SWITZERLAND'S LEGACY

Experience Capitalisation

Disaster Risk Reduction Programme in Central America 1999-2024

Schweizerische Eidgenossenschaft
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Cooperación Suiza en América Central

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Disaster Risk Reduction Programme in Central America 1999-2024

Credits

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Cooperación Suiza en América Central

Contents

Acronyms

- **ACBYR:** Central American Search and Rescue Academy
- **AECID:** Spanish Agency for International Development Cooperation
- **AGUASAN:** Water and Sanitation Programme
- **ALARN:** Local Support for Natural Risk Analysis and Management
- **APIM:** Support to Municipal Investments
- **CCA:** Climate Change Adaptation
- **CEDRIG:** Climate, Environment and Disaster Risk Reduction Integration Guidance
- **CEPREDENAC:** Coordination Centre for Disaster Prevention in Central America and the Dominican Republic
- **CHF:** Swiss francs
- **CONRED:** National Coordinating Body for Disaster Reduction
- **COPECO:** Permanent Contingencies Commission
- **COSEFIN:** Council of Finance Ministers of Central America, Panama and the Dominican Republic
- **CSUCA:** Central American Higher Education Council
- **DRR:** Disaster Risk Reduction
- **ECLAC:** Economic Commission for Latin America and the Caribbean
- **EEL:** Local Emergency Team
- **ENACAL:** Nicaraguan Aqueducts and Sewers Utility
- **EOC:** Emergency Operations Centre
- **ERCC:** Regional Climate Change Strategy
- **ETHZ:** Swiss Federal Institute of Technology Zurich
- **EWS:** Early Warning System
- **FISE:** Emergency Social Investment Fund
- **FOCARD:** Central American and Dominican Republic Water and Sanitation Forum
- **FRHIS:** Human Resource Training for the Integration of the National Disaster Prevention, Mitigation and Response System
- **GIAR:** Rapid Intervention and Support Group
- **IDRM:** Integrated Disaster Risk Management
- **IGG-CIGEO:** Geology and Geophysics Institute of Nicaragua, UNAN-Managua
- **IHCIT:** Honduran Earth Sciences Institute
- **INAA:** Nicaraguan Institute of Aqueducts and Sewerage
- **INETER**: Nicaraguan Institute of Territorial Studies
- **IDB:** Inter-American Development Bank
- **INSARAG:** International Search and Rescue Advisory Group
- **INSIVUMEH:** National Institute of Seismology, Volcanology, Meteorology and Hydrology
- **JICA:** Japan International Cooperation Agency
- **MERVD:** Strategic Framework for the Reduction of Vulnerabilities and Natural Disasters in Central America
- **MIP:** Public Investment Module
- **OCHA:** United Nations Office for the Coordination of Humanitarian Affairs
- **OECD:** Organisation for Economic Cooperation and Development
- **PCGIR:** Central American Integrated Disaster Risk Management Policy
- **PRENICA:** Disaster Prevention Project in Nicaragua
- **PREVAC:** Natural Disaster Prevention Programme in Central America
- **PUCARRD:** Central American University Policy for Disaster Risk Reduction
- **SANAA:** Autonomous National Aqueducts and Sewers Service
- **SDC:** Swiss Agency for Development and Cooperation
- **SDG:** Sustainable Development Goals
- **SHA:** Swiss Humanitarian Aid Unit
- **SICA:** Central American Integration System
- **SINAPRED:** National Disaster Prevention, Mitigation and Response System
- **SNET:** National Territorial Studies Service
- **UNAN:** National Autonomous University of Nicaragua
- **UNDP:** United Nations Development Programme
- **UNDRR:** United Nations Office for Disaster Risk Reduction
- **USAID:** United States Agency for International Development
- **USAR:** Urban Search And Rescue

Presentation

Switzerland's legacy in Central America

A region better prepared for and more resilient to disasters

After more than 45 years of continuous presence in Central America, the Swiss Agency for Development and Cooperation (SDC) is ending its bilateral cooperation with the region. As part of the exit programme, we capitalise on the particular experience of the ***Disaster Risk Reduction (DRR) Programme***, implemented from 1999 to 2024, initially in Honduras and Nicaragua, and subsequently throughout the whole Central American region. The objective of this capitalisation is to identify, analyse and share with other stakeholders the main lessons and good practices of the nearly 70 projects the Programme implemented.

This is one of the most emblematic programmes of Swiss Cooperation in Central America for several reasons: it began in response to the effects generated by the impact of Hurricane Mitch in 1998 and its 25 years makes it one of the longest programmes and largest budgets on this theme Switzerland has executed in the world. It has also left an important legacy of knowledge, approaches, methodologies and innovative tools that have changed the way of preventing and responding to disasters.

Thanks to the joint work done by national and regional partner institutions, academia, United Nations agencies, nongovernmental organisations and private sector actors, among others, the programme benefited more than 1.5 million people directly and close to 19 million people living in risk areas in Central America indirectly.

This report and the following products were generated as part of the *DRR Programme* experience capitalisation process:

- Compendium of publications generated by the different projects
- Timeline (digital story) of the *DRR Programme*
- Brochures and fact sheets on each of the six main thematic lines
- Five videos that summarise the thematic lines

We believe that these materials can be very useful for the staff of municipal mayor's offices and public institutions, particularly technical teams, as well as private sector stakeholders, donors interested in these issues, university students and educators engaged in applied research. Through these materials, one can traverse, learn about and become familiar with part of the legacy that Switzerland and its partners are leaving to the region, contributing to increased resilience in the face of disasters.

We recognise the valuable commitment and dedication of the partners and communities we worked with during the implementation of the *DRR Programme.* Thanks to their participation, we have a region today that is better prepared to manage risks and face disasters with resilience. We are very proud of having contributed to these achievements during the 25 years of the Programme's implementation.

Executive summary

> “Swiss Cooperation’s valuable contribution to the region’s development and its strategic assistance to the strengthening of governance and integrated risk management have made for a more solid region, one bolstered by having reduced the risk of disasters.”
>
> **Claudia Herrera,** executive secretary of CEPREDENAC, 2019-2023

The long-term impact promoted by the *Disaster Risk Reduction Programme in Central America*, hereinafter *DRR Programme*, was to help save lives and reduce both human suffering in the affected population, as well as economic losses and damage caused by disasters in Central America. From 1999 to 2024, almost 70 projects were developed with various partners from municipal, national and regional institutions, civil society, academia and United Nations agencies, among others. More than 1.5 million people benefited directly and at least 19 million indirectly.

One of the main legacies the *DRR Programme* leaves to Central America is an important critical mass of human capital with capacities and competencies to manage and reduce disaster risks. Among the aspects most valued by the actors involved in the Programme (community members, students, teachers, authorities, private sector, and institutional and local technicians) is knowledge and know-how: “Swiss Cooperation leaves and the knowledge remains.”

Another legacy Switzerland leaves to the region is an improved capacity to save lives in disaster situations. The region has better, more inclusive risk governance with the participation of the private sector and academia, more coordinated and effective disaster response capacity, procedures, instruments, institutionalised mechanisms and competent personnel. People living in areas of higher seismic and volcanic risk can now get to safety because the region has an Early Warning System (EWS) for earthquakes and, in the case of Guatemala, operates a warning system at the Santiaguito volcano.

The approval of legal frameworks favourable to DRR, the commitment of key stakeholders and awareness of the population on this issue are among the *DRR Programme’s* main **external success factors. Internal factors** include SDC’s long-term commitment, which strengthened trust and transparency among all actors, and its ability to adapt to the population’s priorities and needs and to the context. Another success factor is the focus on disaster prevention, where SDC has expertise and solid technical knowledge, as well as concentration on relevant and innovative issues.

With respect to **challenges,** climate change generated greater pressure on national systems, causing scarce financial and human resources to be redirected to other more urgent needs. Similarly, the vulnerable population has other priorities, so DRR takes a back seat. In addition, weak institutional governance affected the sustainability of projects and it was difficult to measure the achievement of interventions because not all projects had baselines.

Based on the aforementioned challenges, the following **lessons learned** are identified: have annual planning in accord with the context and contingency plans in addition to promoting multipurpose DRR measures to alleviate the population’s main needs. Also identify administrative and political measures, as well as activities to strengthen institutional governance.

On the issue of gender, there was little awareness and an absence of institutional policies to promote it at the beginning of the Programme, so institutions should be supported to develop gender policies and ensure specialised technical support. Finally, it is important to ensure that partners develop capacities to prepare baselines that allow them to identify the impact of the projects.

Among the main **good practices** are the medium - to long - term planning of the *DRR Programme*, development of capacities adapted to the local context, ongoing specialised technical assistance to partners, regional and national drills, creation of Local Emergency Teams (EELs) and their linkage with the Rapid Intervention and Support Group (GIAR).

Finally, some recommendations **looking to the future:** consider the methodologies developed by the *DRR Programme* in future projects and continue to promote the exchange of experiences and collaboration between national civil protection systems from the region and South America. In addition, the good practices of integrating DRR into other SDC projects should be considered, strategies to strengthen the gender approach should be promoted and mechanisms to continue with the EELs should be established. Considering that the *DRR Programme* was developed in an independent way, greater exchanges and collaborations between programmes should be promoted from Headquarters to take advantage of their experiences and tools, and improve SDC’s institutional learning.

Disaster preparedness activities in the community of San Agustín Arriba, San Esteban, Olancho, Honduras.
© Swiss Red Cross

Introduction

In 1999, Swiss Cooperation initiated the *Humanitarian Reconstruction Programme* in Central America in response to the devastating effects of Hurricane Mitch (1998), which affected several Central American countries, with the greatest damage in Nicaragua and Honduras. As part of this programme, some short-term disaster prevention projects were developed starting in 1999, which were integrated as a *Natural Disaster Prevention Programme in Central America* (PREVAC) in 2003 and later as the *Disaster Risk Reduction Programme*, hereafter referred to as the *DRR Programme*. Switzerland developed other similar programmes in Peru, Bolivia and Haiti, although of shorter duration. It should be noted that during the implementation of these programmes, no major linkage was established between them, beyond some exchanges in the framework of courses or workshops and a visit from Haiti to Nicaragua to learn about the experience of its *DRR Programme*.

The *DRR Programme* set helping save lives and reduce both human suffering and economic losses and damage due to disasters as its long-term impact. To do so, it needed to generate changes in the performance of public and private stakeholders which, with improved and inclusive risk governance, could effectively reduce disaster risks. It also required a streamlined and efficient disaster response based on international humanitarian principles and standards.

Over almost 25 years, the *DRR Programme* implemented about 70 projects in the region, together with various partners from national and regional institutions, academia, United Nations agencies, civil society organisations and communities, among others. Through them, it has promoted knowledge and innovative approaches, methodologies, and tools that have been adapted to the context. Knowledge and practices now exist that help create a more resilient region less vulnerable to disasters.

This Programme has had the longest duration and largest budget that Switzerland has ever implemented in this field. Therefore, as part of its exit strategy from the region, SDC decided to conduct this capitalisation exercise to identify the lessons learned, good practices, and challenges of the *DRR Programme* in Central America. The results of this capitalisation will contribute to SDC's institutional learning and will be shared with DRR and Climate Change Adaptation (CCA) actors in Central America and other regions of the world.

In addition to this report, the capitalisation of the *DRR Programme* includes a compendium of publications generated by the Programme, a timeline (digital story), success stories in audio-visual format, fact sheets and brochures with expanded information on the Programme and its six major thematic lines, which are available online.

Capitalisation of the *Disaster Risk Reduction Programme in Central America 1999-2024*

> “What began with Hurricane Mitch has become, more than 20 years later, a rich history with many successes and some failures. Both are important to institutional learning.”
>
> **Flisch Jörimann,** head of Humanitarian Aid for Swiss Cooperation in Central America, 2020-2022

Evolution of the context

Due to Central America’s geographic and geological position, it is one of the regions of the world that recurrently suffers the impact of multiple hazards. Hurricane Mitch (1998), one of the biggest catastrophes to hit the region, left thousands of people dead or displaced and huge environmental and economic losses that reached 13% of the regional Gross Domestic Product (GDP).[1] The most affected countries, Nicaragua and Honduras, had the highest deforestation rates in Latin America. Between 1990 and 2005, more than 50,000 square kilometres of forest were lost[2] and over 60% of the population lived below the poverty line. In addition, these countries were in a transition period following many years of armed conflict and civil war[3] (1981-1990).

In recent decades, the situation in Central America has become even more complex and vulnerability to disasters has deepened.[4] Due to climate change, the recurrence and intensity of disasters is increasing and their impacts are exacerbating poverty levels and environmental degradation. The region continues with high deforestation levels; between 2015 and 2020 the deforestation rate was 168,000 hectares per year[5] and urbanized areas have tripled over the last 40 years,[6] increasing pollution and water scarcity. In addition to all of the above, there are social crises, violence, especially in the northern Central American countries, and high migratory flows[7] of the region’s young populations. These migratory flows, which are linked to violence, poverty and disasters, have increased 137% over the past 30 years[8] (1990-2020). The sending countries were Honduras, Guatemala and El Salvador, and the destination countries were mainly the United States, Costa Rica, Spain and Mexico. In the case of Nicaraguan migrants, between 2015 and 2020, the number increased by almost 3,000%. Costa Rica, the United States and Spain were the main destinations. In socioeconomic terms, some countries in the region have improved, as is the case of Nicaragua and El Salvador, which are now middle-income countries.[9] Costa Rica is also a member of the Organisation for Economic Cooperation and Development (OECD). Despite these advances, inequality continues to grow in the region.

