humanitarian aid operationally.

## The effectiveness of targeted DRR programmes

The SDC is currently implementing targeted DRR programmes in seven different countries or regions (see map on inside of front cover for the main focus of these programmes): South America (Peru and Bolivia), Central America (mainly Nicaragua, Honduras), Central Asia (Tajikistan and Kyrgyzstan), Southern Caucasus (Georgia and Armenia), Bangladesh, Middle East (Jordan, Syria, Lebanon, Occupied Palestine Territory) and Morocco (the latter two programmes were not subject to the effectiveness assessment). In addition to these integrated programmes, individual projects are being implemented in Colombia, Belarus, China, India and Pakistan; the latter mainly for Urban Search and Rescue, USAR, support, together with the rescue service of the Federal Department of Defence, Civil Protection and Sport (DDPS). Extended and new DRR programmes implemented by the Humanitarian Aid department will be increasingly integrated into the country programmes of SDC's Regional Cooperation department.

Over the past few years, approximately USD 10 million per year (representing approx. 13% of the bilateral Humanitarian Aid budget) was invested in activities covering the five HFA priorities in all of the regions in which SDC is running DRR programmes or individual DRR projects. These investments have produced a return in terms of increased safety, which is roughly estimated as equivalent to between USD 40 and 70 million per year.

Approximately 60% of the invested funds are used to support and increase the capacity of the partner agencies, be it for the identification and management of risks or for the management of disasters. The remaining 40% is shared between policy development, awareness raising and specific risk reduction. The evaluated DRR programmes all contribute to the five HFA priorities for action, however, they have very different focuses.

## Priorities for Action

### **PA 1 – Make disaster risk reduction a priority**

The effects of policy development are often difficult to assess. The fact that other stakeholders also contribute to the same goals makes it difficult to appraise the direct contribution of the SDC. However, capacity building and partner support is presented for the cases of Peru and Georgia.

### **PA 2 – Know the risk and take action**

Significant efforts are being made at national and local levels in Nicaragua, Tajikistan and Peru towards building risk assessment and monitoring capacities.

### **PA 3 – Build understanding and awareness**

Swiss programmes make a strong contribution to knowledge management and education about DRR in Tajikistan, Bangladesh, Peru, Bolivia and Nicaragua. The effects here will only be visible after considerable periods of time.

### **PA 4 – Reduce risk**

Risk reduction using non-structural and structural measures has proven highly effective in Bangladesh (cyclone shelters), Georgia (flood management), Peru and Bolivia (earthquake-safe housing, DRR in local planning), and Tajikistan (river bank protection, watershed management). The cost-effectiveness of these measures is good to very good: every US dollar invested has a return of approximately USD 4-7 in terms of reduced risks.

### **PA 5 – Be prepared and ready to act**

All DRR programmes contribute to better preparedness to varying degrees. Preparedness was a particular focus in the Southern Caucasus programme (national and decentralised rescue units in Georgia and Armenia, respectively). Similarly, disaster management capacities and rescue units are supported in Peru and Tajikistan. The inhabitants directly benefit from improved disaster management and rescue capacities.

## Mainstreaming DRR into development and humanitarian programmes and projects

The SDC's guidelines on DRR require a selective but systematic integration of DRR into humanitarian and development programmes and projects. The process of mainstreaming achieved in the seven pilot countries varies considerably. DRR is well integrated into development and humanitarian programmes and projects in the country programmes of Bangladesh, Peru and Bolivia. Results are clearly visible in the Mongolian and Nicaraguan programmes, but full integration has not yet been achieved. The tuning of the mainstreaming process is ongoing in the Georgian, Tajik and Mali programmes. Capacity building in relation to DRR and climate change adaptation is required for all country offices.

# Risk governance: focus on Peru

## HFA Priority 1 – Make Disaster Risk Reduction a priority

Natural disasters have an enormous economic impact on the Andean countries of Peru and Bolivia. The 1997 - 98 El Niño phenomenon triggered floods, mudflows and landslides and caused damage totalling USD 3.5 billion in Peru alone. The Cusco region in eastern Peru (1.2 million inhabitants) is a typical mountainous area frequently affected by floods and landslides. Deforestation and inadequate land use in watershed areas have resulted in an increase in runoff and erosion. The 2010 floods were responsible for losses totalling USD 200 million in the region.

