Brochure

Natural Hazard Mapping and Local Risk Management

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
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Cooperación Suiza
en América Central

Sendai Framework for Disaster Risk Reduction 2015-2030
Priority 1: Understanding disaster risk

The ***Disaster Risk Reduction Programme (DRR Programme)*** is one of SDC's most emblematic achievements in Central America. It began in 1999 in the wake of Hurricane Mitch with projects in Honduras and Nicaragua, was later expanded to include El Salvador and, finally, the entire Central American region. More than 1.5 million persons benefitted directly and at least 19 million did so indirectly. With participation from a variety of partners, almost seventy projects were implemented from 1999 to 2024. These were structured along six **thematic lines:**

- **Natural hazard mapping and local risk management**
- **Early Warning Systems**
- **Integration of DRR and CCA into universities**
- **Construction of safer housing and infrastructure**
- **Strengthening of national and regional DRR systems**
- **Incorporation of DRR and CCA in other SDC projects**

Disaster risk management is the systematic process of using administrative guidelines, organisations, skills and operational capabilities to implement policy and strengthen coping capacities to reduce the adverse impact of natural hazards and the possibility of a disaster (UNDRR).[1]

Under the thematic line *Natural hazard mapping and local risk management*, 31 bilateral projects were carried out in Honduras, Nicaragua and El Salvador, to which more than CHF 10 million or over 24% of the budget were allocated. During the first project, implemented in Nicaragua from 1999 to 2000, threats were mapped and local risk management capacities strengthened.[2] Eventually, this line evolved from a local to a comprehensive risk management approach. It remained active until 2012[3], when the Swiss Agency for Development and Cooperation (SDC) decided to implement the *DRR Programme* from a regional perspective and strengthen institutional capacities at national level. The rationale was that after more than 12 years developing capacities at municipal level, a sufficient critical mass had been reached to continue with the local risk management processes in an autonomous fashion and seek support from national or international entities.

Impact hypothesis

Reliable, understandable and accessible information regarding threats and the risks of disasters found on maps and studies is essential when it comes to raising risk awareness, planning prevention and mitigation measures and formulating risk reduction and contingency plans. It also serves to guide territorial planning processes and to draw up municipal ordinances that regulate the use of at-risk zones. The training of a critical mass of national and municipal experts ensures the availability of knowledgeable persons which can be engaged by local governments or other projects to help carry out threat studies and design risk plans.

[1] United Nations Office for Disaster Risk Reduction.
[2] Project titled "Strengthening Risk Management at Municipal Governments", later changed to "Local Support for Natural Risk Analysis and Management (ALARN)"
[3] External evaluation of the DRR Programme, 2012. Linda Zilbert.

