Brochure

Construction of Safer Housing and Infrastructure

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
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Cooperación Suiza
en América Central

Sendai framework for Disaster Risk Reduction 2015-2030
Priority 3: Investing in disaster risk reduction for resilience.

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

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

Four bilateral and regional projects were carried out under the thematic line *Construction of safer housing and infrastructure*, to which almost CHF 5 million or 11% of the budget were allocated. This line includes the following subtopics: *Safe construction in the municipalities, focusing on the strengthening of capacities among foremen and municipal technicians in order to apply appropriate construction standards when building homes* and *Incorporation of Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) in the project cycle of the national public investment system.*

The first project focused on the preparation and use of a construction primer for masons and foremen. Starting in 2015, this thematic line introduced a new subtopic, thus widening the scope of the effort to encompass public investment projects. In addition to construction standards, it includes an analysis of project siting and climate change. From 2015 to 2017 both subtopics were worked on together, and since 2019 are concentrating on capacity-strengthening in the national public investment project cycle.

Impact hypothesis

The impact of disasters on both public and private infrastructure can be reduced in different ways. On the one hand, there are the National Public Investment Systems (NPIS), which design and apply criteria and structural and non-structural measures during project cycles; on the other, local governments regulate the construction of informal housing in their territory. In both cases, to ensure their effectiveness, it is necessary to strengthen capacities among sectoral and municipal staff, design and implement risk analysis methodologies for the purpose of reducing losses and damage to infrastructure, adapt to climate change and maintain the continuity of basic services to the population that mitigate the impact of disasters and improves their well-being.

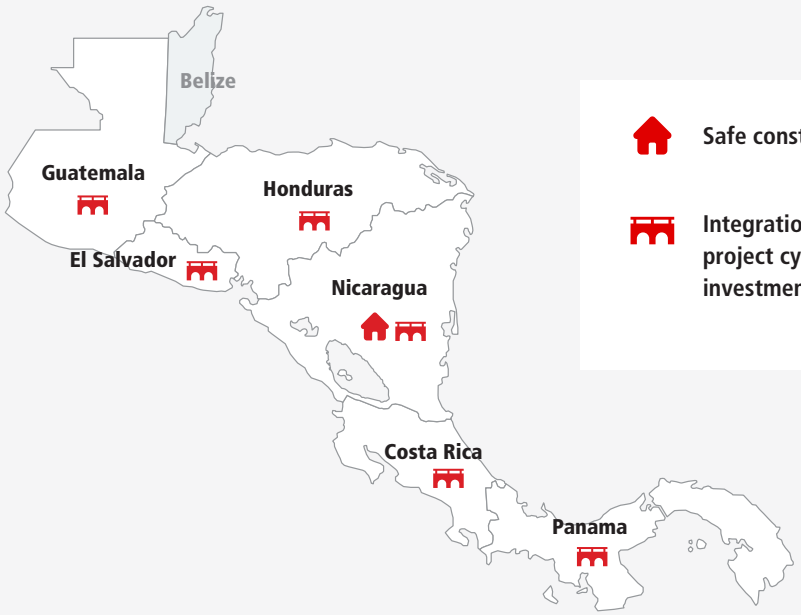
Main projects

Strengthening the National Public Investments System for the incorporation of evaluation and disaster risk reduction and climate change adaptation instruments to the public investments project cycle. Nicaragua. Implementing agency: Ministry of Finance and Public Credit. Single phase: 2015-2016. SDC contribution: CHF 153,000.

Strengthening of local capacities to manage the safe construction of vital installations in ten municipalities. Nicaragua. Implementing agency: National Engineering University (UNI). Single phase: 2015-2017. SDC contribution: CHF 281,000.

Strengthening capacities for the incorporation of disaster risk reduction and sustainable and inclusive climate change adaptation in public investments in countries member of the Council of Ministers of Finance of Central America, Panama and the Dominican Republic / Central American Integration System (COSEFIN/SICA), RIDASICC. Regional. Implementing Agency: Economic Commission for Latin America and the Caribbean (ECLAC). Single phase: 2019-2023. SDC contribution: CHF 4.1 million.

Projects by subtopics



Masons received theoretical practical training on the construction of safe housing in Nicaragua.
© National Engineering University (UNI)

Objective

To reduce losses and damages in public and private infrastructure as a result of hazards and climate change, by furthering the enforcement of appropriate construction standards in the informal housing construction sector and the incorporation of risk analyses and DRR/CCA measures to the public investment project cycle.