Both Peru and Bolivia are increasing efforts to address these recurrent disasters and to implement the HFA, mainly through policy dialogue, the improvement of risk governance and by making territorial and investment planning disaster resilient.

### Risk governance processes in Cusco

As part of the ongoing decentralisation processes in Peru, local governments are developing policies, organisations and resources for dealing with disaster risks. The SDC's support of local government is aimed at strengthening capacities in the field of risk governance. A DRR plan provides an integrated approach involving six strategic lines: (1) risk assessment; (2) risk prevention and mitigation; (3) inclusion of DRR in development planning; (4) institutional strengthening; (5) community participation and (6) optimisation of response mechanisms. The United Nations Development Programme (UNDP) and the Food and Agriculture Organization (FAO), with additional funds from the European Commission – Humanitarian Aid & Civil Protection (ECHO), implemented local risk mapping and capacity building activities in mountainous communities which are periodically affected by extreme weather events such as frost, snow and cold waves.

Switzerland supported the Cusco region with approximately USD 160,000 mainly in the fields of policy development and capacity building; local government matched the amount. The Regional Council adopted the regional strategic DRR plan in August 2007, which makes its application compulsory for the administration of the Departmental Government in Cusco. In addition, government officials received extended support for the assessment, evaluation and management of risks and disaster response, for example during the heavy floods that hit Cusco in February 2010. Thanks to the availability of trained specialists, bodies within the regional and provincial administrations responsible for project planning can value the benefits of disaster-safe projects. Capacity for DRR has been created, but the systematic incorporation of DRR into all relevant aspects of regional development planning and management still requires further momentum.



A village flooded in February 2010. Location: Huacarpay, near Cusco, Perú  
Photo credit: S. Eugster

*„Our project evaluators have to understand that low productivity is not only an irrigation problem. There are natural hazards such as flooding and frost which have to be addressed, as well.“*

A Peruvian woman explaining how the hazard map and municipal land-use planning enabled her to identify a more frost-resistant location for her potato field. Photo credit: R. Villavicencio





The integrative disaster risk management approach adopted by the project for the promotion of risk-conscious planning, the disaster proofing of investments and better preparedness will lead to a significant reduction of disaster losses. Taking the USD 200 million of damage from the early 2010 floods as a typical example of a disaster with a five to ten-year return period, it may be assumed that the adoption of good DRR practices at all levels will reduce such damage by between 5-10% (= USD 10 to 20 million every five to ten years) and corresponds to an annual risk reduction of between USD 1 and 4 million. This rough estimate attributes high (cost-)effectiveness to the initiative, in particular for transport, education and healthcare infrastructure and agriculture. These investments will be more resilient to the next disasters.



High-cost tourism infrastructure exposed to a mountain torrent  
Location: Aguas Calientes near Cusco, Perú. Photo credit: La Republica, February 2010

## Georgian think-tank

Although Georgia has experienced significant socio-economic progress in recent years, natural and man-made disasters often cause recurring crises which remain a key obstacle to sustainable development. The key conceptual challenge in Georgia was to shift the focus from response and preparedness (disaster management) to prevention and mitigation (disaster risk reduction).

In response to the growing risks in Georgia and in light of this shift to disaster risk reduction, a joint project entitled "Strengthening of the Disaster Risk Reduction System in Georgia" was implemented by the SDC, UNDP and the UN Resident Coordinator. The „DRR strategy for Georgia“ works through communities at risk, scientific institutions, and international organisations to encourage policy change towards the adoption of a preventive risk management approach.

In March 2009 a national DRR think-tank with around 40 representatives from government, international organisations, academic institutions and NGOs was established to discuss DRR topics, such as risk assessment methodology, early-warning systems, community-based DRR approaches and the Hyogo Framework for Action. The think-tank provided the basis for the creation of a strong

national platform. The academic sector was also „rediscovered“ by governmental institutions as a source of knowledge suitable for use in the context of risk analysis.

The fact that DRR was mainstreamed within the UNDP programmes in Georgia and among other UN agencies in the country is a secondary benefit of the project. DRR has become one of three priorities of the United Nations Development Assistance Framework (UNDAF) strategy 2011-2015 for Georgia. Switzerland continues to support this process.

