

TECHNICAL NOTE

Disaster Risk Reduction and Public Investment Decisions: The Peruvian Case

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Disaster Risk Reduction and Public Investment Decisions: The Peruvian Case

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INDEX

Foreword	3
1. Introduction	5
2. Integral Disaster Risk Management: the Current Context in Peru	7
2.1 A New Institutional Structure and Goals for Disaster Risk Management	7
2.2 2000 to 2010: Setting the Scene for Institutional and Programmatic Change.....	10
3. Public Investment Decisions Informed by Disaster Risk Reduction Criteria and Analysis: The Process, 2000-2011	13
3.1 The National System for Public Investment	13
3.2 DRR and public investment decisions in Peru: A brief history of the process.....	14
4. Methodology for Incorporating Disaster Risk Analysis in Public Investment Projects	20
4.1 Public Investment Projects and Disaster Risk Management	20
4.2. An example of Risk Analysis for Planning and Investment Decisions: The Machu Picchu Hydroelectric Facility	24
5. Concluding observations	26
5.1 Climate change impacts and updates to concepts and methods.....	26
5.2 Challenges for the future	27
Acronyms.....	29
Bibliography.....	31



FOREWORD

According to the Global Assessment Reports (GAR), published by the United Nations Office for Disaster Risk Reduction (UNISDR), there is clear evidence that economic losses caused by disasters are increasing and in many cases surpassing the national governments' capabilities to produce wealth. The recent GAR 2013 states that one trillion dollars have been lost in the last decade due to disasters but warns that real losses are underestimated as this figure takes into account only internationally reported disasters. Total disaster losses may be up to 50% higher according to an analysis of national disaster loss databases, which provide a more comprehensive accounting of all disaster losses - large and small..

The GAR also highlights that it is more cost-effective to reduce extensive risks for events with low to medium-sized losses than to rely on risk-financing strategies. Furthermore, it states that prospective risk management which factors risk reduction into investment planning is more cost-effective than having to correct risk levels once the investment is made. Without a prospective approach towards risk management, countries will lose competitiveness and the ability to guarantee the durability and sustainability of public infrastructure that businesses depend on to compete in a globalized economy.

Therefore we welcome very much publications such as this technical note "Disaster Risk Reduction and Public Investment Decisions: The Peruvian Case" and would like to recognize and congratulate the effort of the government of Peru and the various institutions at different levels, including civil society actors and the significant support provided by the international cooperation led by GIZ. GIZ has committed long term efforts to promoting effective disaster risk reduction as a key element of sustainable development in articulation with poverty reduction initiatives and aspirations for a more just and inclusive national society.

UNISDR has accompanied these important efforts and has promoted the dissemination of this experience at the regional level, motivating other governments to follow a similar path. As part of these efforts, we have developed, in collaboration with the GIZ, the Government of Mexico and the World Bank the so called San Cristobal Road Map in order to help countries to track their public and private investment on DRR and measure the losses avoided.

As billions of dollars on new investment will be made in many disaster-prone countries in Latin America and the Caribbean in the coming decades, there is an urgent need to ensure that these investments are made risk sensitive. Otherwise, we risk adding to the already high levels of vulnerability, thus compromising ongoing development efforts.

As we move towards a new post 2015 DRR global framework, the call for effective goals, indicators and effective ways of measuring progress has been made. In fact, the Chair's

Summary of the Fourth Session of the Global Platform of Disaster Risk Reduction (May 2013) identifies the links between development and financing of resilience plans as a means for promoting a “whole of society” approach and recommends that policies for investment, improved tracking of financing for disaster risk reduction across sectors and funding streams, and the establishment of special markers in global aid reporting be established.

Finally, the importance of establishing better linkages between disaster risk and climate change adaptation as part of a new paradigm across international agreements, national and sub national governments must be highlighted as the way to secure a more resilient development.

RICARDO MENA SPECK
Head of UNISDR Regional Office-the Americas

INTRODUCTION

1

Disaster risk and the adverse effects of disasters have notably increased over the last 40 years according to the information registered in diverse disaster loss databases (e.g., Munich Re, EM-DAT, DESINVENTAR), as the graphic below demonstrates for EM-DAT data. The 2011 Global Assessment Report on Disaster Risk Reduction of the United Nations Office for Disaster Risk Reduction refers to parts of the world that are now losing wealth quicker than it is being created, due to disaster impacts (UNISDR, 2011). These losses increase even more as large scale disasters are accompanied by a growing incidence of small and medium scale events, with recurrent and accumulative effects on communities and localities, predominantly in but not limited to the developing world (UNISDR, 2009 and 2011).

Infrastructure, production and services damaged or lost in disasters were all once the result of public or private investment decisions. Disaster loss thus signifies differing levels of unsustainability in such investment processes. The probability of the occurrence of a potentially damaging physical event of one type or another is by no means insignificant in most places, and many take out second places face such a significant likelihood of loss that the enactment of risk reduction measures is a necessary step towards increasing the sustainability of investment. Given the high impact of disasters in the last four decades, the Peruvian experience proves especially enlightening as it gives an example of how to effectively manage disaster risk in Ministries of Economy and Finance, along with other national institutions.

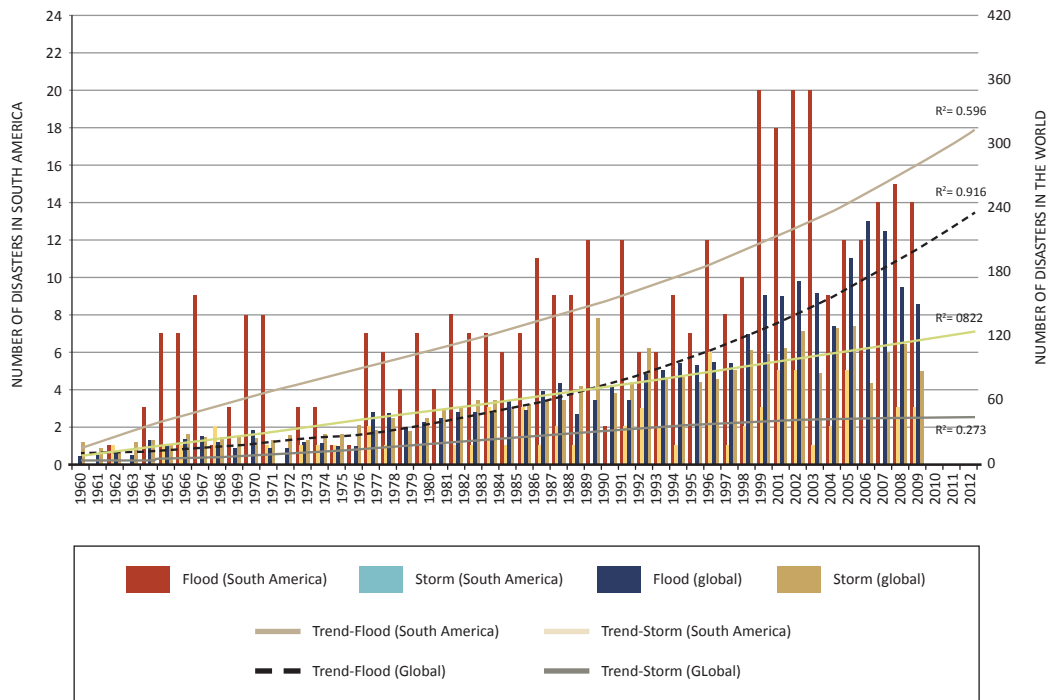
Therefore, the objective of this technical note is to document this Peruvian experience with incorporating disaster risk management in public investment decision-making. This process is considered in the light of the overall advances achieved in the promotion of disaster risk reduction in Peru, particularly during the last decade. The narrative is primarily based on secondary documentary sources and essentially provides an English language summary of analysis mostly written in Spanish to date¹.