As of 1990, Central America began to show progress in DRR within the framework of the United Nations International Decade for Natural Disaster Reduction, which began that same year. One of the main advances occurred in 1993 with the incorporation of the Coordination Centre for Disaster Prevention in Central America and the Dominican Republic (CEPREDENAC) into the Central American Integration System (SICA) as a specialised secretariat. The advances in DRR that followed are marked by Hurricane Mitch, since its regional impact triggered the commitment of the presidents who approved in 1999 the *Strategic Framework for the Reduction of Vulnerabilities and Disasters in Central America* (MERVD) and the Regional Disaster Reduction Plan 2000-2004. Since then, the capacities of the countries and the region to manage and reduce risks and deal with emergencies have gradually improved. The countries also began to update or create legal frameworks and bodies to assume their responsibilities in DRR, leading to the approval in 2010 of the *Central American Integrated Disaster Risk Management Policy* (PCGIR) and the *Regional Climate Change Strategy* (ERCC). The countries adopted these instruments as public policies and, based on them, approved national policies and plans. All of these instruments were updated as of 2015 to harmonize them with the Sendai Framework for Disaster Risk Reduction 2015-2030, the Paris Agreement and the Sustainable Development Goals (SDG). In addition, DRR and CCA are part of SICA’s regional agenda. Several countries have adopted financial protection tools such as

[1] Informe Centroamérica: Evaluación de los daños ocasionados por el huracán Mitch, 1998. Sus implicaciones para el desarrollo económico y social y el medio ambiente. CEPAL, 1999.
[2] Plan Ambiental de Centroamérica 2010-2014, CCAD, 2009.
[3] Informe Centroamérica Evaluación de los daños causados por el huracán Mitch, CEPAL 1999.
[4] In https://estadonacion.or.cr/wp-content/uploads/2022/05/PEN_informe_estado_region_completo_2021.pdf
[5] Evaluación de los recursos forestales mundiales, 2020. Informe principal, FAO 2020.
[6] Estudio de la urbanización en Centroamérica, Banco Mundial, 2018.
[7] Atlas de la migración en el norte de Centroamérica, CEPAL, OIM, 2018.
[8] Migration Data in Central America | Migration Data Portal (migrationdataportal.org).
[9] Países de renta media en America Latina. CEPAL, 2012 https://datahelpdesk.worlbank.org./2020

Entire municipalities were destroyed by Hurricane Mitch. Wiwilí in northern Nicaragua, was one of them.
© Miguel Álvarez

insurance against catastrophes, and collaboration and cooperation between countries has improved. An example of this is the regional simulation drills that have been conducted since 2019 with the participation of all countries. Also noteworthy is the cooperation and exchange of scientific information on risk knowledge and early warnings.

The international cooperation that overflowed in response to the impacts of Mitch began to decrease at the beginning of 2009-2010[10] with the pull-out of Sweden, Finland, and Norway from the region. In addition to Switzerland, the main donors that have remained active in DRR are the European Union through its Disaster Preparedness Programme (Regional Office in Panama), the United States Agency for International Development (USAID-OFDA) with its regional office in Costa Rica, the Spanish Agency for International Development Cooperation (AECID), and the Japan International Cooperation Agency (JICA). The Inter-American Development Bank (IDB) and the World Bank (WB) are also working on DRR and CCA at the regional level through CEPREDENAC or technical assistance in selected countries.

Swiss presence

> “Over the years, humanitarian responses have marked Switzerland’s presence. The *DRR Programme* emerged as a more systemic response to a highly vulnerable situation.”
>
> **Jean Gabriel Duss,** director of Swiss Cooperation in Central America, 2019-2023

Switzerland has been present in Latin America and the Caribbean for almost 60 years with cooperation programmes in Ecuador, Peru, Colombia, Bolivia, Cuba, Haiti and Central America, the latter for more than 45 years. In 1978 it initiated the *Cooperation Programme* in Honduras, which was extended to Nicaragua in 1979 and to El Salvador in 1982. In the humanitarian field, it has a long history of solidarity with the region. Its first intervention in Central America was in Guatemala in response to the 1976 earthquake. Then, in the 1980s, it provided humanitarian aid to populations displaced by the civil wars in Guatemala and El Salvador; and in 1986, after the San Salvador earthquake, it deployed the Swiss Rescue Chain to provide aid, as well as water and health care.

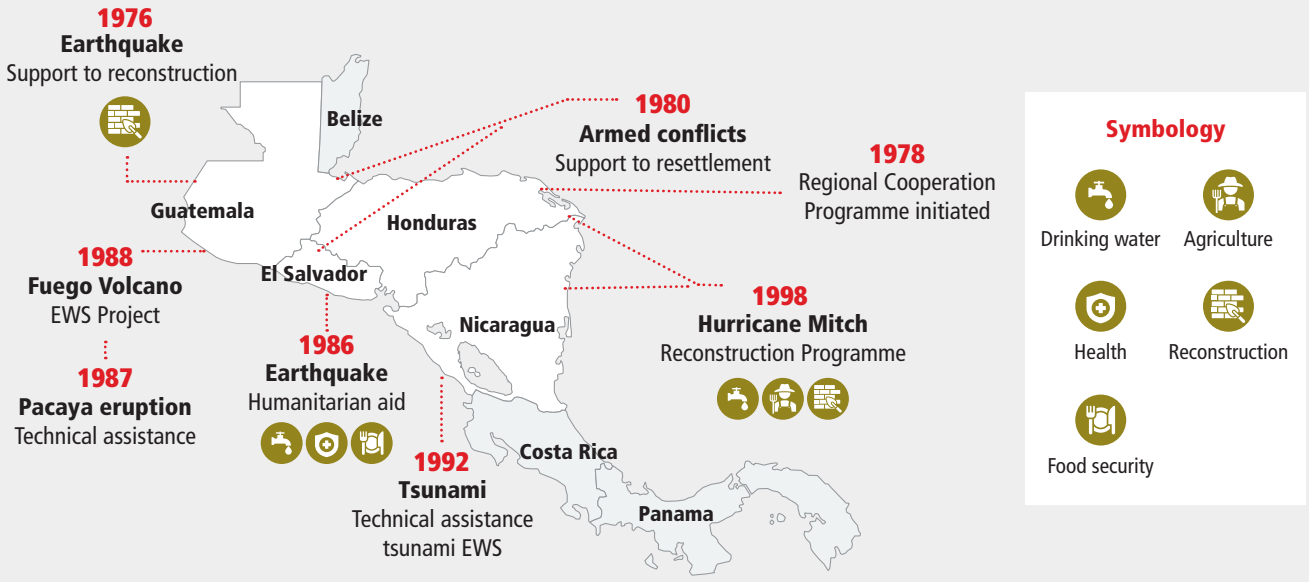
Subsequently, between 1987 and 1992, two events impacted the region: the eruption of the Pacaya Volcano in Guatemala (1987) and the tsunami in Nicaragua (1992). These events highlighted the limitations of the monitoring networks and the lack of specialists in this area and prompted Swiss collaboration in disaster prevention to implement two projects: *Study of volcanic hazards in Guatemala* (EAVEG, 1988-1995) with Guatemala’s National Institute of Seismology, Volcanology, Meteorology and Hydrology (INSIVUMEH) and *Disaster Prevention in Nicaragua* (PRENICA, 1993-1998) with the Nicaraguan Institute of Territorial Studies (INETER)[11] and the Civil Défense. Both projects were implemented by the Swiss Disaster Relief Unit, today Swiss Humanitarian Aid Unit (SHA), and the University of Geneva.

[10] Nicaragua en el contexto de la cooperación oficial externa. E. Montes (2014). En https://repositorio.unan.edu.ni/11860/2/document.pdf
[11] Dirección general de geofísica - Proyectos y Programas (ineter.gob.ni).

As a result of both interventions, scientific knowledge of hazards was increased (maps with delimitation of risk zones and tsunami causes), thus contributing to the design and installation of the first thematic seismic-volcanic network[12] of the Acatenango-Fuego complex in Guatemala; and in Nicaragua the first tsunami warning network was established in addition to improving the seismic network with the installation of specialised equipment (seismic stations and seismographs). The capacities of technical personnel were also improved (Geographic Information Systems, vulnerability, network monitoring, maintenance, etc.) and community awareness and preparedness campaigns were organised, the latter especially in Nicaragua where radio communication equipment was installed.

In response to the impact of Hurricane Mitch (1998), Switzerland mobilized humanitarian aid and established the *Humanitarian Reconstruction Programme (1999-2001)* in Honduras and Nicaragua, as a complement to the *Regional Cooperation Programme (1999-2005).* The objective was to provide a streamlined and visible Swiss contribution to reconstruction in thematic areas related to the cooperation programme and disaster prevention in selected areas. Some 30 projects were implemented with a budget of 10 million Swiss francs (CHF). This programme ended in 2001 after meeting its objectives.

Map 1: Swiss presence before the *DRR Programme*



[12] It transmits automatic information on earthquakes in real time to the central stations of INETER and INSIVUMEH.

The path followed by the *DRR Programme*

> “The country didn’t have a methodology to assess hazards, vulnerabilities and risks. The SDC methodology was adopted and is a reference for the classification of risk levels at the national and regional levels. Now, in any geological campaign I participate in, I always evaluate the hazards as an added value to the study I’m doing in a given place.”
>
> **Lucrecia Cruz Gámez,** Nicaraguan geologist, graduate of the first CIGEO-UNAN master’s programme

The *DRR Programme* advanced continuously; it began in 1999 with short-term projects within the framework of the humanitarian programme mentioned above and continued during six phases until culminating in 2024. The final impact of this Programme was to help save more lives, reduce the affected population’s suffering, losses and damages caused by disasters. Initially its geographical focus was on Honduras and Nicaragua, then in 2001 it was extended to El Salvador and finally, in 2013, to the entire Central American region.

The Programme moved from interventions at the municipal level to national and regional actions with risk management and civil protection systems, as well as with academia. The focus evolved from disaster prevention to an integrated risk and disaster management approach including CCA.

The *DRR Programme* had six phases and almost 70 projects implemented in Central America. More than 1.5 million people benefited directly and at least 19 million indirectly. The following table details information on those phases.

DRR Programme in Central America

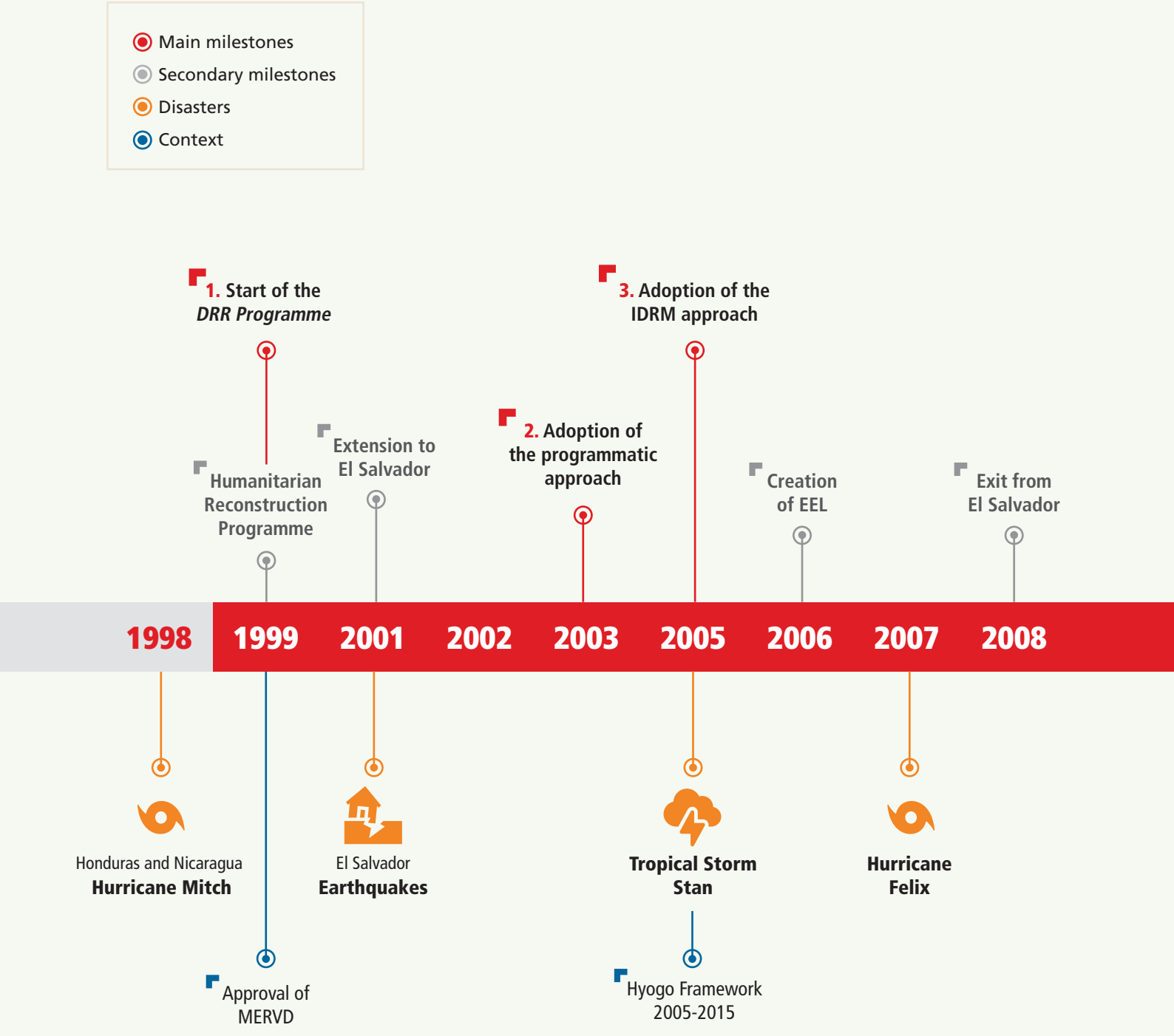
Phase	Projects	Budget (CHF)	Beneficiaries
1999-2004	17	5,840,054	22,868
2005-2007	16	5,154,100	74,215
2008-2012	9	3,836,999	112,150
2013-2017	17	9,904,652	99,625
2018-2021	6	12,930,692	195,050
2022-2024	4	4,185,000	1,002,500
Total	**69**	**41,851,497**	**1,506,408**