Risk-conscious planning processes add to the sustainability of development endeavours and ultimately result in less damage in the case of a future earthquake, flood or drought.

# Risk assessment and monitoring: focus on Nicaragua

## HFA Priority 2 – Know the risks and take action

Nicaragua's national disaster reduction system is largely based on Law 337, which was passed in direct response to the devastation caused by Hurricane Mitch in October 1998. This law defines institutional roles and responsibilities in the field of DRR. The SDC also initiated its DRR activities in Central America in response to Hurricane Mitch. Whereas most of the international institutions and donors in Nicaragua concentrated on preparedness, the SDC pursued the approach of strengthening national and municipal capacities for identifying and assessing risks and introducing measures for prevention and mitigation. The development of hazard and risk maps at municipal level and the overall awareness of institutions and individuals constitute important aspects of this approach. Similar programme lines are being pursued in the current phase of the DRR programme (2008-2012).

### Maps for municipal planning processes – countrywide harmonisation

From 1999 to 2008 the ALARN (Apoyo Local para el análisis y manejo de los riesgos naturales) and PROGEDES (Programa de gestión local del riesgo de desastres) projects contributed to the development of methodologies and instruments for risk analysis (mainly hazard maps). The projects also developed DRR capacities at municipal level. The two projects played a pioneering role for Nicaragua in the development of instruments and methodologies for hazard maps. Prior to this, capacities for the development of methodologies for hazard maps and especially a common and standardised methodology were lacking. The projects were implemented by dedicated local and national partners.<sup>2</sup>

Standardised methodologies for hazard mapping and for the integration of DRR into municipal development planning are applied at national level, for example by SE-SINAPRED (Secretaría Ejecutiva del Sistema Nacional para la Prevención, Mitigación y Atención de Desastres). The projects were implemented in 28 out of 153 municipalities in Nicaragua. Approximately one sixth of the Nicaraguan population, including the three important urban centres of Matagalpa, Estelí and Jinotega, benefited from the projects. SDC supported the project with USD 1.8 million. Today, local technicians are able to develop hazard maps for floods and landslides and consider other hazards such as drought in their daily work. DRR is integrated into local planning processes. When new infrastructure is built, hazard maps are taken into account and a risk analysis is carried out. Whenever possible, high-risk areas are avoided, for example in Dipilto (refer to box). Awareness-building at local level re-

<sup>2</sup> Instituto para el Desarrollo y la Democracia (IPADE); Instituto Nicaraguense para el Fomento Municipal (INIFOM); Instituto Nicaraguense de Estudios territoriales (INETER); Asociación de Municipios del Departamento de Estelí (AMUDES); Asociación de los municipios del departamento de Nueva Segovia (AMUNSE); CARE Nicaragua.

sulted in the integration of DRR into the participative annual planning meeting at the municipality. Based on their knowledge of DRR, communities now cite mitigation in addition to other activities as priorities. Vulnerabilities are thus reduced and the build-up of new risks is prevented or, at least, limited.

Specialists trained by the ALARN project carried out hazard and risk analyses in the Nicaraguan municipality of Dipilto. One day, a team from the Ministry of Education presented a project for a new school to the municipality. The mayor of Dipilto, Mrs Filomena Gradys, told the team that, according to the municipal hazard map, the area they had selected was landslide prone. The school was later built in another, safer location. This decision prevented potential future losses.



Following risk assessments, it was decided to build the school on safe elevated terrain instead of an initial site potentially exposed to landslides.  
Location: Dipilto, Nicaragua. Photo credit: SDC Office Managua, Nicaragua

## Earthquake monitoring - a must for earthquake-proof development in Tajikistan

Tajikistan lies in a very active seismic zone. A functional seismic monitoring network is a pre-condition for optimum town planning and infrastructure development. It also constitutes a basis for the improvement of building standards. With the help of Swiss investments totalling almost USD 1 million, seven digital seismic monitoring stations as well as a receiving and data management centre have been installed, and training courses were carried out.

Although the project does not have an immediate and direct impact in terms of reduced risks, it has a considerable indirect impact through the integration of seismic risk information into planning processes. Such effects are long term, particularly in the context of the planning and construction of hydro-power dams (currently being carried out at Rogun,

upstream from the existing Nurek Dam). However, future risks of failure of these investments are considerably reduced if the structures are built in a way that takes the prevailing seismic conditions into account. Further support for intensified mapping campaigns (standards, methods, finances) is necessary to underscore the aforementioned effects. Only technically sound information in this field will influence the respective reform processes.