The document is structured in the following way:

Following the introduction, the second section summarizes the principle goals and the institutional structure that was laid out by the recent 2011 law which created the

1. Additionally, the author would like to express his gratitude to Lizardo Narvaez, Gilberto Romero as well as Roger Díaz and Miguel Prialé, both former General Directors of the General Directorate of Investment Policies (now known as General Directorate of Public Investment-DGIP) of the Ministry of Economy and Finance, who contributed to this document providing information.

FIGURE 1: TRENDS IN DISASTERS IN SOUTH AMERICA AND THE WORLD, 1960-2009.



Source: Chris Lavell on basis of EM-DAT: The OFDA/CRED International Disaster database - www.emdat.be - Université Catholique de Louvain, Brussels, Belgium

country’s first National System of Disaster Risk Management (SINAGERD)². Factors and processes that help explain the writing and passing of this new law are outlined. This provides a brief background and framework for understanding Disaster Risk Management (DRM) policy and institutional structure in Peru.

The third section summarizes the generic process that has led to public investment decision-making informed by disaster risk reduction (DRR) in Peru over the last 10 years. The incorporation of the disaster risk management approach in public investment began in 2004, driven by two public investment project viability criteria: sustainability and social profitability. The recently passed law of SINAGERD (2011) reinforces the process and, at the same time, validates the conceptual and methodological framework applied in the National System for Public Investment (SNIP). Motivating factors and contexts, as well as significant events in the process, will be closely analysed.

The fourth section summarises the specific instruments and methods used for incorporating disaster risk analysis and management in public investment decision-making and provides an example of the use of risk analysis and cost-benefit calculations.

The final section provides some concluding thoughts and observations about ongoing processes and future challenges, like the recent updating of concepts and methods with climate change considerations.

2. NOTE: In this document we use the Peruvian Spanish version of acronyms, but provide a full translation into English. Please find a full list of acronyms and their translations at the end of this technical note.

INTEGRAL DISASTER RISK MANAGEMENT: THE CURRENT CONTEXT IN PERU

2.1 A New Institutional Structure and Goals for Disaster Risk Management

In February 2011, Congress passed the national law 29664, which created the National System of Disaster Risk Management (SINAGERD).

This new law replaced the 1972 law that had created the National Civil Defense System (SINADECI). The creation of the SINADECI was a response to the 1970 Ancash earthquake and disaster where an estimated 68,000 people lost their lives, including an estimated 20,000 in the small town of Yungay located below the Cordillera Blanca mountain range. The Yungay disaster was due to an earthquake induced avalanche set into motion by the splitting off of the north face of the Huascaran glacier, Peru's highest mountain. The Ancash disaster remains one of the most costly in terms of human life ever suffered in the American continent. National and international response to the overall disaster was severely inadequate in Peru, a country which lacked a formal institutional structure for coordinating and supporting disaster risk management at that time³.

Two overriding aspects characterise the new 2011 law. Firstly, the law places disaster risk reduction concerns on the national agenda, as complements to prevailing disaster response and preparedness goals. Secondly, coordination of the institutional system is placed in the hands of civil as opposed to military authorities.

Seen from the perspective of DRR conceived in the framework of development processes and planning,

3. For a thorough analysis of the creation and development of the SINADECI up to 1995, see Franco and Zilbert, 1996.

ILLUSTRATION 1: EXCERPT OF LAW 29664



Source: El Peruano, 19 February 2011.

ILLUSTRATION 2: YUNGAY AFTER THE EARTHQUAKE



Source: Peruvian Times, issue of June 12, 1970. Available on: <<http://www.peruvian-times.com/31/yungay-1970-2009-remembering-the-tragedy-of-the-earthquake/3073/>> (accessed 10 May 2013).

the new law postulates a synergic and sustainable relationship with existing and nascent economic, environmental, national defense and territorial policies. Thus, the new law calls for "the promotion of the incorporation of DRM in development planning and territorial organisational processes" (Article 8, c.). According to the law, National Disaster Risk Management Policy must consider DRM an intrinsic part of the planning processes of all public entities.

The law identifies three different but related types of DRM, which should guide public intervention in the future⁴.

- Prospective management, which seeks to avoid the construction of new risk associated with disaster risk in sensitive development processes and practices.
- Corrective management, which intervenes in existing conditions of risk that threaten disaster in the future.
- Reactive or compensatory management, which deals with residual, unmitigated risk that requires preparedness and response mechanisms to deal with emergency and disaster conditions once these occur (including risk transfer mechanisms, rehabilitation, reconstruction and recovery).

FIGURE 2: TYPES OF DISASTER RISK MANAGEMENT

Prospective management Intervenes on the future risk	Corrective management Intervenes on the existent risk	Reactive management Intervenes on the "residual" risk which is not reduced
<p>Measures and actions of development planning oriented towards the avoidance of new vulnerabilities</p> <p>Examples:</p> <ul style="list-style-type: none"> • Norms and regulations • Land-use regulation plans that include risk management • Incorporation of risk analysis criteria in investment projects • Alternative use of endangered areas 	<p>Measures and actions that promote the reduction of existent vulnerabilities</p> <p>Examples:</p> <ul style="list-style-type: none"> • Relocation of at-risk communities • Strengthening of vulnerable constructions and/or structures • Index based insurance to prevent future damage 	<p>Measures that minimise expected loss and damages</p> <p>Examples:</p> <ul style="list-style-type: none"> • Measures that increase resilience and response capacity • Early warning systems • Response preparation • Conventional damage insurance

Corrective and prospective risk management are directly concerned with DRR related to development planning processes, including the use of public investment decision-making. Reactive management is predominantly concerned with response to the imminent threat of disaster or the disaster itself. It also considers the need for risk reduction practice during rehabilitation and recovery, and the role of risk transfer mechanisms in creating incentives for DRR by pricing risk correctly and tying insurance policies to risk reduction investments (see examples in Figure 2).