Swiss added value

This thematic line took full advantage of the experience, tools and materials prepared by Swiss experts and other programmes sponsored by Switzerland in other contexts. Some examples are MiResiliencia[1] and EconoMe[2], as these tools are didactic materials used for construction that are keyed to masons and contribute to ensuring the sustainability and protection of both public and private investments, housing among them.

Innovation

A *Public Investment Risk Analysis Model*, which is part of a broader technological platform containing geographic information that is used for risk and cost-benefit analysis in public investment projects, was created. It is innovative because it focuses on the entire public investments cycle. It was built collectively, with the participation of public investment and planning system technicians in the Central American countries. This ensures it reflects and is responsive to their needs and capacities.

[1] MiResiliencia is a platform created in Bolivia and replicated in Honduras to carry out cost-benefit analyses regarding DRR in public and private infrastructure projects, It was inspired by the experience with EconoMe.
[2] EconoMe is a Swiss platform used to carry out cost-benefit analyses for DRR projects.

Stages

There follows a description of the stages in projects under the subtopic *Incorporation of Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) in the project cycle of the national public investment system*, given that these developed more comprehensive approaches, had larger budgets and were of longer duration.

Stage 1

Diagnostic of capacities and resources (1 year)

Objective: To learn about needs and existing capacities in each country so as to carry out resilient public and private investment processes.

Main activities:

- Coordinate and reach agreements with the various entities that make public investments in each country in order to determine their level of institutional commitment.
- Make a diagnostic of the legal framework governing public investment, the existence and enforcement of regulations regarding the design of sectoral projects, competent human resources, the existence and type of scientific entities, the quality and accessibility of the available information, such as hazard maps and studies, climate scenarios, a historical analysis of the most affected sectors and the reasons for their vulnerability.
- Define and approve strategies, approaches and the main activities to ensure the sustainable incorporation of DRR and CCA to the public investment project cycle.

Stage 2

Development and validation of methodologies, instruments and technical capacities in DRR and CCA (2 to 3 years)

Objective: Develop and update technical instruments that allow for including risk and DRR cost-benefit analyses in the public investment project cycle, as well as the strengthening of the technical capacities needed for their application.

Main activities:

- Prepare and approve a training plan.
- Coordinate with universities and specialised entities such as the Central American Public Administration Institute (ICAP).[3]
- Hold classes, diploma courses or master's programmes keyed to developing competencies in the use and application of DRR and CCA instruments in the public investment project cycle.
- Prepare and update methodological guides and manuals for prioritised sectors, such as for example, road infrastructure, water and sanitation, housing, etc. and use these as training material for technicians and sectoral experts.
- Develop and update information platforms and modules with which to assess risks and carry out cost-benefit analyses for public and private investment projects in the countries. If necessary, coordinate with private or supra-regional entities that have specialised information, such as, for instance, the National Aeronautics and Space Administration (NASA) and the UN Satellite Centre (UNOSAT), among others.
- Run pilots of the technical DRR and CCA instruments in real projects underway as part of the national public investment plans and make any pertinent adjustments.
- Prepare and implement knowledge management plans and foster the exchange of experiences between national and regional institutions.

[3] ICAP is attached to the Central American Integration System and specialises in the training of public administrators at regional, national and municipal levels. It works in five fields of specialty, among them territorial development, project management, risk management and climate change.

Stage 3

Institutionalisation and systematic application (permanent)

Objective: To promote the institutionalisation of the outputs generated and accompany their implementation.

Main activities:

- Present the different instruments once developed and validated for approval by the national public investment systems.
- Integrate the approved instruments to the mechanisms, procedures and regulations of the national public investment systems.
- Carry out information and dissemination campaigns regarding the approved instruments to ensure that all sectoral bodies, universities and private entities know of them (for example, associations of engineers, environmentalists) with the aim of furthering their massive application.
- Formulate a quality assurance monitoring and supervision plan for the implementation of the approved instruments and create corrective mechanisms.