A seismic monitoring station with broadband satellite connection  
Location: Shartuuz, Tajikistan  
Photo credit: PMP International, Tajikistan



# Imparting knowledge and expertise: focus on Tajikistan

## HFA Priority 3 – Build understanding and awareness

The mountainous Central Asian Republic of Tajikistan frequently faces natural and man-made disasters, which on top of the residual scars and trauma of the civil war (1992 to 1997) constitute a heavy burden for the country and its citizens. DRR was virtually unknown in Tajikistan when the SDC started its DRR programme in 2003. Due to a lack of equipment, funds and the absence of adequate capacities, the country found itself unable to mitigate and respond to disasters adequately. As earthquake risks are considerable in both urban and rural areas, risk awareness is a key priority.

During the Soviet period, decades worth of risk assessment, research and expertise in seismic risk reduction methods, and vital knowledge about the associated risks were rarely disseminated to the general public in Central Asia. While the theoretical ability to reduce risks improved, the exposure to devastating natural disasters increased. Priority must therefore be given to transferring both risk awareness as well as concrete and specific knowledge about risk reduction to the population.



Earthquake awareness-building at Tajik schools.  
Photo credit: Focus Humanitarian Assistance, Tajikistan

### Educating children to reduce future earthquake losses

The Tajik Earthquake Safety Initiative (TESI) was implemented by Focus Humanitarian Assistance from 2004-2010 in close partnership with the ministries of Education and Health and the national Committee for Emergency Situations (CoES). TESI raised awareness among school children and increased the preparedness of school teachers, staff of health facilities and selected government agencies for earthquakes and other types of disasters. Fourth and 7th graders as well as healthcare staff were directly targeted by this project, which also involved the broadcasting of TV campaigns.

- Correct behaviour at the time of an earthquake considerably reduces the number of potential casualties. With the awareness-building programme, a total of 12,000 students in around 1,100 schools, and approximately 8,600 staff from 220 healthcare facilities received relevant information and practical training in the preparation of individuals and institutions for disasters, e.g. the evacuation of buildings and correct response in the aftermath of a disaster.
- A "Rapid Risk Assessment methodology" was developed together with and for government agencies to prioritise schools and health facilities with strong risk potential. Such data is needed to provide the basis for decision-making in relation to future investments in schools and hospitals: Where are the biggest risks? Where is there an urgent need for action?
- In the framework of the TESI initiative, government institutions obtained material on earthquake risk awareness and preparedness training and assumed responsibility for providing systematic and sustainable training to schools and healthcare facilities; the CoES incorporated this training material into its training curriculum.



A survey-based impact assessment of behavioural change measured the preparedness of the target audience. Approximately 2,600 students were surveyed. The results indicated a significant increase in the number of respondents who had received their information from schools, from 25% in the baseline to 66.7% in the follow-up (six months later). This indicates that the schools were an excellent medium through which to disseminate information on earthquake measures. Almost 60% of the respondents indicated that they lacked knowledge about earthquake preparedness activities. This percentage decreased to 38.6% after the training. The Ministry of Health, the Ministry of Education and the CoES are committed to institutionalising earthquake safety aspects in their work (including through the allocation of the necessary funds) and, ultimately, in their policies. This will help to reduce the negative consequences of earthquakes in the long term (fewer injuries, fewer casualties, reduced economic losses).

### **Knowledge as a mandatory basis for all DRR endeavours**

Knowledge of disaster risks and expertise in DRR is essential for the successful reduction of existing risks or prevention of the build-up of new risks. Educating specialists in the field of DRR continues to play a major role in all of SDC's past DRR programmes. Approaches selected in Nicaragua and Bangladesh are presented. The overall objective is to provide the necessary knowledge and expertise for reducing the negative impacts of disasters and contribute to sustainable development.

#### **Nicaragua**

The Central American Master's Programme in DRR has been running since 2001. The third cycle (2009-2010) of the four-semester course is now in progress at the "Universidad Nacional Autónoma de Nicaragua, Centro de Investigaciones Geocientíficas" (UNAN-CIGEO) in Managua. Fifty students have been technically and scientifically trained on DRR so far. The masters programme places a high priority on the technical analysis of hazards and risks.