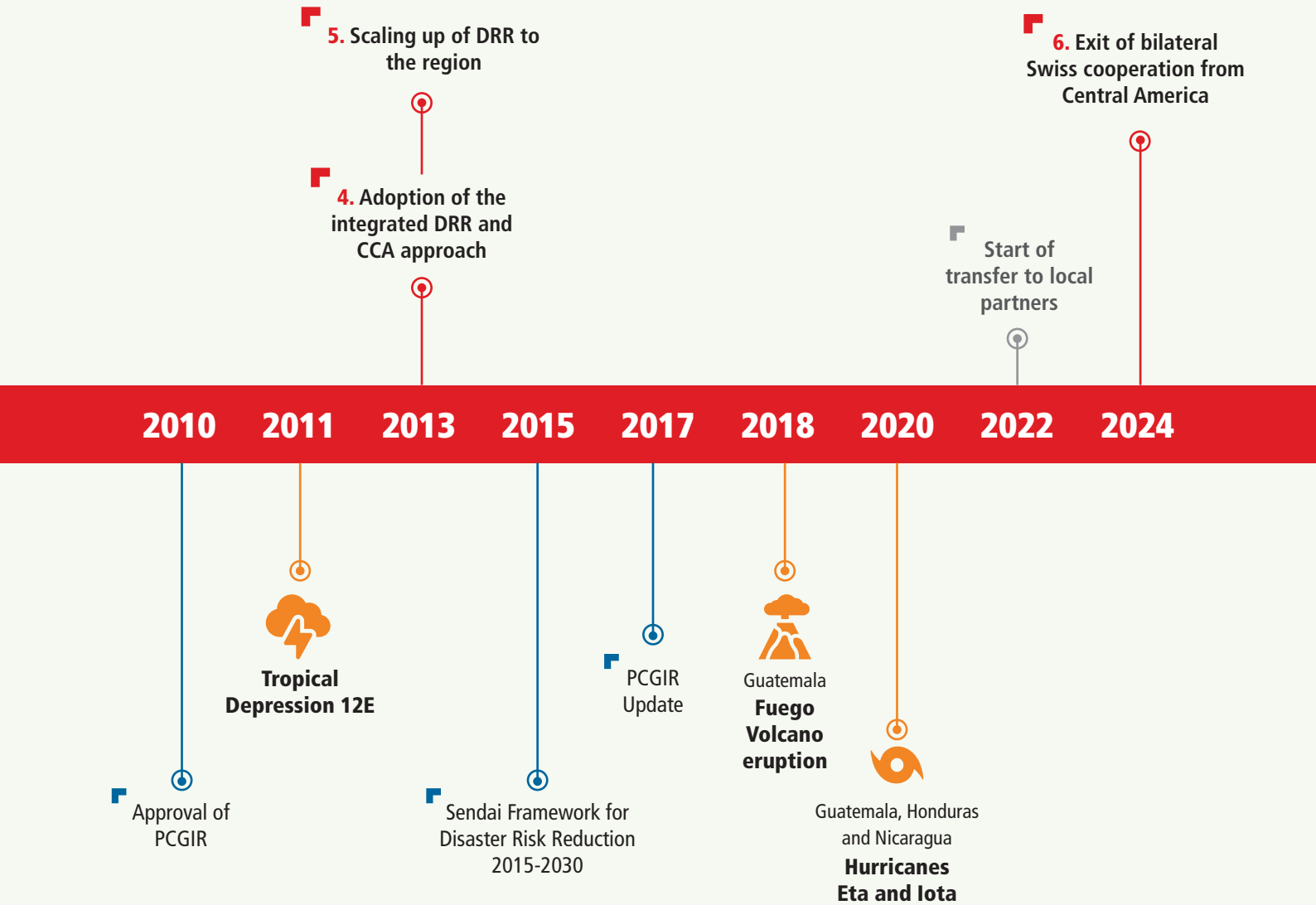
Projects and budgets by country

Region / country	Projects	Budget (CHF)	Porcentaje of budget
Nicaragua	25	7,692,147	18.38
Honduras	12	5,322,151	12.72
El Salvador	9	2,604,965	6.22
Guatemala	1	1,600,000	3.82
Regional	22	24,632,234	58.86
Total	**69**	**41,851,497**	**100.00**

Six main milestones have been identified during the 25 years of the *DRR Programme*, which have to do with the most important events that have marked the Programme’s history. The timeline, presented on the following page, shows these milestones and incorporates context and the main disasters that had some implication for the Programme.

Timeline: *DRR Programme 1999-2024*




5. Scaling up of DRR to the region
4. Adoption of the integrated DRR and CCA approach
6. Exit of bilateral Swiss cooperation from Central America
Start of transfer to local partners
2010
2011
2013
2015
2017
2018
2020
2022
2024
Approval of PCGIR
Tropical Depression 12E
Sendai Framework for Disaster Risk Reduction 2015-2030
PCGIR Update
Guatemala Fuego Volcano eruption
Guatemala, Honduras and Nicaragua Hurricanes Eta and Iota

Milestones

1. Start of the *DRR Programme* - 1999

Hurricane Mitch (1998) highlighted the weaknesses of national institutions and local governments in dealing with disasters and in identifying, mapping and managing risks. Competent human resources were very scarce and the legal and institutional frameworks were focused on emergency management.

The ***DRR Programme began in 1999*** with short-term projects and only a small budget aimed at responding to the weaknesses identified in the area of disaster prevention. The first project, implemented in Nicaragua, was in the area of *Hazard-mapping and capacity-building for local-level risk management*[13] and was aimed at reducing the vulnerability of municipalities to natural hazards. Honduras had no institutions or legal framework to facilitate disaster prevention work, so the Programme focused on the macro level through the United Nations Development Programme (UNDP), with the objective of strengthening the country's disaster prevention capacities and developing a culture of prevention.

Following the **earthquakes in El Salvador in 2001**, activities were extended to this country with projects similar to those in Nicaragua. These events highlighted the frequent recurrence of disasters in the region and contributed to SDC's decision to continue its collaboration in disaster prevention. The *DRR Programme* began to take shape in 2001 with the expansion of projects in Nicaragua, Honduras and El Salvador.

2. Adoption of the programmatic approach - 2003

The **programmatic approach was adopted in 2003** as a result of the revision of the *Regional Cooperation Programme 2000-2006*. For the first time, disaster prevention projects were presented in that regional programme structured as a programme called *Prevention of Natural Disasters in Central America* (PREVAC), which became known as the *DRR Programme* as of 2013. The objectives of this programme were to reduce the loss of lives and economic losses caused by disasters[14] and alleviate poverty and human suffering by building capacity in public institutions and communities.

The adoption of this programmatic approach implied some changes; among the main ones is to have projects of of more than one year's duration, articulated in defined thematic lines. In the following years, this approach was consolidated and the following changes were made: extension of the duration to up to three years, definition of partner selection criteria, impact orientation (SMART indicators and impact chains) and concentration of actions at the local level.

3. Adoption of the Integrated Disaster Risk Management approach (IDRM) - 2005

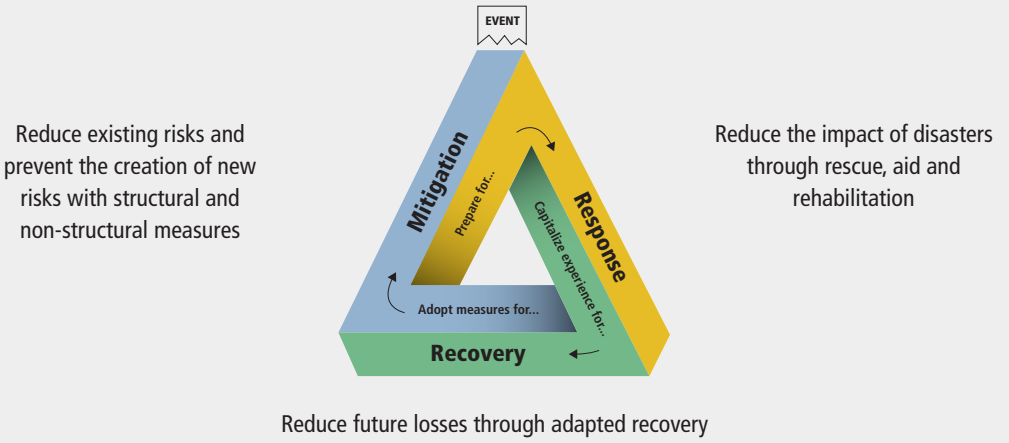
The IDRM approach was adopted in 2005 with the approval of the *Swiss Disaster Reduction Concept for Central America 2005-2007*, in line with the Natural Disaster Reduction Strategy of SDC's Humanitarian Aid Department. This approach focuses on the stages that usually occur before (prevention), during (preparedness and emergency response) and after (recovery) events, as shown in Figure 1, and is consistent with the concept of the United Nations Office for Disaster Risk Reduction (UNDRR).[16]

What is Disaster Risk Reduction?[15]

The concept and practice of reducing disaster risk through systematic efforts aimed at analysing and managing the causal factors of disasters, including reducing exposure to hazards, reducing the vulnerability of people and property, sound land and environmental management, and improving preparedness for adverse events.

[13] Proyecto Apoyo Local para el Análisis y Manejo de los Riesgos Naturales (ALARN).
[14] This refers to disasters triggered by natural hazards.
[15] SDC adheres to the definition established by UNDRR in the Sendai Framework.
[16] In https://www.unisdr.org/files/7817_UNISDRTerminologySpanish.pdf

Figure 1: Strategic concept for a comprehensive IDRM approach



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The **main changes** implied by the adoption of this IDRM approach have to do with the introduction of disaster preparedness activities (community organisation, contingency plans, drills, etc.) and risk mitigation (protection works) in the projects implemented in municipalities and communities. The *DRR Programme* maintained the greatest weight in prevention activities, to ensure an adequate balance since other actors were focused on preparedness activities. Other changes were the selection of new partners with experience in IDRM and the reduction of activities at the meso level.

The IDRM approach continued to be active in the following two phases (2005-2007 and 2008-2012) with the objective of "generating changes at the level of actors controlling the development of vulnerability, improving their IDRM outcomes through increased capacity and knowledge of local natural hazards, social processes of risk construction and more appropriate and sustainable DRR measures."

4. Adoption of the integrated Disaster Risk Reduction and Climate Change Adaptation approach - 2013

The **integrated DRR and CCA approach was adopted in 2013** motivated by the regional dynamic and by SDC's institutional changes. The awareness generated by the constant extreme climatic events[17] affecting the region between 2006 and 2012; and approval of both the *Central American Integrated Risk Management Policy* (PCGIR) and the *Regional Climate Change Strategy* (ERCC) in 2010 expressing the concern about the impact of climate change and the need to articulate DRR and CCA to improve the effectiveness of the programmes stand out among the regional dynamics. Since 2009, some *DRR Programme* projects had already started to address CCA (studies, awareness, works and technologies) motivated by the regional dynamics mentioned above. The DRR Programme supported these partner initiatives as an opportunity to learn from these experiences for future interventions.

At the institutional level, SDC defined climate change as a priority issue; consequently, the *Regional Cooperation Strategy 2013-2017* took up these and other pilots and created a new area of intervention under the name of *Environmental Vulnerability and Climate Change*, incorporating the *DRR Programme* and the environmental and new climate change programmes. Its objective was to generate changes in public and private stakeholders to contribute to an effective resource management for DRR and CCA.

Incorporating the integrated DRR and CCA approach into the projects implied a more systematic incorporation of reflections on the impact of climate change and the development of awareness and training processes in DRR and CCA for the population and other stakeholders. For their part, universities incorporated modules and subjects that addressed both topics. DRR and CCA technologies such as drought-resistant crops, water harvesting systems, greenhouses and protection of coastal dunes were also validated in the communities. In addition to conducting

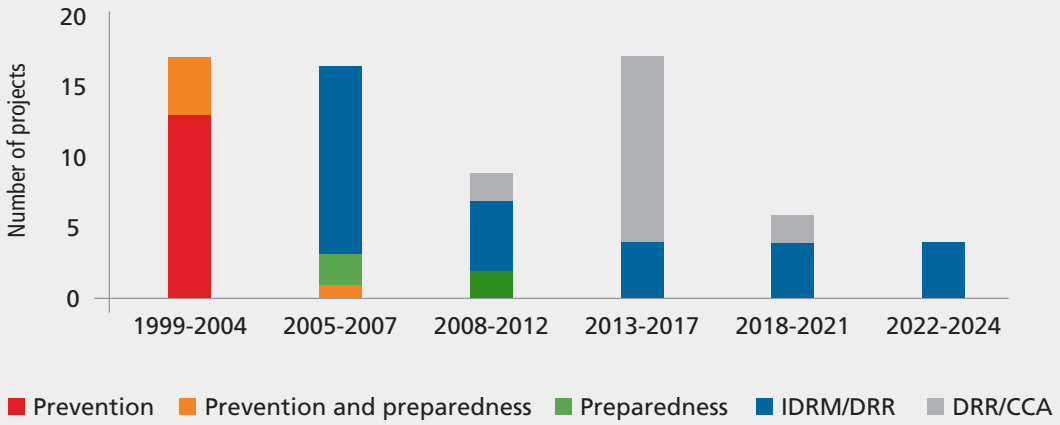
[17] Programa Estado de la Nación. Informe Estado de la Región 2016.

scientific studies, CCA technologies were integrated as part of the DRR measures. Moreover, climate change scenarios were incorporated as design criteria into the design of DRR measures and intervention strategies.

Within SDC, there was encouragement to integrate DRR actions into a large number of climate change projects, for example the *Community Management of the Dipilto River Basin in Nicaragua* and the *Community Management of the Goascorán Basin in Honduras* programmes, which designed DRR protection works as part of the watershed approach. It was also necessary to identify new partners with experience in CCA, as well as to develop training processes for the project technical teams and programme officers of the Swiss Cooperation Office, including several courses on the *Climate, Environment and Disaster Risk Reduction Integration Guidance* (CEDRIG). More systematic support was also provided for the application of CEDRIG in other SDC programmes.

Figure 2 shows the types of projects that were developed with an integrated DRR and CCA approach. As can be observed, from 2008 until the closure of the *DRR Programme*, a good percentage of projects adopted both topics. The partners, universities, and UNDP were the most constant and committed. As of 2018, the number of projects working on the integrated approach was reduced to a third due to the focus on specific DRR topics such as Early Warning Systems (EWS) for earthquakes and volcanoes.

Figure 2: Types of projects by phase



5. Scaling up to the region - 2013

National experiences began to be **scaled up to the region in 2013,** based on recommendations by the evaluation of the *DRR Programme* conducted in 2012.This evaluation indicated that several national projects had replication potential and suggested sharing these experiences with the region through regional entities in order to have greater reach and effectiveness. At that time, CEPREDENAC and the Central American Higher Education Council (CSUCA) were the ideal regional partners as they had prestige among their associates and had recently approved regional policy frameworks that could serve as a reference for future interventions.

The scaling up of successful experiences at the regional level occurred with selected topics: *Integrating DRR and CCA into universities* was piloted in 2008 in Nicaragua in the Multidisciplinary Regional Department (FAREM-Estelí) of the National Autonomous University (UNAN) and was extended to five departments of UNAN-Managua. This experience was scaled up to the region in 2013 through CSUCA. Other topics were earthquake EWS, a project that was piloted in Nicaragua between 2016 and 2017 and scaled up to the region starting in 2018, and the *Integration of DRR and CCA into the public investment project cycle*, developed in Nicaragua in 2017 and expanded to the region in 2019. The latter had also been worked on, albeit to a lesser extent, in Honduras in 2015.

The main changes since 2013 have been the selection of regional partners, mainly from the SICA institutional framework with mandates in the aforementioned areas, as well as projects with larger budgets and longer duration.

6. Exit of bilateral Swiss cooperation from Central America - 2024

In **2020**, the Swiss Parliament decided that Swiss bilateral cooperation would gradually withdraw from Latin America, a process that ends in 2024. For the *Regional Cooperation Programme for Central America*, including the *DRR Programme*, it meant planning the closure together with the partners.