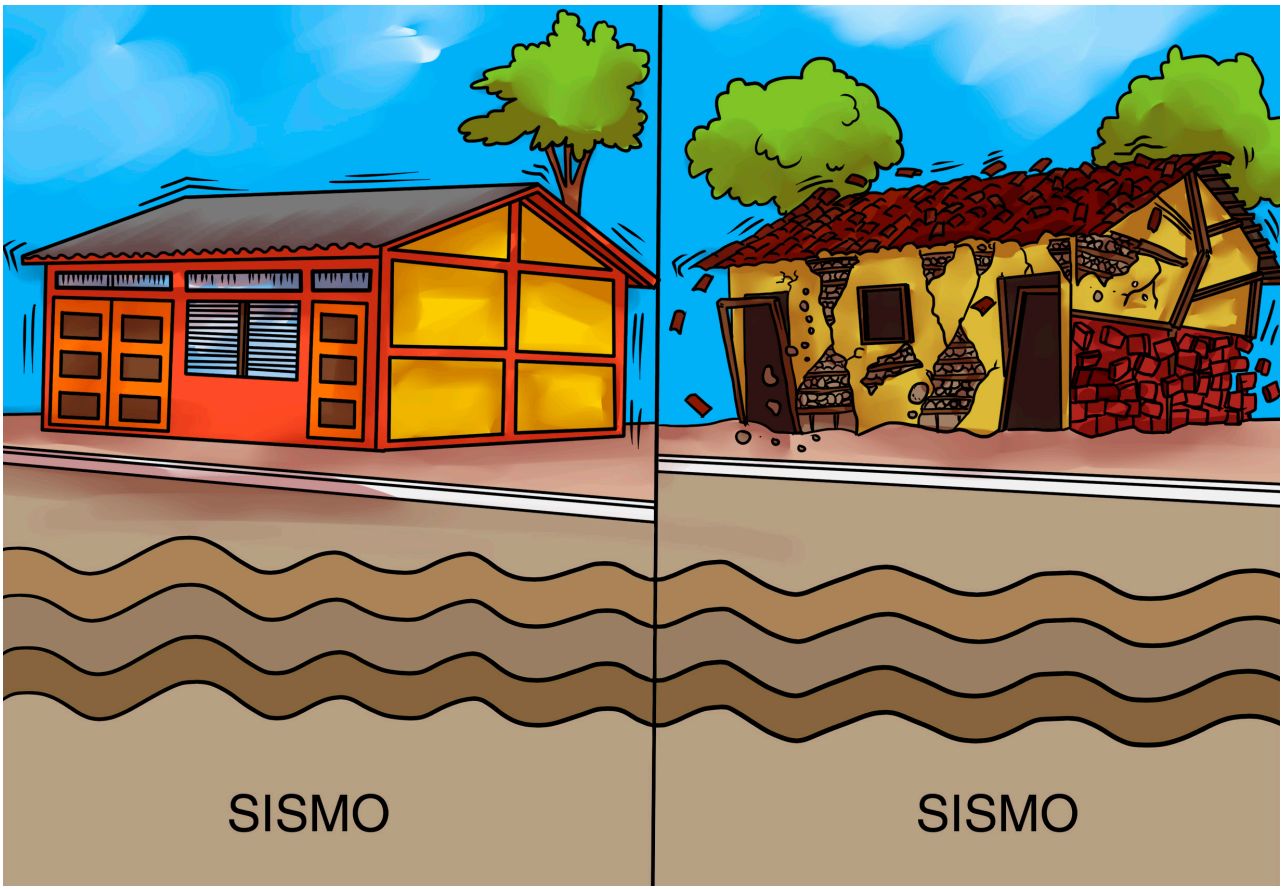


Image taken from the construction handbook distributed in Nicaragua by the Ministry of Transport and Infrastructure (MTI), with SDC support.
© MTI

Sustainability

Sustainability is classified as low to moderate, given that some of the processes, such as safe construction, were not continued by local governments. Notwithstanding that technical staff was trained, procedures were established and regulatory instruments created, these are not enforced. That said, the safe construction manuals are integrated to the *General Strategy for the Training of Municipal Technicians and Masons* at the Nicaraguan Municipal Development Institute (INIFOM) and are used by the National Technological Institute (INATEC).

On the subtopic of public investment, at the time this brochure was prepared, the processes were just concluding, so their institutionalisation remains pending. A good step is that capacities were strengthened, guides were prepared and methodologies developed, with the active participation of several entities, which bodes well for the process of institutionalisation. Whether or not these processes continue depends on institutional will, since integrating DRR and CCA to the public investment project cycle and municipal regulations requires sustained mid- and long-term processes, as well as specialised and multidisciplinary human resources.

Resources

A project coordinator and a team of professionals in a number of specialities, depending on what sector the work is to be undertaken in. If these are related to road infrastructure, water, sanitation, and housing, specialised personnel are needed in fields such as civil engineering, hydrology, geology, economy and agronomy, as well as experts in geological risks, climate change and social work. Whenever necessary, legal advisory services may also be considered. **Reference cost:** CHF 250,000 to one million per year (higher for regional projects).