Graduates of the programme share and exchange knowledge and experience by means of a regional DRR platform. As a result of the programme, DRR is now being taught at other national universities: Central American University (UCA) regularly offers diploma courses in DRR and vulnerability analysis; the National Engineering University offers a master on environmental risks; UNAN-CIGEO offers lectures on hazards and risks to other faculties (engineers, architects). The students work on a practical case study and develop their research into a master's thesis. These studies can provide DRR information for municipalities and raise awareness in particular areas.

#### **Bangladesh**

The technical capacities of the relevant agencies at national and local levels have been extended through a recently developed masters course on disaster management at Dhaka University, Bangladesh. Sound risk assessments and risk management practices require sufficient knowledge and expertise – this is lacking in Bangladesh at times. Bangladeshi students and practising engineers interested in obtaining a post-graduate degree in DRR are obliged to study in other countries (mainly India, Thailand and England) or at private universities. The associated financial burden is often too high for potential candidates. The project with the Dhaka University enables interested specialists to obtain such qualifications inside the country. The courses are held in classes with a maximum of 40 participants. The cost of a two years Master of Science in DRR in Bangladesh is around USD 4,000 per participant (this sum will decline as the course is replicated). This is less than 20% of the cost of similar training at a foreign university. The reasonable cost as well as the option of taking courses after working hours encourage more Bangladeshi professionals to participate in further training and incorporate DRR into their work.

# Upfront risk reduction: focus on Bangladesh

## HFA Priority 4 – Reduce risk

Changing weather patterns, widespread poverty and its location in a huge delta puts Bangladesh at risk from multiple hazards, including cyclones, floods, droughts, earthquakes, tornados and riverbank erosion. An extreme population density (with a record 1,100 persons per km<sup>2</sup>) and extreme poverty render the population highly vulnerable to the forces of nature. Against this background, the Bangladesh government is pursuing a shift towards a comprehensive culture of risk reduction as outlined in its National Plan for Disaster Management (2007–2015). In the aftermath of cyclone Sidr in October 2007, the SDC initiated a recovery programme in Bangladesh. The „Community-based DRR Programme in cyclone Sidr affected areas“ (CB-DRR) is particularly interesting in this context.



Part of a village destroyed by cyclone Sidr. Location: Upazila Sarankhola, Rayenda Union, Bangladesh. Photo credit: G.F.Glombitza

### Reduced future losses through empowerment – and the necessary hardware

The community-based DRR Programme in areas affected by cyclone Sidr is a multi-component project. It aims to increase the capacities and awareness of coastal communities and to resolve the ownership problems which in the past hampered construction of the shelters. Both local government agencies and village committees are important project partners. This support is in line with the government's overall efforts to provide physical protection for the millions of people living in the coastal belt.

- The core of the project consists of the construction of 12 multi-purpose shelters, which will serve around 16,000 inhabitants of rural villages as refuges during times of crisis and thereby considerably increase their safety. In addition, the cyclone shelters will provide protection of livestock (approximately 900 small animals, e.g. goats or sheep, or 300 cows). The community's Cyclone Shelter Management Committee (CSMC) will be able to operate, maintain and manage the buildings. This considerably enhances the sustainability of invested funds and will contribute to the extended lifetime of the structure.
- At the end of the project in 2011, some 30,000 targeted households will be able to implement gender-sensitive disaster preparedness measures. The potential loss of life and assets will be significantly reduced through cyclone preparedness plans, timely warnings and the preparation of emergency kits.
- The capacity of the Upazila Disaster Management Committee (UDMC), Cyclone Preparedness Programme (CPP) volunteers, local institutions and youth volunteers will be strengthened to enable them to respond to pre-disaster and post-disaster challenges.