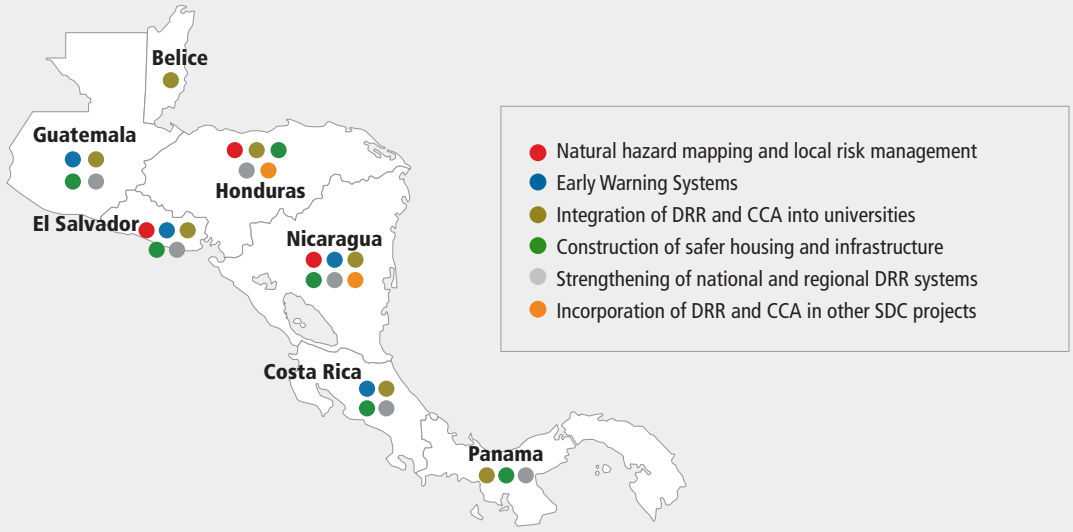
Among the main changes of the *DRR Programme* are the reduction of the duration and phases of the projects that were planned beyond 2024; adjustments to the operational plans and to the scope and goals of the projects, prioritizing the most promising results; reduction of the number of projects and thematic lines of work; and a strong focus on knowledge management and on improving the sustainability of the interventions.

COVID-19 generated significant delays in the implementation of the projects. This crisis made it necessary to restructure the capacity-building strategies by incorporating the necessary equipment and technologies that allowed the training processes to continue virtually. Budgets were also allocated for the purchase of protective supplies to ensure that field activities did not come to a halt.

As part of the exit strategy, SDC considered continuing to support regional strategic partners, including CEPREDENAC, and to promote greater coordination with and support from United Nations agencies, such as the UN Office for Humanitarian Affairs (OCHA) and UNDRR. Both offices have a permanent presence in the Central American region, maintain cooperation relations with CEPREDENAC, and the projects supported by the *DRR Programme* continue to be thematic priorities in their institutional plans. Therefore, it is expected that they will continue to support CEPREDENAC after 2024.

Switzerland's exit from bilateral cooperation in the region does not mean the end of collaborative relations. Switzerland will maintain its humanitarian mandate with the region, in disaster situations, and will continue to accompany some key actions through other cooperation instruments, such as the global programmes and the regional Hub in Lima.

Map 2: Interventions of the *DRR Programme* in Central America



Themes	Projects	Budget (CHF)
Natural hazard mapping and local risk management	31	10,222,937
Early Warning Systems	5	3,938,523
Integration of DRR and CCA into universities	10	6,078,003
Construction of safer housing and infrastructure	4	4,658,328
Strengthening of national and regional DRR systems	19	16,826,430
Incorporation of DRR and CCA in other SDC projects	0	127,276
Total	**69**	**41,851,497**

Management and modalities of the *DRR Programme*

The *DRR Programme* was financed by SDC Humanitarian Aid and managed by the Cooperation Office in Managua through a team composed of a head of Humanitarian Aid and programme officers, with strategic monitoring from the headquarters in Switzerland. The staff in charge of the *DRR Programme* also assumed the process of integrating DRR into other SDC programmes and the response to emergencies in the region. To support the latter, Local Emergency Teams (EELs) were created in 2006 as instruments to support the Swiss response. The objective of the EELs is to ensure that Central America has trained personnel and adequate instruments to support Switzerland's rapid and effective response to disasters.

Local Emergency Teams: A novel experience

The teams organised in Nicaragua, Honduras, El Salvador and Guatemala are made up of representatives of Swiss NGOs, embassies or consulates and *DRR Programme* staff. They also have a regional coordination based in Managua under the responsibility of the person in charge of Swiss Humanitarian Aid. For their operation, each EEL has an organisational structure, a Red File with defined protocols and responsibilities. Continuous training processes are organised, including simulation exercises. Since 2010, the EELs have been coordinated with the Rapid Intervention and Support Group (GIAR) organised for the same purpose in South America. Both concepts, EELs and GIAR, have made progress in standardizing instruments and approaches, taking advantage of the benefits offered by each concept. In view of SDC's exit from the region in 2024, the GIAR has adopted a regional approach covering Latin America and the Caribbean, however in Central America Swiss NGOs organised in the EELs could continue to play a leading role in supporting Switzerland's response.

The added value of the EELs is based on the networks of local partners, institutional contacts, knowledge of the local context and the territorial permanence of Swiss NGOs, which, as part of their role in the EELs, support the identification and prioritization of humanitarian needs and, in some cases, directly implement humanitarian response actions together with their partners. This helps alleviate the suffering of people affected by disasters through a more agile, effective and localized response from Switzerland, as was demonstrated during the emergencies caused by Tropical Depressions 12 E and 16, and Hurricanes Agatha, Eta and Iota, among others. In the case of the latter two hurricanes, a successful intervention was ensured thanks to the joint work of the EELs, the GIAR and specialised groups of the SHA.

Gender as a crosscutting theme

The *DRR Programme* promoted the development of gender-transformative actions in the countries and in the region, especially in recent years. The projects with universities were the first to integrate gender modules into their training and integrated risk management processes. Women's participation in community organisations was promoted.

Postgraduate course in risk management, National Autonomous University of Honduras. ©IHCIT

At the regional level, specific actions were taken to strengthen the gender approach, for example the holding of the first workshop to sensitise and train CEPREDENAC and all the national systems. Strategies were developed in Costa Rica by the National Emergency Commission (CNE) and in Guatemala by the National Coordinating Body for Disaster Reduction (CONRED), to incorporate a gender equality approach into their national risk management systems, and a virtual course on gender in local risk management was designed to train local committees in all the municipalities of Guatemala. In addition, El Salvador's General Directorate of Civil Protection held a workshop on basic concepts of masculinity, with the goal of strengthening the knowledge of 145 technicians of the institution.

In Nicaragua, the National Disaster Prevention, Mitigation and Response System (SINAPRED) prepared an insurance plan for the demonstration sub-project *Strengthening Community Capacities with a Gender Approach* to reduce the vulnerability of women from 200 families in the communities of La Hoyada, Las Viudas, San Isidro de la Cruz Verde and Jocote Dulce in District I of Managua.

In general, as part of the capacity-building actions, all projects conducted training and awareness-raising activities on gender and in several projects an average women's participation of between 20 and 40% was ensured. To date, no evaluation has been conducted to determine the results of this approach in all activities of the *DRR Programme*.

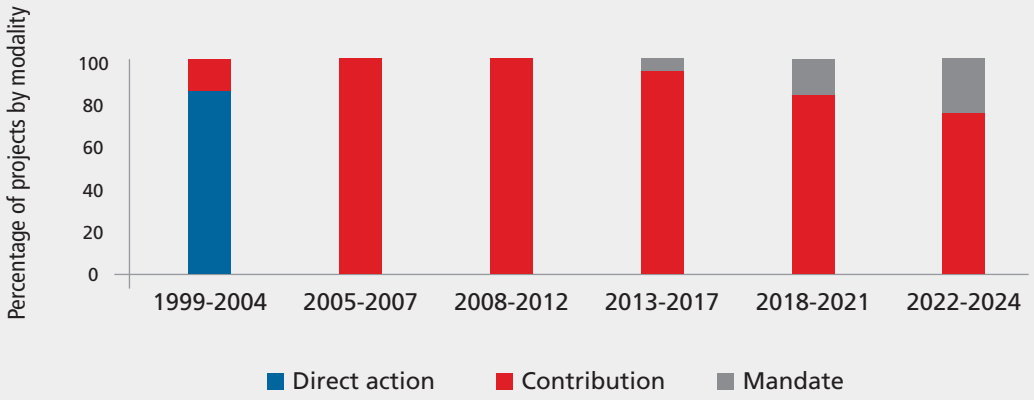
Although gender was a priority issue for the *DRR Programme*, specialised accompaniment was only provided on an ad hoc basis. Risk management continues to have a male bias. For example, management positions at the highest levels are mostly occupied by men. In the area of disaster preparedness, there is a high potential to promote women's participation.

Implementation modalities

Until 2004, the main project **implementation modality** was **direct action** (implemented by SDC) and, to a lesser extent, contributions were made to national institutions, universities and UNDP. Starting in 2005, the **contribution modality** was adopted as a standard, which meant a major change in the implementation of projects, most of which were implemented by partners in order to consider their needs and strengthen their appropriation and sustainability. Although this modality improved project appropriation, it did not necessarily imply a substantive improvement in their sustainability, influenced by the low availability of resources. Most of the projects were implemented with local or international nongovernmental organisations, universities, regional partners, national institutions and the United Nations. To a lesser extent, the **mandate modality** was introduced in 2013, with the Swiss Federal Institute of Technology Zurich (ETHZ).

The documentary analysis highlights some elements that allow inferring that the **contribution modality** ensured a greater scope of the project, greater appropriation and greater probability of institutionalising the results, although their quality was not necessarily higher. On the other hand, the **direct execution modality** permitted streamlined execution and greater control over quality and planned results, but had less appropriation and did not contribute to the actions' sustainability.

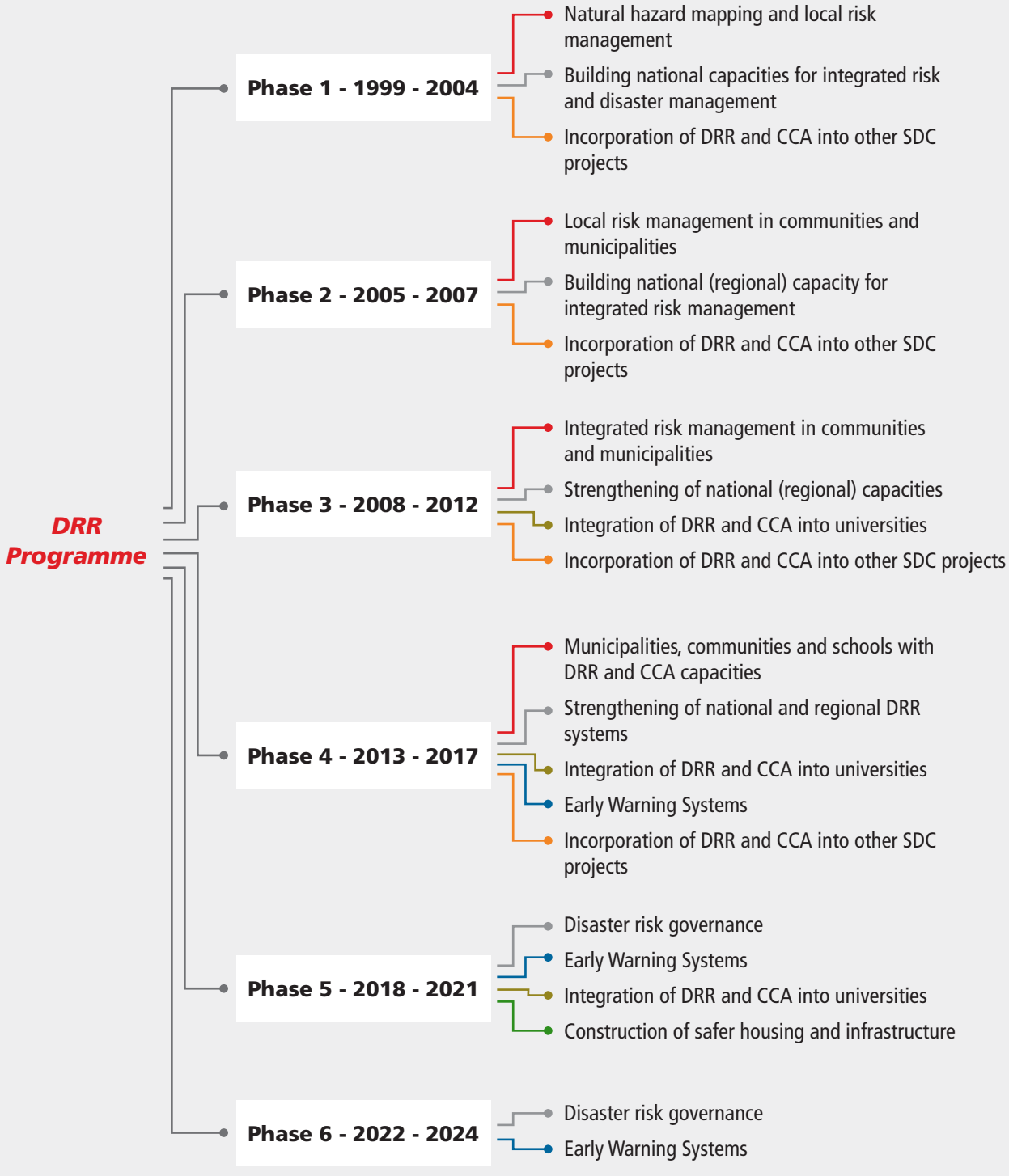
Figure 3: Implementation modalities



Thematic lines

The *DRR Programme* was structured in **six thematic lines**, which were introduced in different periods throughout its 25 years of implementation. Some of the lines changed their name and work focus, for example, *Building national capacities for IDRM* was expanded to *Strengthening of national and regional DRR systems*, which includes *Disaster Risk Governance*. Others became components of broader lines such as *Natural Hazard Mapping*, which was incorporated into the *Local Risk Management* line. Figure 4 shows the names of the different thematic lines in each phase and their evolution. The following chapter presents the thematic analysis of each of these lines.

Figure 4: Global view of the thematic lines by phase



Thematic analysis

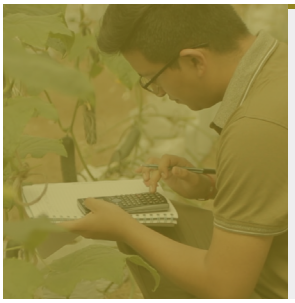
> “I encounter in SDC that desire to innovate, to gamble on processes no one else was betting on and that hadn’t been proven: mapping and risk estimates, linking CCA and DRR, strengthening academia, accreditations, and improving standards, and promoting national processes at the highest level to generate advocacy and progress in the local implementation of disaster risk management and in the population as a whole. These are fundamental elements for the success of the DRR Programme.”

Linda Zilbert, project coordinator *Human Resource Training for the Integration of the National Disaster Prevention, Mitigation and Response System (FRHIS)* 2001-2004

The objectives of the *DRR Programme’s* six thematic lines are presented below:

1. Natural hazard mapping and local risk management
Support municipal governments in developing capacities and technical tools to manage risks and incorporate them into municipal planning.

2. Early Warning Systems (EWS)
Help save lives by developing Early Warning Systems and their timely emissions to the population.