Institutionally, the law provides for a very different structure of control and coordination when compared with the system under the 1972 law, where overall coordination and a good part of operational, analytical and action procedures were in the hands of the military administered National Civil Defense Institute (INDECI).

4. These concepts were first developed by the author in 2003.

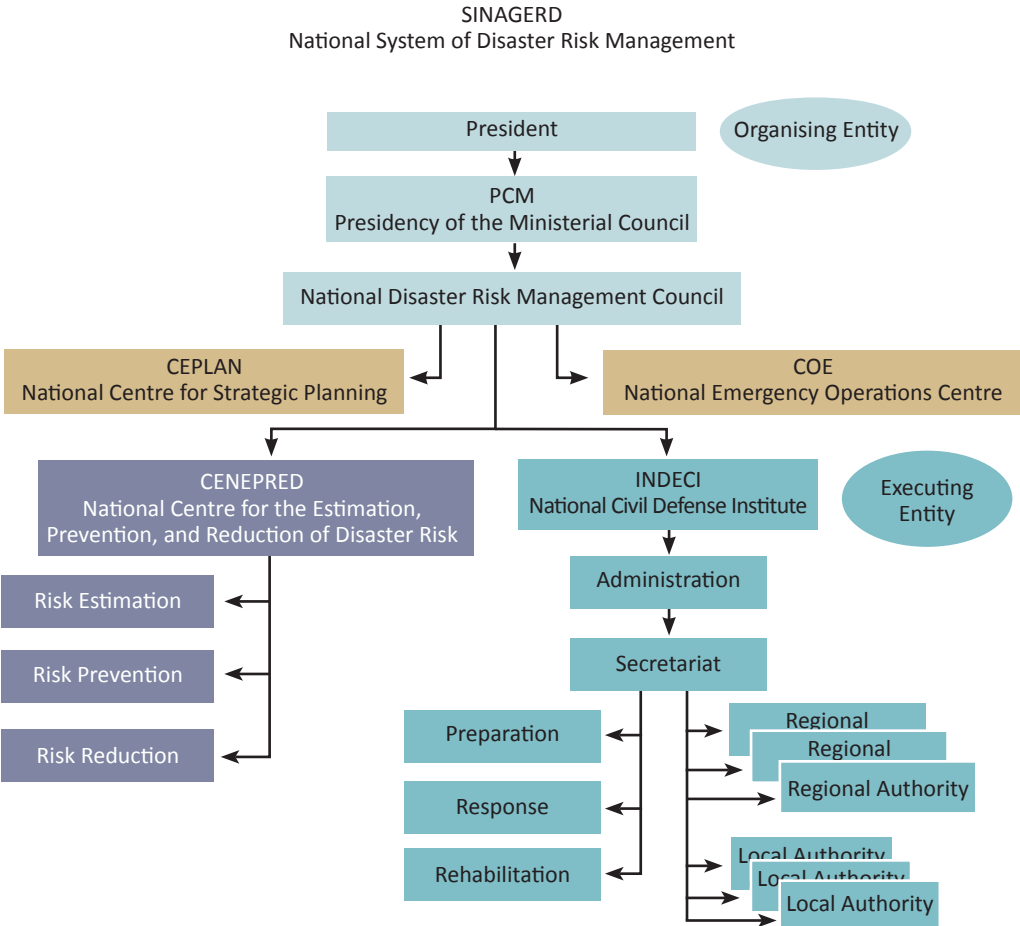
Coordination of the new system and its activities is located in two organisational structures: the President's Ministerial Council (PCM) and the National Disaster Risk Management Council (see Figure 4 for the system organisational chart).

The PCM coordinates the overall system and is responsible for the proposal, elaboration and presentation for approval of all major policies and actions on DRM. These are developed by two specialised agencies linked to and under the aegis of the PCM: the National Centre for the Estimation, Prevention and Reduction of Disaster Risk (CENEPRED), and INDECI.

The National Disaster Risk Management Council is, according to the 2011 law, "the maximum level of political decision and strategic coordination with regard to the working of DRM processes in the country". It is responsible for following up on national policy dictates and making major decisions during disasters. The Council is made up of the Ministers or heads of all major government development and response agencies and may also incorporate representatives of civil society and private sector interests when required.

Technically, the design of disaster risk reduction, prevention as well as recovery and post disaster reconstruction policies, strategies and instruments are now the responsibility of the newly created CENEPRED. Significantly, disaster reconstruction and recovery are the responsibility of this agency given the need to introduce risk reduction criteria and actions in such activities. This agency is also responsible for risk analysis and mapping in Peru.

FIGURE 3: ORGANISATIONAL CHART OF THE SINAGERD



The National Civil Defense Institute (INDECI), the head of the previous National Civil Defense System, is now a component of the new System responsible exclusively for the very important tasks of emergency and disaster response and rehabilitation.

The last major actor in the structure created by the new law is the National Centre for Strategic Planning (CEPLAN). Created in 2000 to strengthen government planning processes, this organisation is responsible for incorporating DRM in the National Strategic Development Plan 2021.

It is too early to offer any comprehensive analysis on the workings of the new law, nor is this an objective that can be fulfilled in the present document. However, a brief comment is warranted here.

The new law clearly requires the consolidation and efficient functioning of new institutional arrangements and alliances, new forms of participation, new understandings in the public and private sectors and new forms of finance, amongst other factors. It also challenges established structures and the status quo and has to overcome the weight of history that this implies. All of these factors mean that consolidation of the new system and its goals will require time, a good deal of effort and understanding and the sharing of goals and processes by the different social actors called to play a role in DRM. However, with the innovative concept and content of the new law, it is to be hoped that the scene is set and the building blocks are in place to support greater disaster risk reduction initiatives in Peru in the future.

2.2 Setting the scene for institutional and programmatic change: 2000 to 2010

The passing of the 2011 law may be largely explained by a number of factors and processes that played out between 2000 and 2010, which contributed to the development of a more integral conceptual framework for disaster risk and to greater consciousness and social support for its promotion. At the same time, this helps explain the transition from the dominant disaster response approach in favour of a greater concern for disaster risk reduction, while the processes that response approaches represent can also be supported and promoted by the new law.