#### *Killa hills protect lives*

*The government of Bangladesh established a comprehensive action plan for cyclone shelter construction along its entire coastal belt. Artificial hills locally named Killa are an important component of the plan, providing a safe haven for humans and livestock during floods. The experience gained with the killa-cum-shelter concept was used as a basis for the design of the new programme. After the 1985 cyclone, SDC's Humanitarian Aid implemented this concept and thus saved thousands of lives and livestock during the 1991 cyclone. Up to now, approximately 2,500 shelters, which are normally used as schools, have been built by various actors.*

A total of around USD 4.9 million has been invested in awareness, capacity building and in the construction of the 12 shelters. Based on an estimated shelter (= hardware) lifespan of approx. 30 years, the cost per beneficiary and year amounts to around USD 6. When the “software” components of the project (e.g. awareness-building in target communities and schools, and capacity building of shelter committees) are taken into account, the „life insurance premium“ per person and year is between USD 7-8. This is a very cost-effective way to protect lives and livelihoods. Nevertheless, the cyclone shelters serve a high-risk zone which is only partly suitable for permanent living.



A shelter under construction with SDC support. Location: Hogolpati, Bangladesh  
Photo credit : F. Poffet

### “Living without risks” (“vivir sin riesgos”) – DRR instruments for Bolivian municipalities

Disaster risk assessments serve the municipalities by providing a basis for risk-conscious decision making. During the assessments officially approved risk maps are compiled with the participation of the population in 24 municipalities. The municipal authorities and technicians also apply their expertise on DRR instruments and methods, incorporate DRR into their plans and budgets, and take decisions that promote DRR. Disaster risks in these 24 municipalities are reduced through three main processes:

- a) Land-use: both public and private buildings and infrastructure are located on safer ground. This directly contributes to the avoidance of future damage.
- b) Public investment projects are made safer: the authorities and technicians who were trained and whose awareness has been increased by the projects will manage a total investment budget of USD 250 million over the next 10 years. The Swiss investment in this project, which totals around USD 250,000 (this represents about 1% of the planned infrastructure investments in the coming 10 years), enables the construction of disaster-proofed infrastructure.



- c) Projects that reduce existing risks: risks are reduced through reinforcement, protection and relocation measures. However, it is difficult to estimate their possible impact. Better preparedness is the most notable impact as it protects human life, leads to the removal of valuable goods to safe locations and temporarily protects critical infrastructure.

Farmer Don Paulino explains his agricultural risk reduction strategy on his plot of land.  
Location: highlands near Cochabamba, Bolivia  
Photo credit: S. Eugster

Today, 110 project profiles already form part of the annual operative plans of these municipalities. Francisco Veizaga, mayor of the municipality of Vallegrande, explains: “Through the project, many municipalities have adopted this initiative. Now it is much easier for the municipality to allocate the necessary resources.” Based on a decision of the people, municipal budgets have been increased by between 10-20% and will incorporate DRR. Based on this experience, the implementing partners are carrying out DRR projects in other municipalities with local budgets.



# Preparedness for better response: focus on Georgia / Armenia

## HFA Priority 5 – Be prepared and ready to act

The Southern Caucasus is a highly seismic region. The Georgian and Armenian governments requested support with a view to improving the response of their respective rescue services to earthquakes and other disasters. In the aftermath of independence, Georgia had limited access to any rescue base or training facility for rescuers only. The 1988 Spitak earthquake in northern Armenia marked the beginning of a long process for the improvement of rescue services. The approaches chosen by the two countries were completely different, but clear mandates and a long-term vision are common features of both.

In 2002, the SDC initiated cooperation with the Georgian Department of Emergency Situations and Civil Defence (now the Emergency Management Department, EMD, and integrated in the Ministry of Internal Affairs) with a view to improving the national disaster preparedness and rescue capacities. The project ran until 2007.

In Armenia, the SDC has been supporting the Armenian Rescue Service (ARS) – part of the Ministry for Emergency Situations – since 2004 to establish a decentralised rescue system. This decentralised structure is also supported by other donors who provide technical equipment to the ARS.

### Tbilisi training centre

Today, the Georgian rescue service can count on a fully equipped rescue base with dormitory, training facilities, offices, a rubble field and storage space. Between 2002 and 2003, specialists from the Swiss Federal Department of Defence, Civil Protection and Sport (DDPS) trained 14 instructors, who in turn trained 100 rescuers. A second phase of the project, which focuses on intensified Urban Search and Rescue (USAR) training, was implemented from 2006 to 2007. Switzerland invested around USD 1.4 million in hardware and capacity building. It costs around USD 7,800 to professionally equip and train a rescuer.