Implementation options

This type of project can be implemented with contributions from institutions governing national or regional public investments or specialised UN agencies such as ECLAC and universities. Some outputs, such as technological platforms, can be tendered among specialised companies.

Success factors

1. Public investment and planning entities are sensitised to the issue as a result of growing losses and damage to vital infrastructure caused by disasters.
2. Highly participatory joint design and construction of technological platforms, the *Public investment risk analysis model*, and sectoral guides by technicians at municipal, national and regional entities in the countries. This ensures that existing needs and capacities in each country of the region are taken into consideration in the instruments which are prepared, and also facilitates their institutionalisation.
3. Implementation of specialised training processes on matters regarding urban development, safe construction, cost-benefit analyses, the design of hydraulic works, and so on, some of which adapted to specific training needs. For example, in Nicaragua the safe construction primers are aligned with the National Municipal Training System (SINACAM) and INATEC.
4. A contribution was made to the implementation of the *Regional Public Investment Agenda*, to green tax instruments, as well as to the *Central American Integrated Disaster Risk Management Policy (PCGIR).*

Closing ceremony of the Diploma Course in Safe Construction at the National Engineering University (UNI), Nicaragua. © UNI

Main challenges and lessons learnt (LL)

1. Carrying out projects that involve multiple actors (ECLAC, COSEFIN, national public investment systems, public works and planning ministries, as well as other sectors, such as infrastructure and environment) when working to introduce DRR, CC and CCA approaches tends to hinder their implementation, fragment the interventions and slow down decision-making, in particular when the processes are highly participatory, which in turn translates into delays in project implementation.

   LL: Projects involving multiple actors must set up a monitoring system, establish clear communications and consulting mechanisms among actors and ensure there is a good planning process in place. Ideally they should concentrate on few sectors and key actors.

2. National public investment systems that have a mandate to build resilient infrastructure have a strong financial and economic bias. This complicates the implementation of processes that require an engineering perspective, such as the methodological guides for road, water/sanitation and housing infrastructure, among others.

   LL. Entities charged with implementing projects involving resilient infrastructure must ensure there are a variety of approaches and multidisciplinary teams, in particular in the fields of engineering, climate and disaster risk on their working teams, in order to ensure the technical quality of the products, an adequate thematic balance and the avoidance of economic biases.

3. Work needs to be done to regulate the construction of informal housing in unfavourable contexts marked by highly centralised decision-making, weak enforcement of the regulatory framework by local governments and poor coordination between entities such as, for instance, local governments, MTI, INATEC and INIFOM in Nicaragua.

   LL. Starting at the design and planning stages, projects must include the different actors that are to play a key role in project implementation, ensuring their commitment and willingness to act by means of a memorandum of understanding or agreements with each of the aforementioned institutions. To embark upon projects without these preconditions leads to unmet project goals and objectives. For example, in the two projects on this subtopic the foremen were not certified, nor was work done in the selected municipalities or on rules and regulations governing local construction. In one of the cases, this forced a change in project strategy and approach, and in the other project objectives were not met.

Good practices

1. Project implementation and follow-up through pre-existing mechanisms, with the participation of all countries (e.g. the COSEFIN Regional Technical Committee, ECLAC and other key actors).
2. Use of financial sustainability criteria, open data and free software in all project activities.
3. Use of materials in awareness-raising campaigns intended to promote the construction of safe housing.
4. Forge alliances and undertake training processes that are integrated to the academic curricula at universities and the Central American Public Administration Institute (ICAP), for the purpose of developing human capital specialising in DRR and CCA, at the service of public and private investments.
5. Carry out door-to-door awareness-raising campaigns, using easily understandable Spanish, as well as the various Indigenous languages. Further, hold workshops in each of the municipalities and broadcast messages by radio about the projects working on the subtopic of safe construction.

Awareness-raising campaign materials intended to further the building of safe homes in Nicaragua. ©UNI

> “Today, in these times, more than ever before, we have better conditions and capacities to understand public investment cycles in a more comprehensive manner … In this evolving process … we have begun to think of how climate change increases the risk to public investment infrastructure”.
>
> **Roger Vega**, main advisor to the RIDASICC programme, Nicaragua

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www.weadapt.org/knowledge-base/sdc-network-climate-drr-and-environment

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