Prior to the passing of the new law, two succinct diagnoses, one by existing government disaster management authorities and the other by an international development bank, summarized the pre-2011 context.

Firstly, a process of internal self-evaluation of the National Civil Defense System undertaken within the National Civil Defense Institute (INDECI) was presented to the 2008 Davos Disaster Conference by the institute's head, General Luis Palomino (Palomino, 2008). This self-evaluation spoke of the need to:

1. Strengthen, coordinate and articulate actions with disaster risk reduction actors;
2. Achieve greater coordination between scientific organizations and civil defense authorities;

3. Promote organizational structures that facilitate wider articulation with development, environmental, scientific and technological and climate change concerns; and
4. Achieve a wider civil society participation in DRR efforts.

Secondly, the prevailing context in 2010 led the Inter-American Development Bank (IDB) to conclude in a project document, arguing for support for disaster risk reduction in the country, that:

"[T]he country lacks a normative framework and institutions that deal with disaster risk strategically employing an integral approach. The present planning framework is based on obsolete legislation, which is limited to the notion of civil defense for emergency response and disaster. Critical aspects such as disaster prevention, financial protection and rehabilitation and reconstruction planning are essentially absent and also there is little mainstreaming of DRM or decentralization of DRM in sectors and amongst regional governments." (IDB, 2010, page 2).

At the same time that these two diagnoses together summarised a series of existing problems and challenges, which the new law would attempt to overcome, the design and approval of the law can only be explained if one considers the influence of a series of processes and programmes instigated during the 2000's. These processes provided the rationale and momentum for change and include:

- The International Strategy for Disaster Reduction (UNISDR) launched in 2000 by the United Nations as a follow-up to the 1990s International Decade for Natural Disaster Reduction.
- The adoption by the UN General Assembly of the Hyogo Framework for Action 2005-2015 (HFA) and the preparation, by Peru, of a national report on the implementation of its 5 priority areas and 22 indicators every other year.
- The Andean Development Corporation promoted the project Disaster Prevention in the Andean Region (PREANDINO) which began at the end of the 1990s and which was instrumental in arguing for development based risk reduction;
- The Network for the Social Study of Disaster Prevention in Latin America together with the local academic and NGO community, which stimulated conceptual development, debates and discussions on disaster risk and development and their practical implications for DRM;
- The seminal work of the German Development Cooperation GTZ's (now GIZ) Sustainable Rural Development Programme (PDRS) in linking discussion and practice in DRM, including territorial planning and public investment decisions, first in the north Peruvian region of Piura and then nationally;
- The Ministry of Economy and Finance (MEF), which innovated concepts and methodologies for incorporating risk analysis in public investment decisions (this process is the central concern of the present document and is dealt with in greater detail below);

- The European Commission financed Disaster Prevention in the Andean Community (PREDECAN) project which promoted change in DRM governance, strategic and instrumental approaches in Andean countries, between 2004 and 2010;
- The work and approach done by the CONAM (National Environmental Council, today Ministry of Environment) through its climate change programme considered a more intense coordination and linkages among DRR and CCA within development actors;
- DIPECHO European Union financed the preparedness projects;
- And many NGOs which contributed to practical advances in the topic, following up on and fine tuning conceptual premises developed elsewhere, particularly, but not exclusively, PREDES, ITDG (now Practical Solutions), OXFAM and CARE.

These processes and programmes worked synergistically to advance ideas on disaster risk reduction in the country and helped create a caucus of decision makers who would promote the changes, which finally led to the postulation, and approval of the new law in 2011. The impact of a series of major disasters at the end of the 1990s and throughout the 2000s also increased the saliency of the DRR theme and demands for increased investment in risk reduction. These included those associated with the 1997-98 El Niño/ENSO event, the Pisco and Arequipa earthquakes, freezing spells in Puno and elsewhere and extensive flooding in the tropical lowland regions.

The introduction of concerns for public investment decisions that take into account disaster risk reduction needs, reflected the growing concern for disaster risk reduction in the country. At the same time it provided one fundamental mechanism for helping achieve such reduction. The process and method by which such public investment concerns evolved and the results of the ongoing efforts are the central topic of the following sections.

PUBLIC INVESTMENT DECISIONS INFORMED BY DISASTER RISK MANAGEMENT: THE PERUVIAN PROCESS, 2000 TO 2011

3.1 The National System for Public Investment

The Peruvian National System for Public Investment (SNIP) was created in 2000 according to the dictates of Law 27293. The SNIP is a governmental administrative system that through a series of principles, methodologies, procedures and technical norms certifies the quality of Public Investment Projects (PIPs). The principal criteria for determining this are: sustainability, social profitability and relevance. Public investment must be oriented toward improving the capacity of the State to provide public services in an opportune and effective manner. The improvement in investment quality must be oriented toward ensuring that every sol (or dollar) invested produces the maximum social wellbeing. This is ensured with projects that are sustainable, that operate and provide services to the community without interruption.

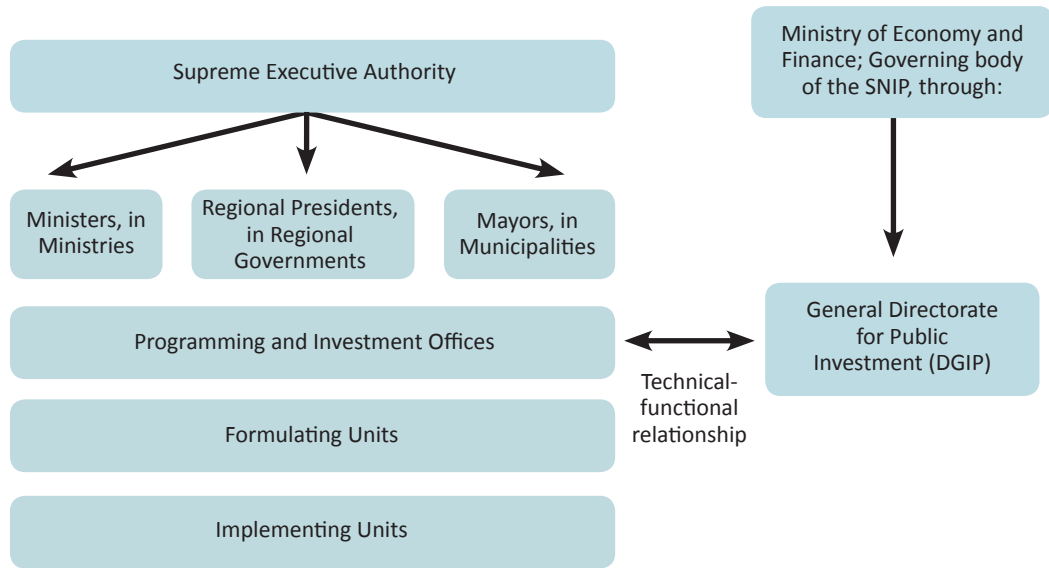
Its objective is to rationalize and improve public investment decisions, guaranteeing support for development goals within national policies and programmes, and the promotion of increased planning in public affairs.