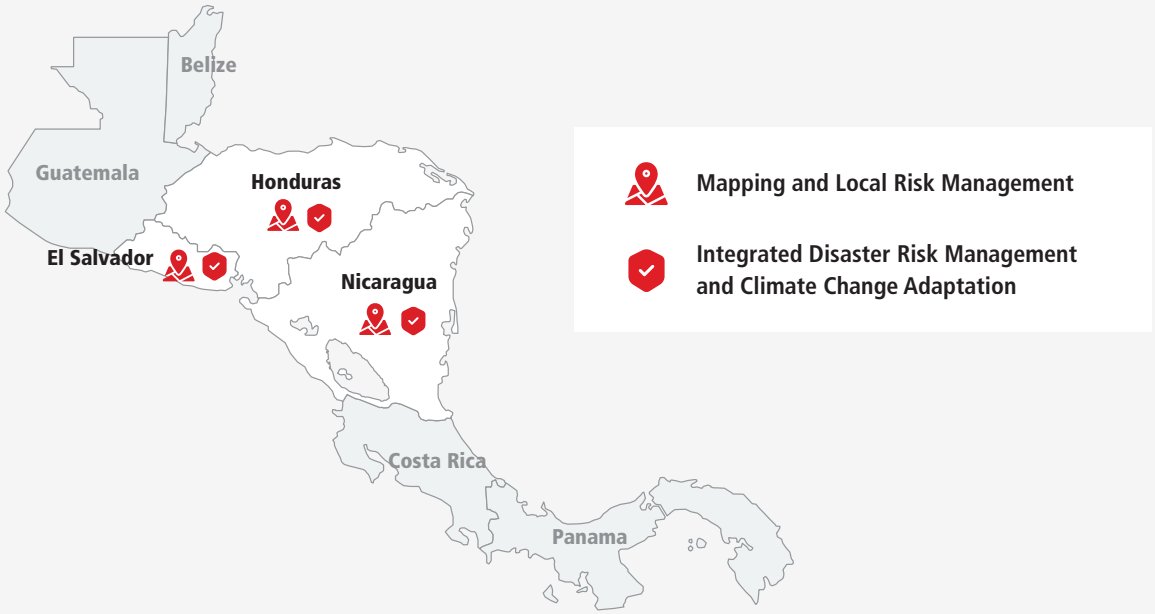
Main projects

Local Support for Natural Risk Analysis and Management (ALARN). Nicaragua. Implementing agency: SDC Three phases: 1999-2000, 2001-2002 and 2003-2004. SDC contribution: CHF 958,000.

Integrated Disaster Risk Management (IDRM) in Ten Municipalities in Sonsonate. El Salvador. Implementing agency: National Territorial Studies Service (SNET). Single phase: 2005-2008. SDC contribution: CHF 579,000.

DRR in Ten Municipalities in Honduras. Honduras. Implementing agency: Permanent Contingencies Commission (COPECO). Two phases: 2006-2009 and 2010-2012. SDC contribution: CHF 1.1 million.

Projects by subtopics



Objective

Provide support to municipal governments to ensure they have the technical tools and capacities needed to understand and manage threat- and risk-prone areas and incorporate them to their municipal development planning.

Swiss added value

This allowed for enriching the local management strengthening efforts by means of good quality technical and scientific analyses. Swiss knowledge, experience and methodologies were transferred to national professionals. The DRR/Environment Group of Experts at the Swiss Humanitarian Aid Unit has expert staff in these fields.

Innovation

This thematic line, especially during the first ALARN project, developed innovative outputs, among which a *Methodology for the Mapping of Threats due to Landslides and Floods at Municipal Level* and *Technical Recommendations for the Analysis and Mapping of Threats*. These are simple instruments that use practical, low-cost methods, without thereby forfeiting their scientific nature and technical robustness.[4] The methodology was adapted to the local context in Nicaragua and was later validated and applied also in El Salvador and Honduras. One of its characteristics is that it was a pioneering effort to integrate local and scientific knowledge.

ALARN project experts evaluating threats in the municipality of Río Blanco, Matagalpa, Nicaragua. © SDC

[4] Tested methods, example of a geomorphological analysis to identify flood plains or unstable terrain.

Stages

In order to carry out a mapping and IDRM project it is recommended to proceed according to the following three stages:

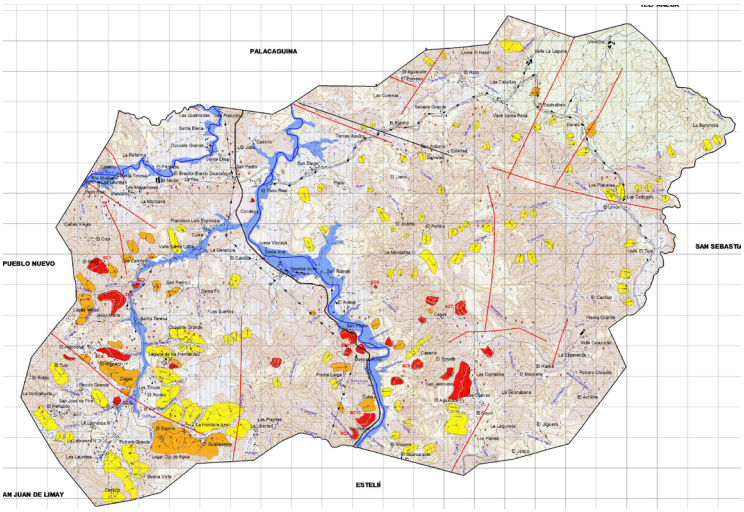
Stage 1

Methodology, pilot and dissemination (2 to 3 years)

Objective: To define a methodology, validate and apply it in the largest number possible of municipalities.