3. Integration of DRR and CCA into universities
Reduce disaster risks and damage to key infrastructure by training specialists, capacity-building of teachers and students, and developing methodologies and tools to integrate and institutionalise DRR and CCA in academic programmes, research and community activities.

4. Construction of safer housing and infrastructure
Help reduce losses and damage to public and private infrastructure resulting from disasters by promoting the application of building standards in the informal housing construction sector and the incorporation of DRR and CCA in the cycle of public investment projects.

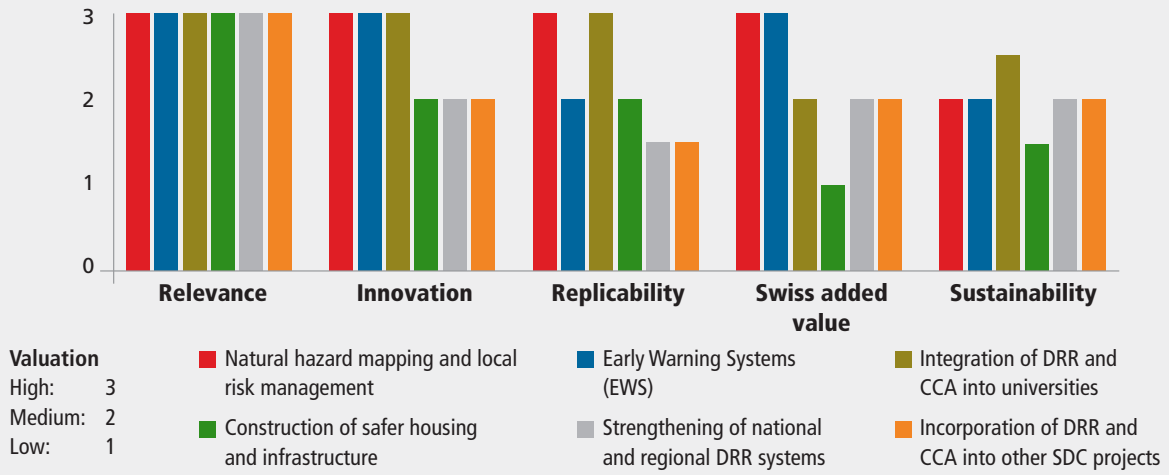
5. Strengthening of national and regional DRR systems
Develop DRR capacities in national institutions for effective risk and disaster management.

6. Incorporation of DDR and CCA into other SDC projects
Provide technical support and advice to ensure that SDC programmes incorporate the DRR approach into their projects and thus contribute to the sustainability of investments, reducing disaster losses and damage (see Appendix 3).

Some of the products generated by each thematic line are gathered in a **Compendium of publications** that can be consulted online.

The analysis of each of the thematic lines is based on the following criteria: **relevance, innovation, replicability, Swiss added value and sustainability.** These criteria, with the exception of the Swiss added value, are universal criteria used in systematisation processes and experience capitalisations since they serve to better structure, analyse, and interpret the contribution of each systematisation axis, in this case of the thematic lines of the *DRR Programme.* Appendix 2 presents each criterion and the valuation (High, Medium, Low) used in this analysis.

Figure 5: Thematic analysis



All thematic lines were **relevant.** Central America is one of the regions of the world with the highest risks and multiple hazards. At least 19 million people live in these areas. In addition, these themes responded to the region's problems and needs, were consistent with the context and priorities of the Sendai Framework for Disaster Risk Reduction 2015-2030, the SDGs and the PCGIR.

Among the most **innovative** themes are *Natural hazard mapping and local risk management, Integration of DRR and CCA into universities*, and *EWS*, through which unique methodological tools were developed in the region. These adapted state-of-the-art technologies were relatively low cost, while maintaining their quality levels. In the case of Mapping, the main innovations were made in ALARN, where risk management tools were developed with a methodology and technical recommendations for landslide and flood hazard analysis and mapping. These instruments used simple, practical methods -without losing their scientific character and technical robustness[18] – or their low cost. The ALARN methodology also had the novelty of integrating local knowledge with scientific knowledge.

Integration of DRR and CCA into universities was highly innovative because it generated unique products in Latin America. The approval of an innovative *Central American University Policy for Disaster Risk Reduction (PUCARRD)*, which integrates DRR and CCA, and *Quality criteria guidelines for university accreditation purposes* stand out. The instruments were developed in a participatory manner, piloted and adjusted to the context of each country and university.

In EWS, the innovation was high because it was possible to adapt a very specialised technology in earthquake EWS to the characteristics of each country (Nicaragua, Costa Rica, El Salvador and Guatemala), which few countries have. The merit was to make it accessible to these countries without losing quality and at a much lower cost than the original Swiss system.

Natural hazard mapping and local risk management and Integration of DRR and CCA into universities were where the greatest opportunities for **replicability** were identified, because they were proven functional methodologies, with low implementation costs, simple in their application, but guaranteeing the scientific nature of the instruments. In *Mapping*, this methodology continues to have great replicability potential because it is still valid as most of the municipalities do not yet have maps and studies to manage risks locally. Its replicability potential was proven after Nicaragua, El Salvador, and Honduras implemented it with funding from the *DRR Programme* and other institutions.

[18] Proven methods, e.g. geomorphological analysis to identify flood plains or unstable areas.

For its part, *Integration of DRR and CCA into universities* presented high replicability promoted by having methodologies, commitment of university authorities, a policy framework that facilitated it, and the availability of teachers trained in these topics, in addition to the interest of the student body. Replicability was proven because the pilot project, developed by the Regional Multidisciplinary Faculty of Estelí, was implemented at the National Autonomous University of Nicaragua (UNAN) and later by CSUCA in 23 universities in the region and two private universities. Regarding the lower replicability lines, *Strengthening of national and regional systems* and *Incorporation of DRR and CCA into other SDC projects* are less valued because they have budget limitations for replicating the experiences and the high staff turnover rates lead to the loss of acquired knowledge.

With respect to **Swiss added value**, all topics benefited from *Swiss expertise*, albeit to varying degrees. *Mapping* and *EWS* stood out with the highest value in this criterion. Knowledge, methodologies and technologies were successfully transferred to the region, after adaptation to the context. In the former, the Swiss added value was high and consisted of enriching local risk management strengthening processes with good quality technical-scientific analysis, transferring Swiss knowledge and methodologies to national professionals and sharing experiences of Swiss experts and other SDC projects with partners.

Swiss added value was also high in *EWS*, and was based on the transfer of technology and specialised know-how from Switzerland to Central America. In addition, the scientific knowledge of hazards was enriched through technical studies and high-quality technologies to which there was no access before the *DRR Programme*. Of all the themes, the line *Constructing safer housing and infrastructure* presented the least Swiss added value because it did not take full advantage of the experience, tools and materials that Swiss experts have developed in other contexts (MiResiliencia and EconoMe)[19] as well as the construction guides of Ecuador and Haiti.

As regards **sustainability**, almost all the thematic lines and, therefore, the projects linked to them, presented average levels in this criterion, because the institutions could not significantly increase their budgets to provide continuity, update or replicate the experiences and instruments developed with the support of the *DRR Programme*. In addition, the high turnover of trained personnel in local governments and institutions caused the loss of competent human capital and the discontinuity of some processes. However, the most sustainable results were achieved in the thematic line *Integration of DRR and CCA into universities*, because it was possible to institutionalise the processes through the PUCARRD and each university's institutional policies.[20] In addition, a critical mass was formed of teachers who do not require greater resources to continue the training processes for young students. Most of the master's and postgraduate programmes, initially supported by the *DRR Programme*, are still offered with funding from universities and students.

In this same sustainability criterion, the *Construction of safer housing and infrastructure* thematic line presents the lowest levels of sustainability, since the institutions involved have low budgets and the processes developed were not yet institutionalised at the time of this capitalisation.

Swiss expert exchanging knowledge and experiences with a community leader from the municipality of Dipilto, Nicaragua. © SDC

[19] Swiss platform for the economic evaluation of risk mitigation measures in projects.
[20] In https://www.unan.edu.ni/wp-content/uploads/Politica_Gestion_Riesgo.pdf

Impact and effects[21]

1999: Initial DRR context.[22] Central America is a highly vulnerable region, which increases the risk of disasters causing severe damage to the exposed populations, their productive base and physical infrastructure. Some countries have undertaken actions to deal with emergencies (early warning, evacuation and first aid), but little has been done on prevention and mitigation issues. The factors that increase Central America's fragility include inadequate land use such as unplanned and unregulated urbanization and unsustainable urbanization processes, as well as unsustainable practices such as over-exploitation of water resources, deforestation and agriculture on hillsides without management and soil conservation plans.

2023: DRR Context. The current situation in the region has become more complex and vulnerability to disasters has deepened. Poverty levels, exposure of the population to hazards, and environmental degradation have increased due to climate change,[23] which is generating a greater recurrence and intensity of disasters. It should be noted, however, that the region now has more capacities, instruments, policies and plans that favour the reduction of these risks compared to the initial context, although they are still insufficient to achieve sustainable changes.

The **long-term** impact sought by the *DRR Programme* through its interventions was to help save lives, alleviate the affected population's suffering and reduce the losses and damage from disasters in Central America.

- **Save lives:** are The institutions and a modest percentage of the populations at risk in the four countries with the highest seismic risks are receiving the warnings issued by the EWS. This percentage is expected to gradually increase in the coming years as the EWSs consolidate. There are also standards, procedures and capacities in the national systems for developing national accreditation with recognition from the International Search and Rescue Advisory Group (INSARAG) - IRNAP, which allows for a more streamlined response and a greater likelihood of saving lives.
- **Alleviate the suffering of the affected population:** The population's needs are addressed in a more agile and timely manner, which, in disaster situations, helps alleviate their suffering. Having equipment, capabilities, instruments and Emergency Operations Centres (EOCs) allows for a coordinated and timely response. Response times are reduced from days to a few hours, so that the affected population can receive aid more quickly.
- **Reduce losses and damage from disasters:** The *DRR Programme* has laid good foundations at different levels, for example in municipalities through greater knowledge of risks; in universities by forming a critical mass of students and teachers specialised in DRR; and in public investment institutions that have methodologies with which projects that consider DRR measures are now designed.

Due to the long-term commitment assumed by SDC and its partners, the *DRR Programme* also generated intermediate impacts and effects in the medium term, some of which are detailed below:

First medium-term impact. The populations, their livelihoods and the infrastructures that provide them with services are more resilient to the effects of climate change and other natural hazards because the improved performance of the actors involved has effectively reduced disaster risks.

[21] It is important to mention that the analysis of the information presented in this chapter responds to the capitalisation exercise, which is focused on identifying and assessing the medium- and long-term effects and impacts presented in the reports, evaluations and direct observations of the DRR Programme.
[22] Programa Estado de la Nación. Informe Estado de la Región 2016.
[23] In https://estadonacion.or.cr/wp-content/uploads/2022/05/PEN_informe_estado_region_completo_2021.pdf

Members of the Local Emergency Committee, Loma Linda Community, El Palmar municipality, Guatemala. © SDC

> "We built a house on the edge of a ravine. When we built it, we didn't know we were in danger, but when we made the map, we saw the house was at risk, so we dismantled the whole house, then rebuilt it the same, only even bigger. You're grateful when someone informs you."
>
> **Sara Munguía,** beneficiary, José de la Montaña - Dulce Nombre de Culmí, Olancho, Honduras

The Programme has been able to promote changes in the performance of local governments, universities, sectoral institutions and public and private stakeholders. This has laid a good foundation for achieving the medium - and long - term impact sought, which is to make the population and their livelihoods more resilient to climate change and other threats. The main changes identified are detailed below.

1. At the local government level, the main systemic change achieved is the **availability and application of DRR** instruments in their municipal planning processes. One hundred municipalities[24] of Nicaragua, Honduras and El Salvador have maps, risk studies, municipal DRR plans, ordinances to regulate risk areas and trained technical staff. Between 1999 and 2012, these instruments were widely disseminated to the population, increasing their awareness and knowledge of risks.

   More than ten years later, several of these municipalities continue to use these instruments as a reference for DRR and have implemented many of the DRR measures in their municipal plans, especially those referring to critical sites in each municipality. In Nicaragua, SINAPRED encourages their updating and promotes risk management in these critical sites. In general, the implementation of DRR plans with the municipalities' own resources has been low; in some cases, they have had contributions from other donors and organisations. Some causes that influence the low implementation are: high costs of DRR measures recommended in the plans, low municipal budget, absence of advocacy and awareness strategies aimed at municipal councils and central government, which are considered key actors in the allocation of budgetary resources.

   Cases were also identified of municipalities that have continued and made advances in the institutionalisation of risk management processes, for example by creating Municipal Risk Management Units in Guatemala, Honduras and Nicaragua, regulating risk areas and locating small public infrastructures in safer zones. The municipal government of the central district of Tegucigalpa in Honduras stands out for having reduced the risk of disasters

The *DRR Programme* contributes to the following priorities of the **Sendai Framework for Disaster Risk Reduction 2015-2030:**

Priority 1: Understand the risk of disasters.

Priority 2: Strengthen the governance of disaster risk.

Priority 3: Invest in disaster risk reduction for resilience.

[24] In total, there are 713 municipalities in the 3 countries. With the *DRR Programme*, 14% of municipalities were covered, and including studies financed by other donors, it reaches 21%. In terms of municipalities at risk, more than 60% were covered in Nicaragua.

in some areas with the application of ordinances in risk zones and the systematic evaluation of constructions through prevention officials trained by the *DRR Programme,* as well as for having an alert monitoring system.

Thanks to their improved performance and the community awareness and training processes, the municipalities have provided support, knowledge and tools (such as community maps) so that people like Sara Munguía, a beneficiary from the community of José de la Montaña, Olancho, Honduras, have been able to reduce the risk to their family. Thanks to the knowledge acquired, Sara moved her home from a high-risk zone to a safe one, making it more resilient to climate change and other hazards.

2. The main change foreseen in the performance of universities was that they **graduate competent professionals in DRR and CCA to implement good construction and agricultural practices** and influence the definition of public policies for the designation of larger budgets or better institutional frameworks for DRR and CCA, all with the ultimate goal of reducing risks. Among the changes generated to date, about 40,000 undergraduate students and almost 200 professionals specialised in DRR and CCA stand out, although it is not known how many of them are applying their knowledge to reduce risks in infrastructure or in key sectors of the region's economy. However, this capitalisation found that a good number of these specialists are working on the subject or in related areas in different key institutions for DRR,[25] from which they apply and contribute knowledge for decision-making.

   Effects in universities include the approval and implementation of the PUCARRD in 25 universities, making this region the only one in the world with this kind of instrument, as well as career accreditation guidelines. More specialists continue to receive master's degrees in Honduras and Nicaragua. Centres with competence in DRR, such as UNAN Managua's Institute of Geology and Geophysics (IGG-CIGEO) in Nicaragua and the Honduran Institute of Earth Sciences (IHCIT) are providing information and expertise to manage risks. In addition, the universities continue to prepare students in these topics and according to data from the documentary review, nearly 2,000 teachers from the different universities have received training in DRR and CCA. All these achievements undoubtedly show that university graduates could help reduce risk effectively in the medium term.