The SNIP is made up of five principal organisational units, each with specific duties along the continuum from preparation, ex ante evaluation, prioritization, execution, and ex post evaluation of a project (see figure 4). These five units are:

- **General Directorate for Public Investment (DGIP)**, as the governing body;
- **Supreme Executive Authority (Órgano Resolutivo)**, for each sector, regional government or municipality;
- **Programming and Investment Offices (OPIs)**, which evaluate and determine the viability of PIPs; and
- **Formulating Units (UFs)** which draft pre investment studies;
- **Implementing Units (UEs)**, which execute, operate, maintain and evaluate the results.

The SNIP's provisions apply to almost 2000 UFs and 920 OPIs covering 850 national level organizations including ministries, institutes, schools, universities, national corporations, regional & local governments.

FIGURE 4: SNIP ORGANISATIONAL CHART



Source: MEF, 2014

By 2003, and following the evolving national policy on government decentralization and the organisation of local and regional governments, the SNIP had moved to promote the decentralization of public investment evaluation in favour of regions and municipalities, except for projects financed by external debt. Methodological guidelines were drawn up to direct the pre-investment and post-investment evaluation processes. Between 2004 and 2010 the role of local and regional governments in the execution of public investment had increased from 43% to 62% of the total, while the national government’s participation decreased from 48% to 28%.

3.2 DRR and public investment decisions in Peru: A brief history of the process

All sectors of society, from civil groups, to the private sector and government agencies, can and should take responsibility for different facets of disaster risk reduction. However, a particularly important role has been assigned to government. Although public investment rarely accounts for more than 15% of total annual investment in countries with a capitalist economy, it is critical that this investment be effectively allocated and implemented in a sustainable manner for the development and economic solvency of the private sector and civil society. Firstly, it provides critical preconditions for economic sectors to function (for example, roads, airports, irrigation systems, energy infrastructure). Secondly, it provides basic services for society and human development (e.g., schools, hospitals). Thirdly it provides orientation and guidance to the private sector and civil society (e.g., standards, planning tools).

In Peru, deliberations on dimensioning public investment decisions with disaster risk reduction considerations commenced in the early 2000s following the creation of the SNIP (see Table 1).

TABLE 1: TIMELINE OF KEY EVENTS IN PERUVIAN DRR EXPERIENCE WITH INVESTMENT PLANNING

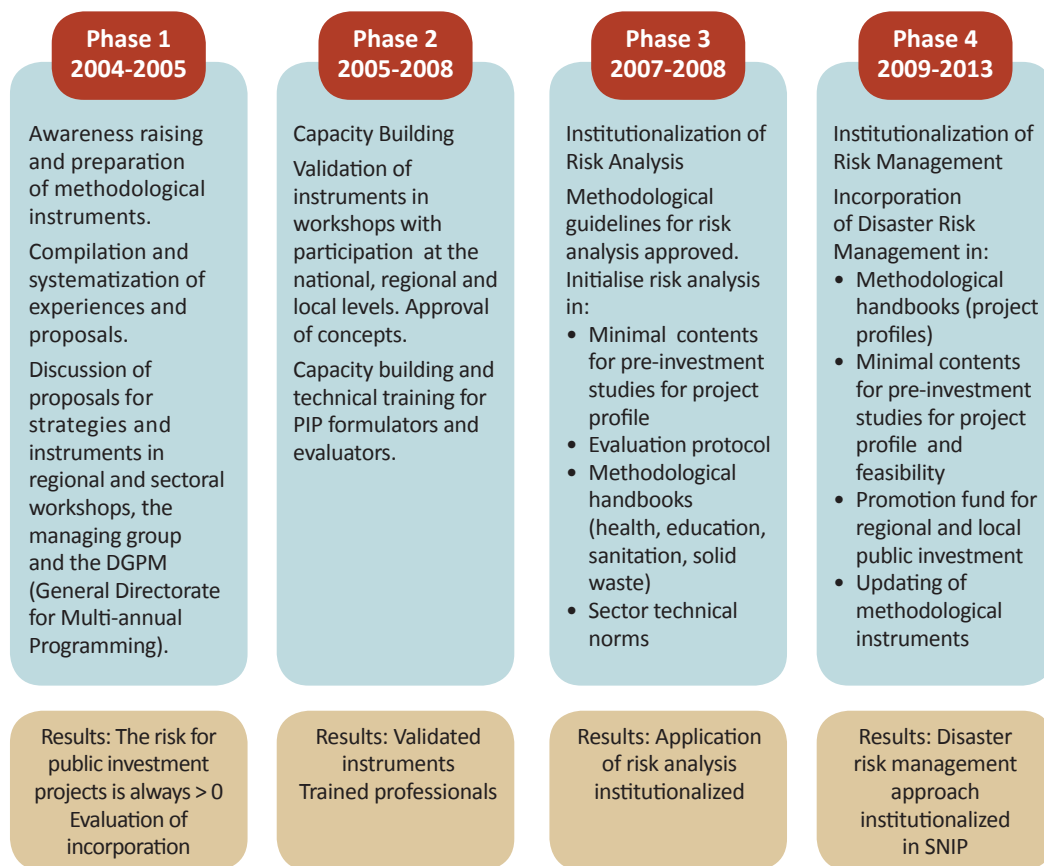
Date	Detail
Pre-2000	Conventional disaster risk response model managed by civil protection / military authorities, and primarily focused on preparation and attention.
2000	Promotion of the PREANDINO disaster risk reduction programme seeking to integrate disaster risk concerns into development planning.
2002	Multi-sectorial commission for disaster prevention and attention established within the PCM.
Mid-2000's	Establishment and use of guidelines for public investment, first mention of disaster risk reduction in investment planning.
2005-2008	Capacity building period: Around 1,000 technical staff are trained in pre-investment disaster risk analysis.
From 2005	Other Andean and Central American countries adopt Peruvian methodological guidelines in collaboration with the Coordination Centre for the Prevention of Natural Disasters in Central America (CEPREDENAC) and UNISDR.
2009	Legal amendment requiring disaster risk analysis for all public investment projects over a given amount.
2009-2011	Incorporation of disaster risk management into instruments and methodologies of the SNIP.
2011	National law 29664 passed by Congress creating a National System of Disaster Risk Management (SINAGERD) with disaster risk reduction concerns at the front of the development agenda and controlled by civil authorities. Guidelines for public investment integrate disaster risk management into central text.