Main activities:

- Encourage the participation of national institutions in the process so they adapt and institutionalise the methodology.
- Prepare a methodological proposal focusing on threats caused by unstable terrain and flooding in places where heretofore there were no methodologies or the capacity to map these.
- Run pilots of the methodology in different contexts in order to adapt it to local conditions, taking into account availability and access to quality data, existing human resources and technical capacities.
- Validate the products, risk maps and studies with local governments and other users.
- Provide national experts with theoretical and practical training in this methodology.



Hazard map in the municipality of Condega, Nicaragua, made using the ALARN methodology. © SDC

- Organise multidisciplinary groups, have them undertake a study and make a hazard map, under the supervision of national and foreign experts.
- Supervise and monitor the work of these multidisciplinary groups so as to ensure the quality of their outputs and identify needs for methodological or technical strengthening for the working groups.

Stage 2

Awareness-raising on the importance of local risk management (1 year)

Objective: To raise awareness among the population and decision-makers on existing risks in the territory and the measures that can be taken to reduce these.

Main activities:

- Prepare popular versions of the studies and maps and disseminate them widely among the population and authorities.
- Offer technical assistance to local governments so the maps, studies and risk plans are used in municipal development planning.
- Issue ordinances that regulate the use of risk zones.
- Negotiate a budget for the implementation of disaster risk reduction measures recommended in the municipal risk management plans.
- Hold training sessions for municipal technicians and other local actors so they can use the available instruments and update them periodically.

Stage 3

Integrated Disaster Risk Management and Climate Change Adaptation (permanent)

Objective: Accompany local governments in order to strengthen their capacities to manage existing risks, while preventing and avoiding that new risks appear, as well as becoming better able to respond in emergencies.

Main activities:

- Establish municipal and community committees and disaster response brigades, while preparing contingency plans, evacuation routes and holding drills.
- Offer training on IDRM and CCA.
- Implement DRR and CCA measures.
- Issue ordinances to regulate the use of risk zones.
- Carry out awareness-raising campaigns to inform and involve the population in all activities. If needed, create community-based early warning systems.

The hazard maps made as part of the ALARN project continue to be used and updated by technical staff in the municipality of Condega, Nicaragua. © COSUDE

Sustainability

In general terms, sustainability is qualified as "moderate", given that some processes are more sustainable than others. For instance, the technical recommendations on how to make hazard maps will continue to be useful when the time comes to update them, and can be consulted on the website of the Nicaraguan Institute of Territorial Studies (INETER). Along the same lines, the National Territorial Studies Service (SNET) in El Salvador has undertaken nationwide studies and made hazard maps, while in Nicaragua the National System for Disaster Prevention, Mitigation and Response (SINAPRED) continually updates its municipal plans.

Other processes, however, are a challenge for local governments, in particular the allocation of resources with which to implement the risk management measures described in their studies and plans. In addition, the ALARN methodology was not institutionalised, which made it more difficult for INETER to adopt. At first, the institution didn't participate directly in its design and methodological development, and then became partially involved in mapmaking and threat studies. Only in the later stages did INETER participate actively in the drafting of the aforementioned technical recommendations.

Resources

This type of project requires a person to be charged with coordination, and in this particular case it should be a professional risk expert in fields such as risks arising from nature, mapmaking, risk analysis, geology, hydrology, geotechnical and hydraulic engineering, agronomy and forest engineering, among others. **Reference cost:** CHF 200,000-400,000 per year.

Options for implementation

In phase 1, these projects can be implemented directly, especially if technical expertise is needed of a type that does not exist in the country. In the subsequent phases, contributions by municipal or communal associations, as well as local organisations and national or international institutions can be integrated.