Georgia now has a functioning rescue service: 100 rescuers are fully equipped and ready to intervene in emergency situations. Twenty-five are on duty around the clock. They cover Tbilisi and surrounding areas with some 1.5 million inhabitants and are deployed up to 15 times a week for various kinds of accidents and (so far only minor) disasters nationwide. The Tbilisi rescue centre is recognised as a standard in Georgia. Linking fire fighting and rescue functions reduces the administrative overheads and improves the performance of the services. The rescue base is now administered by the Ministry of Internal Affairs and funding is provided from the national budget. Establishing a closer cooperation between the Georgian rescue organisation and services in neighbouring Armenia and Azerbaijan remains a challenge.

*Ilia Jamrishvili is 30 years old. He joined the Tbilisi rescue team in 2002. He specialises in diving and uses this skill to remove cars from lakes and rivers and also participates in other rescue operations. He looks happy when he talks about a successful rescue operation in 2008. On that occasion, after three days of intensive searching, his team found a person still alive, who had been lost in the mountains north of Tbilisi. Ilia Jamrishvili is a skilled rescuer and became team leader in 2009.*

Photo credit: SDC Office Tbilisi





## Armenian rescue service

The implementation of the „Ardzagank“ project started in the Lori and the Syunik districts in 2004. Two years later the project was extended to the whole country with a view to establish a decentralised nationwide rescue system for natural disaster preparedness and response. Between 2004 and 2010, Switzerland invested approximately USD 2.8 million in this project. A new phase which will incorporate other rescue components (e.g. a medical unit) is under preparation.

The response capacities (trained personnel, equipment) in 62 decentralised fire stations are significantly improved. Victims benefit from a better and quicker response. The 62 fire stations reach almost two million people, i.e. around 65% of the population living in urban and suburban areas. Today, 2,200 trained fire fighters/rescuers and 200 volunteer rescuers are able to search and rescue victims in the event of small-scale emergencies (e.g. floods, car accidents, mountain accidents). The rescue base in Stepanavan is considered as one of the three centres of competence countrywide. The Crisis Management Academy established a branch in Stepanavan and makes use of the training facilities at the rescue base.

An awareness-building component aimed at young students is being implemented in the course of the Ardzagank project using fire fighters/rescuers. From



2010, approximately 10,000 students and their teachers have been receiving information about disaster risks and disaster risk reduction. The efficient evacuation of school buildings is possible if required. The students share their knowledge with their families thereby leading to a multiplier effect. However, the effects of awareness campaigns on the population at large may only be observed in the long run.

Rescuers in Armenia are trained in technical and medical skills in order to provide first aid to a trapped victim in a car accident. Photo credit: SDC Office Tbilisi

## Urban search and rescue (USAR) as an important component of DRR

For the past 10 years, Switzerland has been supporting national and local authorities in increasing their rescue capacities, in particular Urban Search and Rescue (USAR), in a number of individual projects, e.g. with authorities in China, India and Pakistan and within the DRR programmes. Specific rescue components of these programmes are implemented in Jordan (with the Jordan Civil Defence), Lebanon (supporting the Lebanon Red Cross Society), Peru and Tajikistan (supporting the national Committee of Emergency Situations). The

rescue service of the Federal Department of Defence, Civil Protection and Sports (DDPS) acts as a key partner for many of these training courses.

The Swiss-supported projects stress the importance of compliance with the INSARAG Guidelines (International Search and Rescue Advisory Group). Switzerland holds the chair of the INSARAG Steering Group and strongly supports the activities of this mechanism, in particular the standardisation and classification of rescue units.

## Effects of DRR mainstreaming in Mali and Mongolia

### Disaster risk reduction – the key to sustainable pasture management in Mongolia

Since its transition to a market economy, privatised livestock grazes on the vast common steppes in Mongolia. As the size of herds steadily increases, pastures are turned into deserts, pushing more herding families into poverty and eroding the basis of national food security. In addition, the country is subject to occasional harsh winter conditions known as dzuds. Many of the herder households lost most of their livestock and their livelihoods during the dzuds in 1999-2002 and 2009/2010. In the first half of 2010 alone, 8.5 million livestock (out of a total of 43 million) died in Mongolia.