In 2000, the Andean Development Corporation, an agency of the Andean Community of Nations, promoted the PREANDINO disaster risk reduction programme, whose main objective was the introduction of development-based disaster risk reduction initiatives in planning and development institutions in the Andean countries. This emphasis was a direct result of the increasing interest in disaster risk reduction that had previously been strengthened by the International Decade for Natural Disaster Reduction during the 1990s and carried on with the UN's ISDR that was established in 2000. These initiatives sought to compensate the very disordered approach to disaster work where preparedness and response approaches clearly dominated.

By August 2002, a Multi-Sectorial Commission on Risk Reduction in Development had been established in the PCM in order to discuss and promote development-based DRR. It was made up of representatives from different line sector agencies, international agencies and NGOs. This Commission attempted to promote an inter-sectorial view of the problem of disaster in Peru recognizing that disaster risk is constructed within and by society in the framework of different land use and land occupancy processes. The Commission's legacy was the clear message that sustainable development would only be possible if disaster risk reduction were part of the formula.

The notion of social disaster risk construction quickly led to a consideration of the need to introduce disaster risk analysis in the public investment project cycle. Following the 1997-98 El Niño in northern Peru, the Piura region and GTZ, through its Sustainable Rural Development Programme, implemented land use and territorial planning, and promoted

FIGURE 5: STAGES FOR INCORPORATING THE DISASTER RISK MANAGEMENT APPROACH IN PUBLIC INVESTMENT



Source: MEF, 2013

development based disaster risk reduction approaches in public investment. This experience was later scaled up to other regions and the national level⁵.

Following on from this experience, the head of the SNIP proved instrumental in promoting the DRR theme within the Ministry of Economy and Finance. A promotion group for DRR themes within the Ministry of Economy and Finance was set up and an ongoing inter-institutional dialogue was initiated. Despite its informal nature, this group generated an important space for discussion and collective analysis of disaster risk and development in Peru. It was in this context that the SNIP moved to transform discourse into practical action due to the fact that public investment decisions are the complete responsibility of the SNIP.

Between 2004 and 2008 conceptual and methodological frameworks were developed for the process of disaster risk analysis and social evaluation of disaster risk reduction measures in public investment projects (MEF, 2006; MEF, 2007; Campos and Narváez 2010). Conceptual consistency and homogeneity have been considered one of the major reasons for the success of the initiative over time. The framework and the guide-

5. For a complete analysis of the experiences with the Sustainable Rural Development Programme, see GIZ-PDRS, 2011.

lines for introducing DRR in public investment decisions were written as a complement (annex) to the then existing Guidelines for Public Investment, which date from 2003.

From 2008 to 2011, difficulties were faced regarding the integration of DRR in national plans by the National Centre for Strategic Planning-CEPLAN, the official government agency responsible for such matters, and explicitly named in the new 2011 law in such a role. Such integration would have given decisions on public investment a central point of reference in global planning terms.

Under these circumstances, however, the Ministry of Economy and Finance, through its General Directorate of Multi-Annual Planning, promoted the use of methodological guidelines for the incorporation of risk analysis in public investment projects (see figure 5). Since then the use of risk analysis in pre-investment processes at national, regional and local levels has been standardized and since 2009 is obligatory for both new and revised public investment projects. Nowadays, these methodological indications and frameworks, along with norms from the Ministry of Housing and Ministry of Environment relating to urban and regional Land use planning are the principle development management plans, available for promoting the incorporation of risk analysis in Peru.

By 2011, a new version of the SNIP guidelines had in fact integrated risk reduction concerns fully into its central text thus raising the official status of disaster risk reduction processes in public investment decisions.

THE STRATEGIC BUDGETING PROGRAMME FOR THE REDUCTION OF VULNERABILITY AND ATTENTION TO EMERGENCIES (PREVAED)

Additionally, in 2011, the Strategic Budgeting Programme for the Reduction of Vulnerability and Emergency Response was designed by the MEF, in acknowledgment of existing structural causes of vulnerability, especially in light of the need to promote policies for their reduction. Particular objectives of the programme included: the strengthening of institutional, normative and policy frameworks and the identification of priority needs and areas for disaster risk reduction; and the development of financial protection mechanisms. An overall goal of the programme is to achieve regular budgeting from national sources for the actions outlined.

Priority was assigned to the educational, health, housing and sanitation, agricultural, environmental and economic and financial sectors. Vulnerable populations and livelihoods, particularly those affected by El Niño, intense rain, cold weather and earthquakes, are of principle concern to the programme.

The programme follows the Budgeting by Results programming principles, effective in the General Directorate's office of the Budget and the Ministry of Economy and Finance since 2007. The intention of this budgeting procedure is to promote a process which clearly relates results to the means and actions required for their achievement, based on existing needs and experience. The mainstreaming

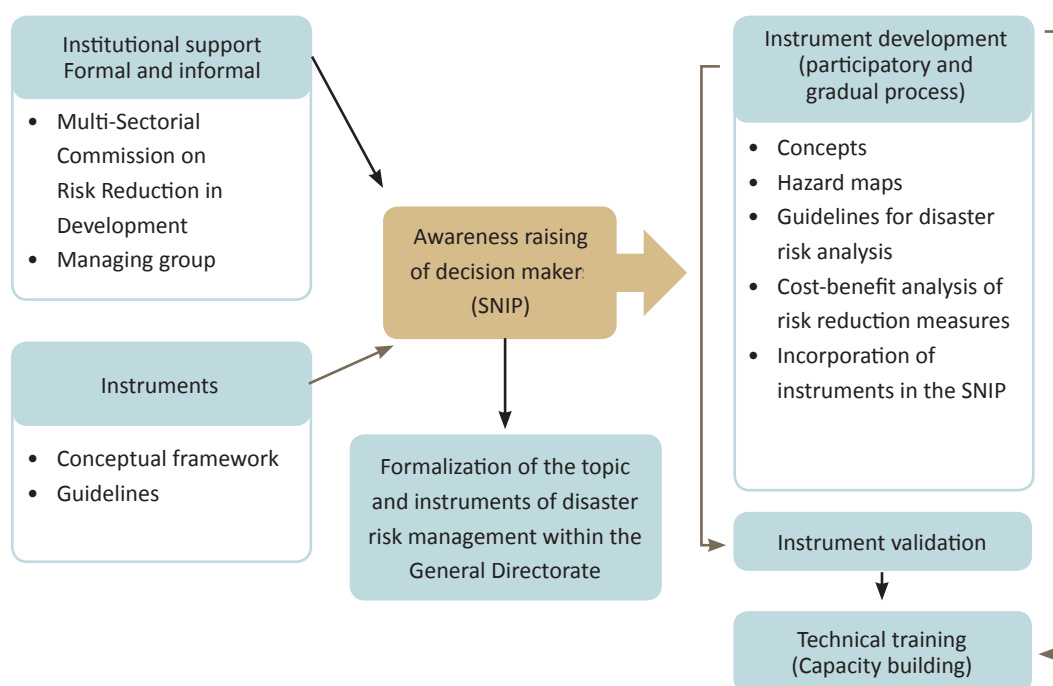
of disaster risk management considerations in public sector budgeting processes, as opposed to more sectoral approaches, is also of prime concern. As such it complements the approach to disaster risk reduction promoted through the dimensioning of public investment decisions with risk reduction criteria.