Success factors

1. These projects served to fill a gap in mapping and IDRM. At the outset there were no initiatives or methodologies on these matters, notwithstanding the real need to know the risks so as to be able to manage them. At the time, cooperation concentrated only on disaster response.
2. Municipal authorities and other counterparts acknowledge that the ALARN maps and studies are useful planning and management instruments for decision-making and local development planning purposes. To have on hand a considerable number of maps and studies contributed to strengthening risk management at the mayor's offices and other governing entities. Further, the use of this methodology became a routine practice and was replicated in Honduras and El Salvador.
3. The dissemination and transfer of scientific information into popular parlance facilitated the spreading of knowledge regarding risk, rendering it accessible to the population. This in turn led to increased awareness and the taking of DRR actions on its part.
4. Local professionals in natural and earth sciences who are willing and able to work on DRR were trained by SDC and reached a critical mass of experts who understand and apply DRR methodologies.

Participants in a postgraduate course in IDRM, Siuna, Northern Caribbean Autonomous Region, Nicaragua. © SDC

Technical staff making a risk map in 2003 at the Dipilto mayor's office, province of Nueva Segovia, Nicaragua. © SDC

Main challenges and lessons learnt (LL)

1. The lack of financial and technical resources available for DRR in the municipalities limits implementation of the risk reduction measures proposed in the municipal risk management plans. In many cases, implementation takes place through contributions from other donors and organisations.

   LL: The DRR measures contained in plans must include options at differing levels of efficiency and costs. For example, there should not be exclusively concrete works, but also bioengineering and nature-based solutions. Likewise, advocacy and awareness-raising strategies must be developed which are aimed at the municipal councils and the government, who are key actors in budget allocations for local governments, and other donors.

2. It is difficult to ensure the involvement of technical staff at governing institutions in the development and standardisation of methodologies[5] and project activities in general when these are not the implementing bodies. This limits the taking of ownership and institutionalisation of the methodologies, as well as reaching the desired project outcomes.

   LL: Governing institutions must be incorporated to project planning and implementation as a means of encouraging the taking of ownership and thus the participation of their technical staff in the various processes. Ideally, these should be the implementing agencies, but even when they are, there is no guarantee that ownership will improve substantially,

[5] For example, the ALARN methodology for making landslides and flooding hazard maps.

3. Delays in project implementation and the loss of trained human resources due to weak DRR governance in the national systems translate into slow administrative processes and decision-making. In addition, administrative laws are often not flexible but instead rather bureaucratic, and there are high technical and executive staff turnover rates because of administrative changes resulting from elections (every four/five years).

LL: To improve efficiency, all projects should include strategies that promote the strengthening of institutional DRR governance.

Good practices

1. To prepare and disseminate methodological guides in order to evaluate and manage risk. Among these the following stand out: *Support instrument for natural risk analysis and management; Guide for experts and support instrument for natural risk analysis and management in Nicaraguan municipalities;* and *Guide for use by the mayor's offices*. Such guides were distributed to 152 mayor's offices in Nicaragua and disseminated by various means of communications. Improved and adapted versions were prepared in El Salvador and Honduras.
2. Ongoing training for municipal technicians on matters linked to the use of DRR methodologies in planning and territorial management, as well as the design of mitigation works, accompanied by Swiss experts and in alliance with universities. The accompaniment and alliances ensured quality and academic support to the training processes, while motivating the universities to become involved in DRR.
3. Carrying out awareness-raising campaigns based on simplified versions of the risk studies and maps, in an effort to involve the population and taking its local knowledge into account. This contributed to increase awareness and understanding as concerns risks, the taking of ownership regarding the maps and popular participation in DRR actions.

> "We learned to break down the threats. We used to think it was just floods, but then we realised there were also mudslides, landslides and a host of other risks associated to threats and vulnerabilities. By going deeper we were able to expand our list of risks and threats".
>
> **Axel Gómez**, deputy mayor of Ocotal, Nicaragua

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