3. Another change sought was for **sectoral institutions and the private sector to build infrastructure that is more resistant** to the impact of disasters and thus reduce losses and damage caused by these events.

   At the close of the *DRR Programme*, there is some progress in the construction of infrastructure that is more resilient to the impact of disasters, due to the incorporation of DRR analysis and measures in public investment projects. There is no database to know exactly the number of projects that are now more resilient, but since 2017, in the case of Nicaragua, all public investment projects must submit studies and risk analyses on a mandatory basis as part of the regulations[26] by the General Directorate of Public Investment. In the case of Honduras, the S*ite and constructed space risk assessment manual* is one of the instruments applied by the General Directorate of Public Investment in its project cycle. In the rest of the countries, the processes are underway at the pilot level with the support of ECLAC. The *DRR Programme* leaves a legacy of instruments and capacities in sectoral and private institutions so they can advance and consolidate these processes of resilient construction in the medium and long term. These include guides, sectoral methodologies to integrate DRR and CCA in the project cycle, construction primers, and capacities for their application at different levels.

   As for informal construction, there is no evidence that the tools are being applied on a massive scale to build properly due, among other things, to the high cost of construction materials and quality labour, low application of construction regulations and low appropriation of the instruments by local governments.

4. The fourth effect sought by the Programme was that **public and private stakeholders invest more in DRR and CCA based on improved and inclusive governance.** According to the analysis done, public stakeholders are investing more in DRR and CCA,[27] but not necessarily with resources from their budget; to a large extent these come from international cooperation. The budgets of the governing bodies have had few increases, and most of them are for operating expenses. But improvements in governance are observed with the inclusion of other stakeholders in DRR, such as universities and the private sector.

[25] IDB, WB, UNDP, IHCIT COPECO, SINAPRED, SNET and universities. National IDRM and civil protection systems.
[26] In http://www.snip.gob.ni/Normativa/Preinversion.
[27] In https://www.eleconomista.net/economia/BID-presenta-millonario-plan-de-apoyo-a-reduccion-desastres-en-Centroamerica-20210222-0021.html

The *DRR Programme* planned actions to ensure that the private sector increased its investment in these issues, but it found low sensitivity in this sector, which is why the Programme's strategy focused on raising awareness and promoting business continuity plans in disaster situations. Nicaragua made progress by incorporating the hotel sector in several municipalities of the country, and Honduras with the *maquilas* (assembly plants for re-export), getting them to implement their business continuity plans, and companies such as Holcim to contribute resources for the construction of key infrastructure. The initial hypothesis of increasing investments for DRR by the private sector has not been fulfilled as expected to date, and a significant increase of investments for DRR has not yet been observed.

CEPREDENAC and the countries of the region improved their accountability processes and implementation of their plans and strategies. Most of them prepare annual reports and, in addition, report their progress in fulfilling their plans and international commitments to the Sendai Framework for Disaster Risk Reduction 2015-2030. This is the only region with a module in the Sendai monitoring system. The reports are shared via national spaces and regional and global DRR platforms promoted by UNDRR. Despite the progress identified, governance still needs to be strengthened to improve CEPREDENAC's performance and quality management. The sustainability of these processes will require the willingness of the countries and financial and human resources for their implementation.

Second medium-term impact. The vulnerable population has fewer needs and they are met in a timely and efficient manner, in line with international humanitarian principles and standards.

> "The benefit has been enormous. We've been able to equip the USAR teams in Guatemala...we have some teams that have high standards for an effective and efficient response. We're prepared, but hope never to use them."
>
> **Iván Mazariegos,** director of the Incident Command System, SE CONRED, Guatemala

Since 2018, Latin America and the Caribbean have experienced a significant increase in the number of people in humanitarian need. In Central America, the population in need increased by 60% in 2021 due to the impact of sudden-onset disasters and in particular strong hurrican seasons such as the one of Eta and Iota.[28] The *DRR Programme* has helped lower water and sanitation needs by strengthening the capacities of vulnerable communities and the availability of on-site teams to ensure safe water in emergencies. Beyond this, all of the capacities generated in national civil protection systems contribute to better risk reduction, planning and response in emergency situations.

The *DRR Programme* has established good foundations so that the population's needs are better met during emergencies. Some changes in the performance of CEPREDENAC and the national civil protection and risk management systems have been generated, as evidenced during hurricanes Eta and Iota in 2020. The main changes identified are detailed below:

The *DRR Programme* is contributing to the following priority of the **Sendai Framework for Disaster Risk Reduction 2015-2030:**

Priority 4: Increase disaster preparedness for effective response and build back better.

1. CEPREDENAC, the national and municipal systems, have significantly improved their capacity to respond to disasters and provide humanitarian assistance to meet the population's needs in a more efficient, effective, inclusive and principled way. The response is more coordinated, as was demonstrated during the COVID-19 pandemic and Hurricanes Eta and Iota when humanitarian corridors were established and technological platforms were used to share information and expedite attention to the affected population.

   The response is more efficient because these institutions now have standards aligned with the international humanitarian system, procedures, instruments and institutionalised humanitarian aid transit mechanisms, such as national search and rescue accreditation systems endorsed by INSARAG. Having these standards in place helps to speed up the response and increase the likelihood of saving lives. In addition, they have regional

[28] Panorama global humanitario, 2022. Informe abreviado para Latinoamérica y el Caribe.

protocols for the transit of humanitarian aid and institutionalised regional and national simulation drills. These drills have been key to implementing the SICA Regional Humanitarian Assistance Mechanism (Mec-Reg/SICA), identifying areas for improving and strengthening cooperation among the countries. Progress was also made in strengthening the capacities of almost 7,000 technicians from the region's national systems in areas such as ditch rescue, simulation design, information management, water and sanitation, among others. There is greater knowledge of international humanitarian principles and standards, but their application depends on the political will of governments. More than 20 EOCs[29] in the countries have been equipped and in municipalities of Nicaragua's Caribbean Coast, local volunteer men and women have been equipped and trained, helping to decentralize emergency responses. With this decentralization, the response time is reduced from days to a few hours, permitting a faster and more timely response to the affected population.

2. The *DRR Programme* contributed to the fact that the national civil protection and risk management systems of El Salvador, Nicaragua, Costa Rica, and Guatemala are receiving timely seismic warnings and transmitting them through a technological application to key actors and at-risk populations. In the future, it is expected that the number of people receiving the alerts will increase given that the countries have installed an Early Warning System for earthquakes and, in the case of Guatemala, it also has an EWS for volcanic eruptions of the Santiaguito volcano. The great challenge will be sustainability, since it will depend on the availability of human and financial resources to maintain the networks and the interinstitutional coordination between those who operate the EWS and those who issue the warnings. In addition, governance for network management is still in its infancy and the existing legal frameworks hinder the sending of warnings to the entire population.

   An unplanned result was the alliance with JICA and the Japan Telecommunications Engineering and Consulting Service (JTEC), which accelerated the process of sending experimental warnings to the population through digital television and cellular phones. Other initiatives are also active and institutionalised in INETER; for example, the volcanic alert monitoring system developed in Ometepe Island and the tsunami monitoring system. In the latter, this experience was replicated by INETER and the Civil Défense with the support of other cooperating partners. Switzerland's great merit was to be a pioneer in showing the way to build such a system, which is today one of the best in Central America.

First regional humanitarian assistance drill 2019, Managua, Nicaragua. © CEPREDENAC

[29] Known in Nicaragua as Disaster Operations Centres (CODES).

Success factors

> “The first and most important factor is the political one. There is a political will to ensure that risk management issues are and remain a priority on the agenda. This is expressed in the Government’s effective support to the actions we conduct from SINAPRED... to the support given in its entirety.”
>
> **Guillermo González,** minister director of SINAPRED, Nicaragua

The success of the *DRR Programme* can largely be attributed to the approaches and strategies used, the partnerships established, and contextual factors that in one way or another influenced its development. The main **external and internal factors** are detailed below.

External factors:

1. Recurrent impacts of disasters and climate change in the region increased the awareness of the population and key actors. It also generated the approval of favourable regional (PCGIR, ERCC) and national laws and policies, all of them linked to global frameworks such as Hyogo and Sendai, which boosted the progress of DRR in the region.

2. Committed and reliable partners that shared values and interests with SDC.

Internal factors:

1. Long-term commitment by SDC, which strengthened trust, transparency and flexibility among all stakeholders, as well as its ability to adapt to the priorities and needs of the context (IDRM and CCA approaches), thus maintaining its relevance.

2. Focus on disaster prevention from the beginning of the *DRR Programme* in which SDC has great expertise and solid technical knowledge, thus quickly positioning it as a relevant and reliable actor in the field. In addition, the focus on highly relevant and innovative thematic lines (hazard mapping, university integration, EWS, among others) contributed to their adoption and replicability.

3. Formation of a critical mass of capable national professionals experienced in the DRR and CCA field in alliance with universities.

4. Working with multiple actors from different levels, sectors and cooperation agencies on mutually reinforcing issues strengthened alliances, synergies and networks. It also made possible the exchange of experiences and knowledge horizontally and vertically. In addition, it strengthened regional integration and efficient resource use.

Challenges and lessons learned

> “We learned to break down the hazards; we thought it was only flooding, then began to realise the issue of landslides, rock falls and other risks associated with hazards and vulnerabilities. We have expanded the list of risks and threats and detailed it more.”
>
> **Axel Gómez,** deputy mayor of Ocotal, Nicaragua

The *DRR Programme* faced a series of challenges related to its context, management and implementation, and availability of financial and human resources, among others. From these challenges, some lessons learned, good practices (GPs) and bad practices (BPs) are included below. These are intended to serve as inputs for future interventions.

No.	CHALLENGES	LESSONS LEARNED
1	While the impact of climate change has increased public awareness of the issue, it has also put greater pressure on civil protection systems. This has meant that scarce financial and human resources were largely redirected to the most urgent response and rehabilitation needs and, to a lesser extent, to DRR.	Projects must have annual plans that take into account the dynamics of the context, including periods of high incidence of climatic and geological events, and have contingency plans that allow for an adequate response to these emergencies, ensuring the project’s operability.
2	The vulnerable population has other immediate priorities to deal with, such as poverty, lack of jobs, water sanitation, and security, which move DRR issues to the back burner.	DRR measures and actions should be multipurpose and, as far as possible, should alleviate the population’s main needs. For example, the construction of bridges not only serves to evacuate the population in emergencies, but also facilitates access to schools, hospitals and markets, among others.
3	Weak institutional governance that affects project sustainability, particularly limited budgets, inter-institutional coordination difficulties, low institutionalisation of processes, and constant personnel rotation in key positions - authorities and technical staff - due to changes of government.	From the outset of the projects, the external and internal factors that influence sustainability must be identified, as must the administrative and political measures that need to be implemented to ensure compliance with the commitments made. Activities to strengthen institutional governance should also be included.
4	Moving from a direct implementation modality to implementation by partners implies changes in the implementation quality, budget execution and project duration.	The change of modality implies accepting the dynamics, procedures and execution rhythms of the partners to avoid constant delays, reprogramming and pressures on budget execution during the last year. It also requires investing greater human and financial resources for follow-up and technical assistance to ensure adequate project execution.
5	It was difficult to incorporate the gender approach in the projects at the beginning of the Programme due to low awareness, little experience in the subject and the absence of institutional policies. In addition, there were few specialised capacities and resources to promote gender mainstreaming in the projects. In the area of youth, a challenge for the Programme was to try to include this approach when it was not a priority topic in the DRR field for SDC and for most of its partners.	Gender mainstreaming processes are slow when institutions do not have institutional policies and plans as reference frameworks. Institutions should be supported from the beginning of the projects to develop gender policies and be provided with specialised technical support. If the youth approach is to be incorporated into projects, it is important to have a defined strategic vision shared between SDC and its partners to promote its inclusion, particularly when working with universities.
6	Some *DRR Programme* partners had limited experience formulating and managing impact-oriented projects, development of baselines and preparation of annual plans.	It is important to include training processes in the projects to strengthen the competencies of partners in the formulation and management of impact-oriented projects.
7	In projects and programmes that did not have baselines, it was difficult to measure the achievement of their interventions. In many cases, annual plans were very ambitious, resulting in low execution.	The development of these instruments should be ensured at the outset and end of the project. The cooperation offices should include specific clauses on this issue in the contracts and encourage the partners to develop capacities for their implementation.

Good and bad practices

Good practices (GPs) are those exemplary, innovative, effective actions that produce positive results and can be adapted or replicated in future similar initiatives. On the other hand, bad practices (BPs) affect the development and implementation of projects. Some good and bad practices of the *DRR Programme* are included below:

1. **GP:** The medium-to-long term planning of the *DRR Programme* facilitated predictability and availability in the use of the budget, which generated greater confidence of the partners. It also allowed the cooperation office to take better advantage of intervention opportunities consistent with the defined themes and the context, as well as to reduce administrative procedures, improving the efficiency of the processes.

2. **GP:** The capacity-building processes were adapted to the context, and to the participants' knowledge and training level and profile. It was ensured that they were practical and oriented to concrete products, which generated interest and enrolment retention, increased the credibility of the *DRR Programme*, and promoted application of the knowledge.

3. **GP:** The development and promotion of practical, good quality, scientific-level tools, methodologies and technologies adapted to the local context, particularly to the physical and socioeconomic conditions and the availability of scientific information. These were positively valued by partners, which encouraged their use, application and appropriation by the different stakeholders. Their validation and continuous improvement are also highlighted.

4. **GP:** Ongoing accompaniment and provision of specialised technical assistance to partners through local experts, Swiss experts (backstoppers), specialised centres in the region and in Switzerland. This favors the transfer of knowledge and technologies, helps improve the quality of results and fosters innovation among local partners.

5. **GP:** Promotion of and support to the organisation and implementation of regional simulations and drills are seen as a contribution to risk governance where communities, municipalities, national and regional systems put their disaster response mechanisms and procedures into practice. This made it possible for these exercises to be scaled up to different levels, to integrate diverse actors and systemic approaches, and to validate and consolidate existing response mechanisms, thus encouraging their institutionalisation.

6. **GP:** The creation of Local Emergency Teams (EELs) proved to be effective as they take advantage of the contacts, knowledge of the local context and language; permanence in the territory; network of partners and relationships of Swiss NGOs to identify humanitarian needs and speed up the Swiss response.

7. **BP:** Some projects lacked adequate criteria to select DRR and CCA beneficiaries and did not involve them in the selection of DRR technologies; as a result, their processes were not sustainable.