The 2011 budget for the programme, the first ever, included 11.6 million soles for protection works, 1.9 million for studies of hospital vulnerability and 6.9 million for the acquiring of humanitarian response items.

In terms of process and results, between 2005 and 2008, around 1,000 technical staff were trained in the use of disaster risk analysis. Instruments were validated in workshops with participation at the national, regional and local level, and new concepts approved.

The methodological guidelines developed and published by the MEF are now used by all public servants, and were even replicated in other countries in the Latin American region.

FIGURE 6: STRATEGY FOR INCORPORATING THE DISASTER RISK MANAGEMENT APPROACH IN PUBLIC INVESTMENT



Source: MEF, 2013

To summarise, the process by which Peru has advanced with public investment decisions informed by risk reduction notions, consists of stages that considered consciousness raising and social networking, conceptual and methodological development and specifications, the establishment of norms controlling the process of investment analysis, and the training of public investment project formulators and evaluators in risk analysis aspects.

In the next chapter, we are going to look at some key aspects which led to the introduction of disaster risk management into public sector investment decisions. An analysis (GIZ-PDRS, 2011) undertaken in 2010 identified the following relevant aspects:

- Strategic aspects: these included the development of an adequate conceptual framework, demand for the scheme by political actors, training and more training, mainstreaming and multisectoral approaches;
- Cooperation: internally by methods that guaranteed participation, consensus and constructivist techniques for arriving at solutions; existing institutional setups that could assume the challenge and an integral vision of disaster risk management and its components. Externally through strategic alliances with international agencies.
- Process: a long term view with clear objectives; small sized promoting group with highly motivated and technically competent staff; clear distribution of roles and notion of leadership; clear identification of spheres of influence and action; good practice; step by step advances.
- Innovation and learning: disaster as an opportunity; institutional memory; conservation and replication of knowledge.

4

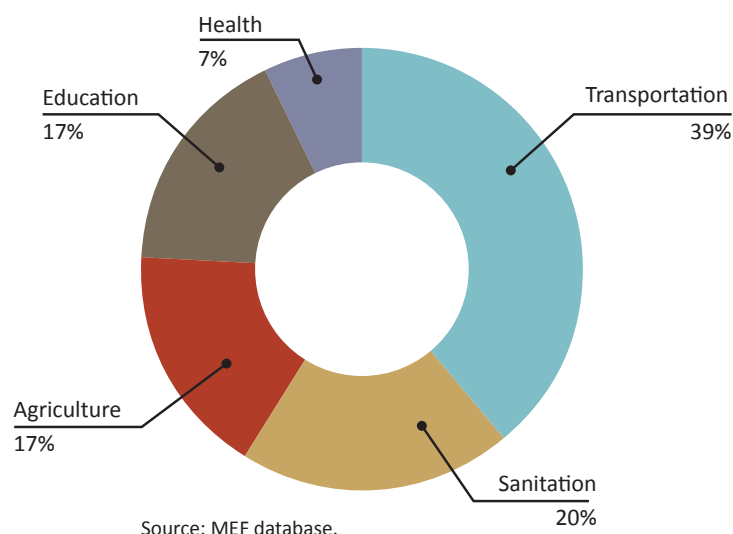
METHODOLOGY FOR INCORPORATING DISASTER RISK ANALYSIS IN PUBLIC INVESTMENT PROJECTS

4.1 Public Investment Projects and Disaster Risk Management

As mentioned previously, a document outlining the methodological steps to be taken to introduce disaster risk reduction aspects into public investment decisions was published in 2007. This was the product of experiences substantiated in various working group sessions held between 2004 and 2005. This document was an important complement to the already existing General Guidelines for the Identification, Formulation and Social Evaluation of Profiles of Public Investment Projects, produced in 2003 by the MEF. In this way, the formulators and evaluators of public investment projects were provided with a single point of reference and method as a basis for training and action.

A Public Investment Project (PIP) is defined as *"an intervention that is limited in time and that uses public funds, totally or partially, with the objective of creating, amplifying, improving, modernizing or recovering the capacity to produce goods and services that generate social benefits during their useful lifetime and are independent of other projects"* (SNIP General Directive, MEF 2011). Projects must be socially profitable, sustainable and reflect sectoral, regional or local public policies. Approximately 15% of all PIPs are to be found in each of the sectors ; transportation, agriculture, health, sanitation, education and culture account for 70% of public investment and 74% of all projects approved (see figure 7).