The SDC's activities in Mongolia have gradually shifted from humanitarian assistance to development cooperation. Today, SDC's programme (USD 8.5 million per annum) focuses on the livelihoods of herder households. DRR issues are systematically integrated into these development endeavours. The DRR approaches include prevention/mitigation (e.g. improved pasture management by Pasture User Groups), response (e.g. fodder reserves) and recovery mechanisms (e.g. index-based livestock insurance).

As part of the Green Gold project, approximately 13,000 herder households (8% of Mongolia's herders) were organised into Pasture User Groups which developed pasture management plans, fodder reserves and alternative income opportunities. These herders are now better prepared to address risks and handle future disasters. This approach is currently being scaled up.

### Food security in Mali – close links to DRR

In recent years the rains have become less predictable in the Sahel countries. Traditionally, the rainy season lasted from May to August – enough for a good harvest of the traditional food crops. With climate change, weather extremes become more pronounced and traditional agriculture is at risk. Helping the population to adapt to climate change strengthens the resilience of farming communities and herders to erratic weather. Together with government agencies and non-governmental organisations and with a high degree of community participation, the SDC has been supporting projects that aim at reducing the risk of crop failure and contribute to increasing agricultural and livestock production and household income. CRISTAL, a methodology for joint systematic risk screening and DRR planning with the communities, has been successfully tested in Mali.

The following approaches have proven successful:

- increase in water infiltration into the soil through stone contour bounds, trenches and small dams, to make best use of short and heavy rains;
- development of low-lying areas which are seasonally flooded for rice and vegetable production, including protection against disastrous floods;
- small-scale irrigation schemes using simple water-saving irrigation technologies;
- assisted natural re-growth of native trees and shrubs, often in combination with contour bounds, resulting in agroforestry-type production which is very resistant to drought spells;
- improved local storage of crops, seeds and animal fodder to safeguard against crop failures – often combined with schemes for local processing and better marketing.

The AVAL programme (Programme d'Aménagement et de Valorisation pacifique des espaces et du foncier agricole dans la région de Sikasso AVAL) contributes to food security in the Sikasso area through the equitable and sustainable management and use of natural resources. The adequate use of flood plains has a high priority.

# Conclusion – key points

## **The Hyogo Framework for Action 2005-2015 is a strong political commitment to DRR.**

The international road map was adopted by 168 countries in Kobe, Japan, January 2005.

### **PA 1 - Make DRR a priority**

Countries that develop policy, legislative and institutional frameworks for disaster risk reduction and that are able to develop and track progress through specific and measurable indicators have greater capacity to manage risks and to achieve widespread consensus for, engagement in and compliance with disaster risk reduction measures across all sectors of society.

### **PA 2 – Know the risk and take action**

The starting point for reducing disaster risk and for promoting a culture of disaster resilience lies in the knowledge of the hazards and the physical, social, economic and environmental vulnerabilities to disasters that most societies face, and of the ways in which hazards and vulnerabilities are changing in the short and long term, followed by action taken on the basis of that knowledge.

### **PA 3 – Build understanding and awareness**

Disasters can be substantially reduced if people are well informed and motivated towards a culture of disaster prevention and resilience, which in turn requires the collection, compilation and dissemination of relevant knowledge and information on hazards, vulnerabilities and capacities.

### **PA 4 – Reduce risk**

Disaster risks related to changing social, economic, environmental conditions and land use, and the impact of hazards associated with geological events, weather, water, climate variability and climate change, are addressed in sector development planning and programmes as well as in post-disaster situations.

### **PA 5 – Be prepared and ready to act**

At times of disaster, impacts and losses can be substantially reduced if authorities, individuals and communities in hazard-prone areas are well prepared and ready to act and are equipped with the knowledge and capacities for effective disaster management.

## **Mainstreaming DRR in country development programs and projects is crucial**

Disasters can wipe out long lasting development efforts. It is therefore essential that disaster prone countries and developing organizations mainstream DRR in their programmes.

### **“Build back better” after disasters**

The early recovery phase is a “window of opportunity” for building resilience. Disasters are thereby an opportunity to avoid failures from the past and to reduce future risks. All relevant actors have their part to play.

### **Prevention pays off**

It's worth to invest in DRR! Cost-benefit estimations of SDC Humanitarian Aid programmes revealed reduced risks 4-7 higher than initial investments. It is necessary to shift the focus away from merely responding to disasters to pre-disaster prevention and preparedness activities.

## Editorial

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