8. **BP:** Despite the change in the project implementation modality by partners, SDC continued to hire project managers or coordinators directly. This practice undermined the trust of partners, reduced project appropriation and, in some cases, hindered the work of project managers.

Risk evaluation in the municipality of San Ramón, Matagalpa, Nicaragua. © SDC

Conclusions

The conclusions of this capitalisation process indicate that the *DRR Programme* is relevant and has helped generate systemic changes in the performance of national and regional institutions, universities and, to a lesser extent, the private sector.

1. The *DRR Programme* helped strengthen the disaster prevention culture in the region, increasing the level of knowledge and awareness of decision-makers at different levels (teachers, students, private sector, community and general population).

2. One of the greatest contributions of the *DRR Programme* was in the development of capacities to manage risks and disasters. More than 1.5 million people improved their capacities directly, forming a critical mass that contributes to disaster risk reduction in the region.

3. The *DRR Programme* was pioneering and innovative by introducing novel topics, methodologies and technologies that have been validated and continuously improved. Among the innovative topics, the following stand out: *Natural hazard mapping and local risk management, EWS,* and *Integration of DRR and CCA into universities.*

4. The sustainability of the results achieved is average in general because not all processes are institutionalised and depend on the political will of the institutions, good governance, resource management capacity, and the maintenance and expansion of competent human resources.

5. The process of integrating DRR into other SDC projects took longer than expected, and only accelerated when partners were involved and work plans, budgets and human resources were defined. As a result, it improved the sustainability of the infrastructures built and institutionalised the instruments in the partner institutions.

6. The *DRR Programme* recorded little progress on the gender issue because not all countries took full advantage of the funds specifically allocated to implement pilot projects to promote this approach. The absence of legal frameworks promoting the inclusion of gender issues encouraged interest in developing strategies, plans or policies, so resources were allocated for this purpose. Some concrete examples are those of Costa Rica (CNE) and Guatemala (CONRED), which, as part of the *DRR Programme*, succeeded in developing strategies to incorporate the gender equality approach in their national risk management systems.

7. The *DRR Programme* was developed in isolation from other programmes in Latin America and the Caribbean and with few exchanges among their counterparts. As a result, the opportunity to take better advantage of the experience and instruments developed in the region was lost, limiting institutional learning in DRR.

Looking to the future

> “Every time a project is generated, we’re forced to think about the sustainability strategy. The funding goes away, the consultants finish their work and leave. I think it’s our responsibility to always think about sustainability.”
>
> **Luis Amaya,** general director of Civil Protection, Disaster Prevention and Mitigation, El Salvador

This section presents recommendations that may be of interest to SDC, national and regional risk management and civil protection systems, academia, scientific bodies, cooperation agencies and key actors from other countries in the world working in DRR and CCA.

1. SDC headquarters should encourage future *DRR programmes* to promote greater exchanges and collaborations among the various programmes and regions. This will allow better use to be made of experiences and tools, optimise the work and improve institutional learning on the subject.

2. Continue promoting the exchange of experiences and collaboration between national civil protection systems in the region and those of South America to learn about good practices and successful DRR and CCA experiences promoted by SDC in these regions, particularly with universities and entities responsible for the implementation of Early Warning Systems. These may be through existing mechanisms such as the regional platforms of UNDRR or the Latin American and Caribbean University Network for Disaster Risk Reduction (REDULAC/RRD), among others.

3. Consider the good practices developed in Central America for the incorporation of DRR and CCA into other SDC projects, mainly those of water and sanitation, and rural roads. This process contributed to the sustainability of these projects, is systematised and can serve as a reference for other similar programmes.

4. In future risk management projects, consider using the innovative methodologies and technologies developed by the *DRR Programme*. These tools have been validated, are low cost, have good technical quality, and are easily replicable to the characteristics of each country, and can therefore represent a good entry point for local and national governments.

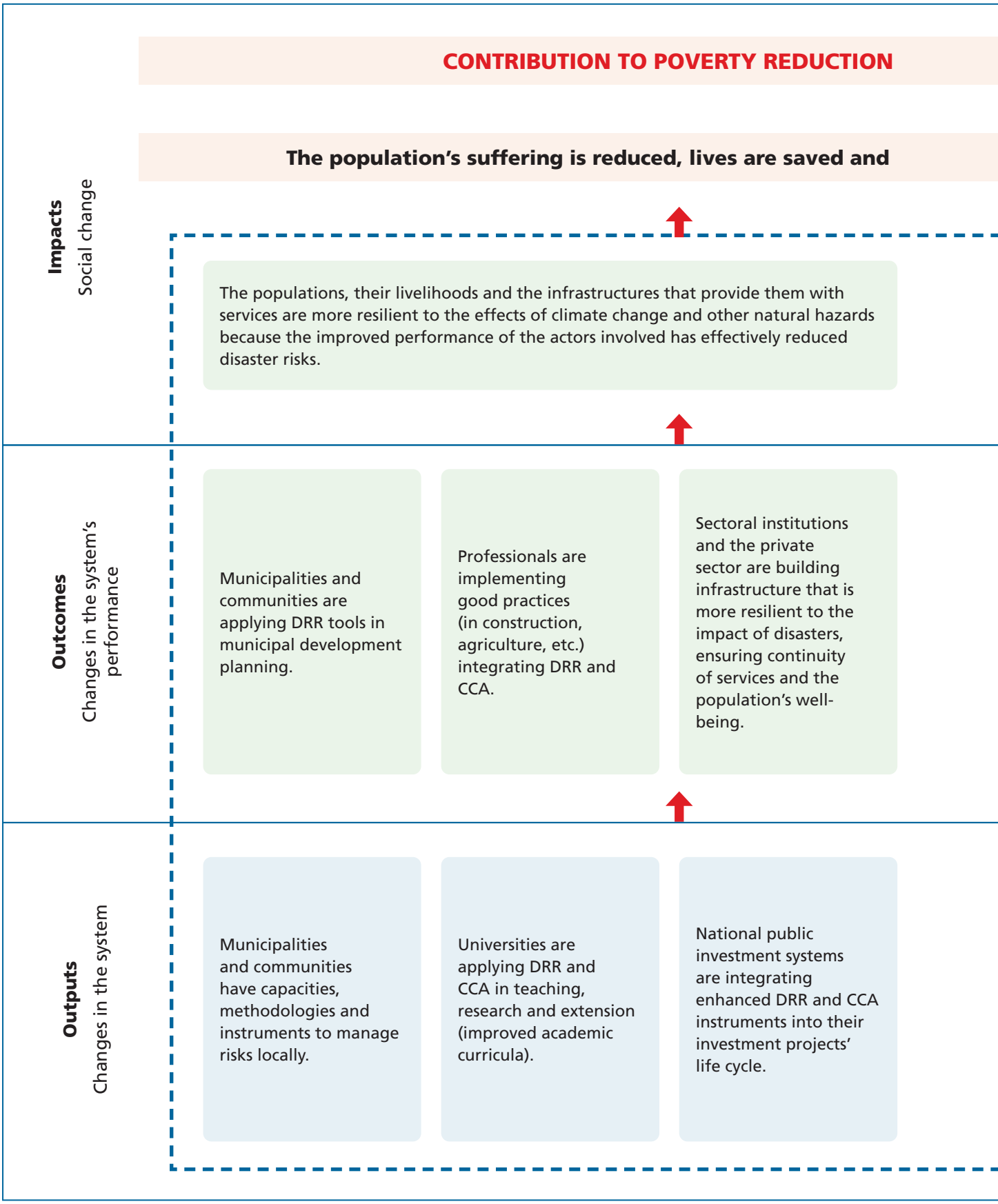
5. Develop advocacy strategies in future DRR and CCA projects working with universities that encourage the participation of youth in these processes, facilitating spaces to hear their voices and participation in decision-making. These efforts should be articulated with other actions developed in the region, for example, with UNDRR.

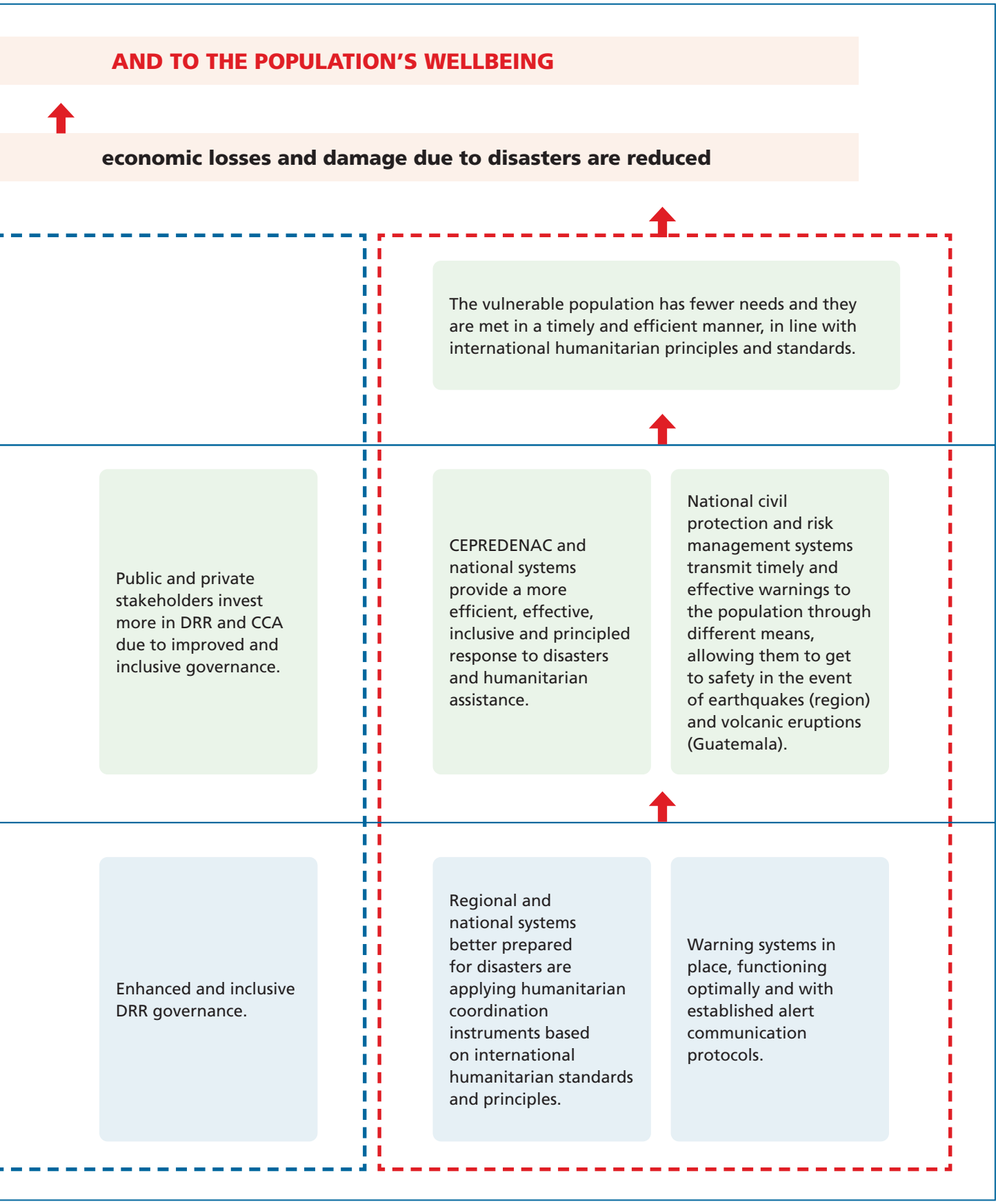
6. Ensure that all DRR projects incorporate budgets for gender actions and, above all, develop and implement their gender strategies, which should be aligned with existing national or regional frameworks.

7. Establish a mechanism to provide continuity to the training and support processes for the EELs so they can continue to operate in support of a potential humanitarian response by Switzerland in the region. This mechanism should continue to strengthen their linkage with the GIAR and it is recommended that agreements between Humanitarian Aid and Swiss NGOs be formalised to ensure that the EELs are institutionalised.

Appendices

Appendix 1: *DRR Programme* impact chain




AND TO THE POPULATION'S WELLBEING
economic losses and damage due to disasters are reduced
The vulnerable population has fewer needs and they are met in a timely and efficient manner, in line with international humanitarian principles and standards.
Public and private stakeholders invest more in DRR and CCA due to improved and inclusive governance.
CEPREDENAC and national systems provide a more efficient, effective, inclusive and principled response to disasters and humanitarian assistance.
National civil protection and risk management systems transmit timely and effective warnings to the population through different means, allowing them to get to safety in the event of earthquakes (region) and volcanic eruptions (Guatemala).
Enhanced and inclusive DRR governance.
Regional and national systems better prepared for disasters are applying humanitarian coordination instruments based on international humanitarian standards and principles.
Warning systems in place, functioning optimally and with established alert communication protocols.

Appendix 2: Assessment criteria for the thematic lines

Criteria	Assessment		
	3	2	1
	High	Medium	Low
Relevance	Responds to context (gaps and opportunities), is consistent with policy frameworks	Partially responds to context and is moderately consistent	Does not respond to the context and is barely consistent
Innovation	Unique products or processes, contextualised adaptations, good cost-effectiveness, adequate technical quality	At least 2 of the 4 factors apply	None or only 1 of the factors applies
Replicability	Availability of budget and human resources, validated experience and proven effectiveness	At least 2 of the 4 factors apply	None or only 1 of the factors applies
Swiss added value	Swiss experiences, technologies and methodologies and those of other Swiss programmes in other contexts are transferred to the region; Swiss experts are involved in transfers and in training of locals; processes and methodologies are enriched with Swiss inputs and GPs; Swiss-generated materials from other contexts are used	At least 2 of the 4 factors apply	None or only 1 of the factors applies
Sustainability	Availability of budget and human resources, and the tools and technologies are institutionalised	At least 2 of the 3 factors apply	None or only 1 of the factors applies

Appendix 3: Incorporation of DRR and CCA into other SDC projects

The process of incorporating DRR and CCA began in 1999 with water and sanitation projects in response to concern about the huge losses and damage caused by the disasters occurring in this sector. Although no specific projects were developed in this thematic line, it was incorporated into this analysis due to its importance. The following text presents the evaluation of the criteria that stand out in this thematic line.

Relevance

Incorporating DRR and CCA into SDC projects was highly relevant given the great vulnerability existing in the region and the losses and damage caused by disasters.

Innovation

This was medium because only three innovative, practical, sectoral, technically sound and easy-to-use products were developed. These are: *Guide for vulnerability reduction in drinking water and sanitation systems, Methodological guide and typical designs for local roadworks as a measure of DRR and CCA,* and *Technical guide for the development of Terms of Reference for pre-investment studies for drinking water supply projects incorporating DRR and CCA.* These guides were developed and validated in a participatory manner in 2009 and 2016, respectively; the first with the Nicaraguan Institute of Aqueducts and Sewerage (INAA) and the second with the Public Investment Directorate.

Replicability

It was medium because it was replicated in Honduras and Nicaragua with three additional SDC programmes: Local Governance, Municipal Investment Support (APIM) and the Honduran AGUASAN Programme. They had a strategic concept, work plan, human resources and budget to accompany this process, as well as specialised technical support.

Swiss added value

It was high because it contributed knowledge and experience in the preparation of the different sectoral instruments resulting from this process, and also provided methodological guidance through guides prepared at headquarters (CEDRIG).

Sustainability

It was medium because the instruments are institutionalised and applied with a certain systematicity. Nonetheless, after the closure of these projects in 2017 and 2019, the continuous training and monitoring processes were reduced due to the low budget. Consequently, the institutions' new staffs do not always have the knowledge to apply the instruments. In addition, resources for the measures required by the projects are scarce.

Appendix 4: Stories of change

Legacy of knowledge

In Central America, nature can be overwhelming, not only for its biodiversity and beauty, but also for the threats and disasters it generates, as it is one of the regions of the world most prone to suffer them. Hurricanes, earthquakes, droughts, floods or volcanic eruptions are the main threats that seem to take turns more and more often. And when this happens in impoverished societies with complex social scenarios in the background, having a comprehensive view of the situation is essential not only to save lives, but also to avoid losing all the developmental progress that has been made.

When Hurricane Mitch struck in October 1998, the region's vulnerability and the limitations of national institutions and local governments to respond to the crisis became evident. Central America was unarguably not prepared to deal with an event of such magnitude, nor did it have specialists who could adequately comprehend, evaluate and manage the risks to which the region was exposed. In the aftermath of the hurricane, all actions focused on coping with the emergency and less on understanding the causes of the enormous destruction.

SDC recognised these gaps and from the outset focused its support on training so the technical staff of the most affected municipal governments could acquire practical knowledge to identify and manage risks. "We acquired a new vision of what risk management was; very few of us handled the concepts but we began to clarify them," recalls Axel Gómez, deputy mayor of Ocotal, Nueva Segovia, Nicaragua.

The first task was to develop short, practical courses adapted to the context of each country. Subsequently, in partnership with universities, diploma, postgraduate and master's degrees in DRR were offered. The idea was to build a critical mass of specialised professionals and technical personnel who, once trained, could apply their knowledge in institutions, local governments, nongovernmental organisations, universities and communities in the region.

The strategy of promoting these training processes, which began in Nicaragua as part of the *DRR Programme,* was a success and, due to its good results, was later replicated in Honduras and El Salvador. In Honduras, a diploma course on *Tools for risk management at municipal level* was initially offered, in which Cintia Borja, Rubén Fernández and Lilian Rivera participated. Upon completion of their training, they were hired by the Tegucigalpa mayor's office. Rubén joined the newly created Risk Management Unit, where he remained for almost 15 years. Cintia started as an adviser to the mayor's office and Lilian became vice minister of the Ministry of Finance.

In Nicaragua, Julio Manuel Rodríguez is one of the technicians who participated in the first diploma course on risk management and since then has been in charge of the mayor's planning department in Condega, Estelí. From his position, he has helped develop different DRR projects and actions, as well as natural resource protection ordinances, which are currently being updated.

Diploma course on risk management, Nicaragua. © Save the Children

In addition to diploma courses and short courses, three cycles of master's degrees on disaster prevention and risk management were also offered in association with the National Autonomous University (UNAN) and its then-Centre for Geoscientific Research in Nicaragua (CIGEO), the National Autonomous University of Honduras and the University of El Salvador. The professionals from Central America who completed their studies have held or still hold key positions in public and private institutions, including higher learning centres. Guatemalan Juan Pablo Olivas is one of them. He graduated from the regional master's programme and has held several key positions in his country. He was director of the Seismic, Volcanological and Meteorological Institute of Guatemala (INSIVUMEH) and from there he promoted strategies, managed resources, hired specialists and formulated several projects to strengthen the institute. The warning and surveillance system for the Santiaguito Volcano is one of these projects.

The Honduran Lidia Torres also earned one of these master's degrees and is now director of the Honduran Earth Sciences Institute (IHCIT), a reference centre on DRR in the region. Another successful case is that of the Panamanian Natalia Reyes, who serves as director of the University of Panama's Risk Management Unit and from there provides support to the Panama City mayor's office on risk knowledge and management.

In addition to these people, other DRR and CCA specialists have been placed in permanent positions or consultancies in various national institutions, universities and multilateral organisations, or as independent advisers. Although there is no impact evaluation that enumerates how many of the participants in short courses, diploma courses, postgraduate studies and master's degrees are in key positions, many of the people who have graduated from this educational process are having an impact and applying their knowledge in different areas, thus helping to prevent and mitigate human and economic losses caused by disasters.

Permanent Contingencies Commission (COPECO)
A decentralised model to save lives

The occurrence of a hurricane, flood or earthquake requires a quick response to a list of needs that grow exponentially. For this reason, the development of a decentralised management model of the Permanent Contingencies Commission (COPECO) since 2008 marks a before and after in the functioning of the Emergency Operations Centres (EOCs) in the department of Colón, Honduras, which has high risk levels.

Previously, when a contingency arose there, the distance between the EOCs that supplied the logistics to respond to the needs of the Municipal Emergency Committees (CODEMs) delayed the aid to the affected people, given that the department of Colón is a zone of heightened risk levels.

Because response time can clearly mean the difference between life and death, COPECO laid out to SDC the need to promote a systemic change aimed at decentralising disaster response. The San Alfonso Foundation backed COPECO's idea and together they opened up new opportunities in this field.

The decentralised management model included strengthening a EOC with capacity-building and warehouses for food and supplies. This model was piloted in the department of Colón and its success led COPECO to replicate it in Juticalpa, San Pedro Sula, Santa Rosa de Copán and La Ceiba, with funds from international cooperation. The model helped solve the logistical problem and made response and attention to save lives in disaster situations faster and more efficient. Before, it took several days for humanitarian aid to arrive due to the distances involved and the deterioration of access roads. Having EOCs in the territories makes it possible to have food and supplies available in vulnerable places so the population can be attended to in a few hours.

To reduce disaster risks, preventive actions must be strengthened in different ways. To this end, another element was to develop local capacities through a diploma course in risk management accredited by the National Autonomous University of Honduras (UNAH) aimed at municipal technicians and members of the CODEMs.

This course was crucial to technical personnel acquiring knowledge and skills in Integrated Risk Management. They in turn contributed to the design and construction of mitigation works that have benefited more than 1,400 families (approximately 8,000 people) living in Colón's 10 municipalities.

SDC continued to provide direct support to COPECO and other countries in strengthening more than 20 sub-national EOCs, which received capacity-building and equipment. This support is also coordinated through regional projects with the Coordination Centre for Disaster Prevention in Central America and the Dominican Republic (CEPREDENAC) in each of the countries of the isthmus.

Members of the Drinking Water and Sanitation Committee (CAPS) at the water treatment plant, reinforced with bio-engineering works to prevent landslides. El Jobo, Matiguás, Matagalpa, Nicaragua.
© SDC

Incorporating the DRR vision to protect water and sanitation systems

Access to clean water is vital to ensure life and health in emergencies and disasters, especially those caused by hurricanes, tropical depressions, floods or earthquakes. In disasters of this type, there is a risk that drinking water and sanitation services will be seriously affected, not only by the contamination of sources but also by the destruction of distribution systems, latrines and wells.

The devastating effects of Hurricanes Mitch (1998), Felix (2007), and both Eta and Iota (2020) are proof of this. These hurricanes showed SDC not only the need to rebuild the damaged water systems, but also the urgency of incorporating DRR into water and sanitation projects (AGUASAN), one of the main pillars of its cooperation in the region for almost 20 years. AGUASAN was one of the first to incorporate DRR in its activities. During different phases, starting in 1998 in Honduras and Nicaragua, AGUASAN, the *DRR Programme* and its partners worked together to identify risks and the main actions to avoid future destruction of water and sanitation facilities.

This collaboration, which lasted almost 20 years, involved the preparation of tools and a *Technical guide on vulnerability reduction in drinking water supply and sewage systems*, in addition to organising training activities for the technical staff of national institutions (INAA, ENACAL, FISE, SANAA) and community and municipal leaders. The workshops provided training in risk prevention and reduction measures and the application of DRR procedures in the construction design and operation of municipal and community water projects.

During this period, nine training courses and workshops were supported and more than 300 water and sanitation leaders from municipal governments, national agencies, building contractors and NGOs were trained. With the closure of these programmes in Honduras and Nicaragua, the dynamics slowed down; although thanks to the work with the National Public Investment System of Nicaragua, it was possible to institutionalise the *Technical Guide on vulnerability reduction in drinking water supply and sewage systems.*

In addition, DRR issues were incorporated into university programmes on water and sanitation in Nicaragua and other countries in the region, thanks to the collaboration of the Central American Higher Education Council (CSUCA) and the Central American and Dominican Republic Drinking Water and Sanitation Forum (FOCARD-APS). This collaboration contributed to the creation of a critical mass of leaders specialised in this topic, who, from their different work spaces, help develop safer, more sustainable and resilient water systems in the face of disasters.

Honduran Earth Sciences Institute
A seed that germinated

Almost 20 years ago, it was a simple office and now it is a key scientific institution in the region. The Honduran Earth Sciences Institute (IHCIT) began with two people working in risk management and emergency response, as part of the Physics Department of the National Autonomous University of Honduras (UNAH). Now IHCIT is one of the main pillars of UNAH's Department of Sciences and has become a national and international academic reference in geosciences and disaster prevention.

SDC accompanied this evolution by focusing not only on strengthening the scientific capabilities of its human capital, but also on ensuring that they had the means to conduct their work with specialised equipment. Its teaching and research staff have more than 25 people specialised in Geology, Geophysics, Hydrometeorology, Water Resources, Climate Change and Hydrology, key topics in a country that puts them to the test every year. All these subjects are now part of the UNAH, which ensures their permanence.

The Institute is committed to studying phenomena related to the Earth's structure, physical conditions and evolution, as well as natural and atmospheric phenomena. Unlike other countries, Honduras has no technical-scientific institutes such as INETER in Nicaragua or INSIVUMEH in Guatemala; in this case, it is IHCIT that provides valuable information to civil protection systems for decision-making. IHCIT has developed in such a way that it is self-sustainable: it publishes research, conducts training and offers advice in different specialties such as Risk Management, Climate Change, Seismicity and Water Resource Quality in the country and the region. With its diploma courses, master's degrees, technical studies and applied research, it generates knowledge to find solutions to various problems affecting the population.

Its research projects stand out at such a level of scientific rigor that they have aroused the interest of other universities in the region, and even some foundations in Cameroon and Cambodia. This is a clear example of how the university as an institution should be at the service of society. It is a reference not only in the country, but in the whole region.

Tegucigalpa Municipal Mayor's Office
Learning the risks to save lives

Choosing the construction site and assessing the risks is the first step before building a house. In Tegucigalpa this cannot be ignored, given the city's physical characteristics, mining history and the rivers that cross it and make it prone to flooding, landslides and mudslides. It is a capital city teetering on a tightrope.

How is the population to be supported in this matter? Local governments are mandated to regulate territories using risk maps, ordinances and regulations. SDC and UNDP in alliance with the Honduran Earth Sciences Institute (IHCIT) of the National Autonomous University of Honduras (UNAH), promoted the strengthening of the municipal mayor's office of the Central District, starting with training for disaster prevention officers on risk management issues, in order to promote systemic changes in public institutions and local governments

The people trained strengthened not only the mayors' offices but also the Permanent Contingencies Commission (COPECO) and have had an impact on the design of national, departmental and municipal risk management and disaster response plans. They also led to the creation of the Municipal Risk Management Unit of the Tegucigalpa municipal mayor's office and the drafting of ordinances to regulate risk zones and risk assessment for housing construction. All these instruments have been institutionalised.

With UNAH's support, they developed a susceptibility map and a real-time Early Warning System (EWS) for floods, that are still in use. With support from other donors, this EWS evolved into a Multi-Hazard Warning Centre installed in the Tegucigalpa City Hall. It currently has specialised equipment and competent personnel working 24/7.

As a basis for the new ordinances of the Central District municipal mayor's office, the risk mapping helped strengthen the city's urban development, where all constructions and modifications to urbanisations must be studied and approved in advance to avoid situations such as the one that occurred in the Ciudad del Angel residential development a few years ago. In that place, despite the existence of a 1985 COPECO study declaring that the area was not suitable for construction, they went ahead and more than 80% of the houses were affected by a landslide.

The municipality of Tegucigalpa is moving forward with a firm step and with installed capacities to manage development and face the challenges of a highly vulnerable city.

Experiences of change

> “I didn’t stay just as a technician, but transcended into managing institutions and taking on the challenge of making institutional changes.”

Juan Pablo Oliva, Guatemala, graduate of the master’s programme in Risk Management and Disaster Prevention, UNAN-Managua, Nicaragua

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> “SDC taught me a lot, not only about risk management but also about how to run projects of this type, so when SDC withdrew from El Salvador and new projects came along, I was able to put into practice the leadership SDC had allowed me in other projects.”

Carolina Rivas, SNET, El Salvador

> “We learned about mitigation and disasters; we’re now in a prevention brigade and we apply that knowledge. We also learned how to conserve the environment.”

Mirna Martínez, beneficiary of La China community, Ciudad Darío, Matagalpa, Nicaragua

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> “SDC was the agency that supported the Honduran Earth Sciences Institute the most, especially in its early days. Thanks to SDC, the Institute is now a national and international reference.”

Nabil Kawas, founder and former director of IHCIT, Honduras

> “Zamorano proposed to SDC to create a practical Learn-by-Doing module within the project framework that would include climate change adaptation and DRR strategies.... SDC is leaving and the module remains. In the current curricular reform process, our Environment and Development Department is proposing a new career to be called Agro-environmental Engineering, which will focus on climate change, sustainable agriculture thought of as climate-smart and climate-adapted agriculture.... That seed has germinated and will remain after the project.”

José León, teacher in the Environment and Development career, Zamorano University, Honduras

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> “The Central American Higher Education Council (CSUCA) involves 24 public universities in the Central American region and the Dominican Republic.... We were able to educate, train and raise awareness of disaster risk reduction and climate change adaptation in the university community and this was replicated in our students. The future decision-makers are in the universities and that’s why it’s very important to raise awareness on these issues from the universities.”

Carlos Guillermo Alvarado Cerezo, general secretary of CSUCA, 2022-2026, Guatemala

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> “I believe we have been among the most affected municipalities in the department with respect to flooding, but the people are prepared thanks to the work our government and the mayors’ offices have done with the support of cooperation. For example, the Early Warning System has helped us a lot, as have the mitigation works.”

Aura Marina Montoya, mayor of Condega, Estelí, Nicaragua

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