FIGURE 7: NUMBER OF PUBLIC INVESTMENT PROJECTS PER SECTOR IN 2012

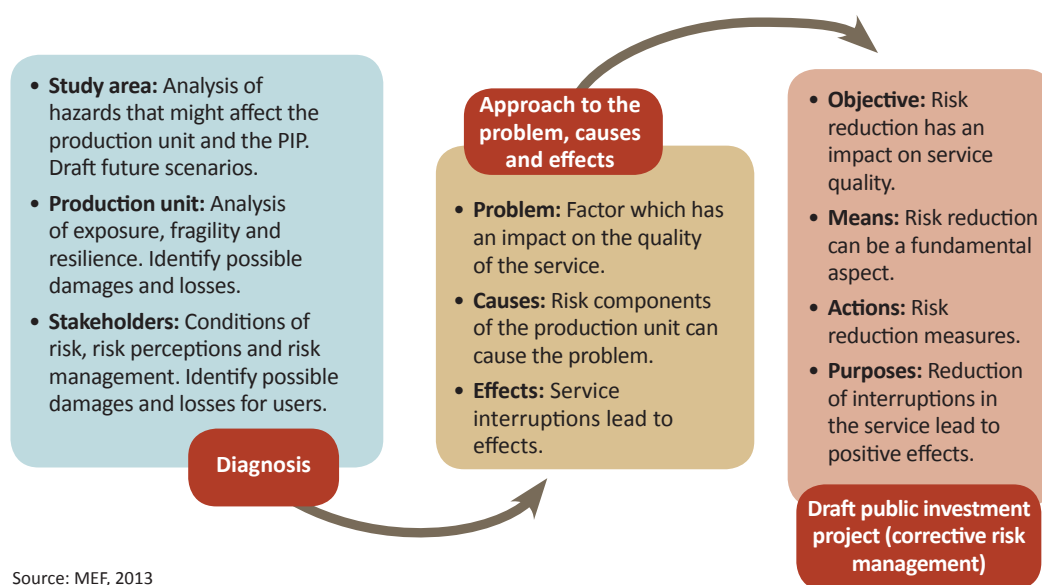


Peru is by nature a highly hazard prone country and a large number of public investment projects are located in areas where there is a threat of interruption in the provision of services and goods and services, and the possible need for new expenditures on emergency, rehabilitation and reconstruction activities. In this way, benefits may be lessened and original cost calculations increased unless risk reduction measures are incorporated. The social profitability and sustainability of projects may thus be affected, contradicting the logic of the National Public Investment System and its principle objectives. In view of this, the SNIP promotes disaster risk analysis for both existing and new projects. It follows the dictates of "corrective" and "prospective", and more recently "reactive" disaster risk management practice. Through disaster risk analysis and management, risk is both identified and evaluated and solutions for this are postulated.

The methodology developed by the MEF in incorporating disaster risk management considerations is applied to the project formulation stage and project life cycle. The formulation stage comprises 6 discrete but interrelated aspects: hazard analysis, vulnerability analysis, risk estimation, cost estimates for alternative risk reduction schemes, evaluation of alternatives and best option selection. The project draft has a modular structure that comprises three chapters: identification, formulation and evaluation.

Identification: This first chapter is generally used to establish the project framework and analyse the specific problem, its causes and consequences, to which solutions are being sought. The process of DRM incorporation basically includes a spatial and social contextualization of the proposed project, considering the physical hazards that are present and the opinions and commitments of relevant stakeholders when faced with disaster risk. Checklists are offered to help project formulators analyse existing hazards and stakeholder opinions and perceptions. Hazards are classified considering both the frequency and severity of possible events. The exposure, fragility and resilience of the current infrastructure are also analysed (see figure 8).

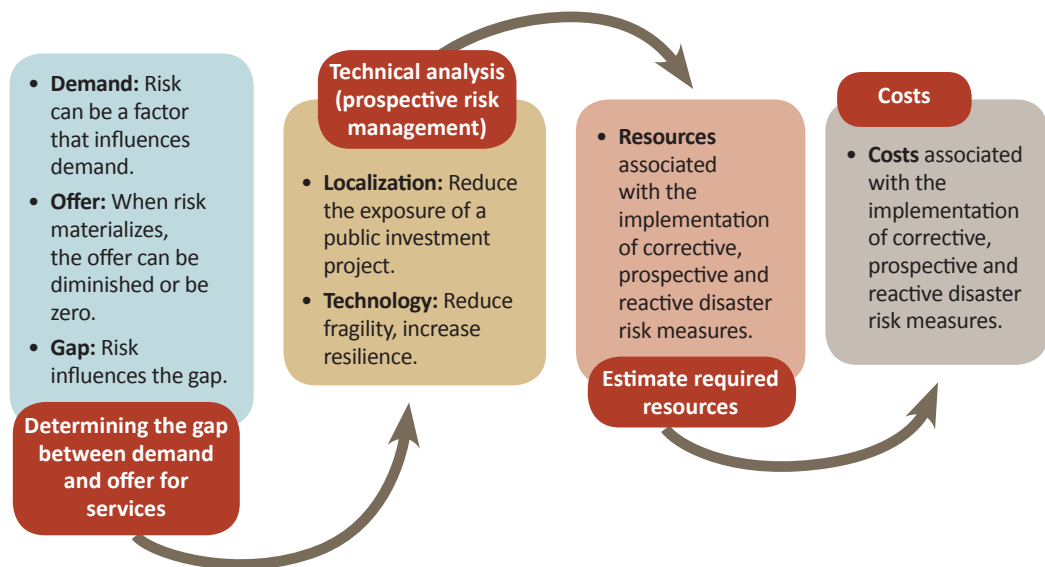
FIGURE 8: INCORPORATING RISK MANAGEMENT IN PIPS - IDENTIFICATION



Source: MEF, 2013

Formulation: The formulation chapter looks at the demand and supply side of the public services and analyses the different alternatives, so as to optimize mainly location, technology and size. The basic concern in relation to DRM considerations is to determine levels of probable damage and loss where disaster risk mitigation is not considered and planned for, and to postulate cost alternative schemes for disaster risk reduction. Vulnerability analysis, when faced with determined hazards, is based on the identification of factors of location, fragility and resilience. Checklists are made available to help project formulators identify prevailing vulnerability factors and contexts. Once disaster risk levels and types have been identified, the existing options for disaster risk reduction are postulated and priced. Investment and maintenance costs are identified and cost flows are calculated using market prices (see figure 9).

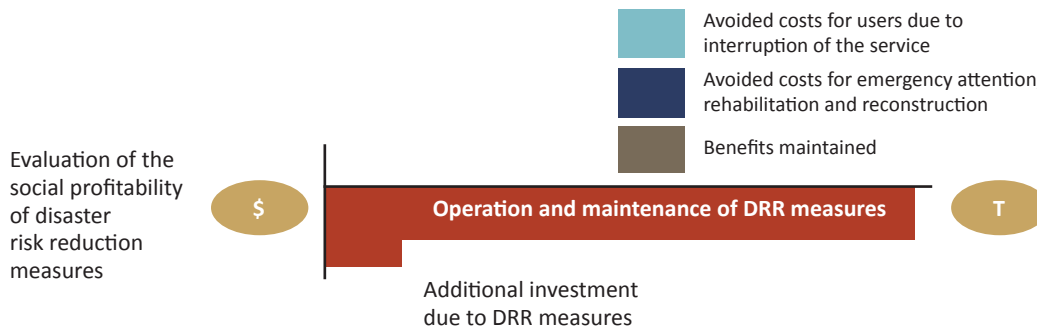
FIGURE 9: INCORPORATING RISK MANAGEMENT IN PIPS - FORMULATION



Source: MEF, 2013

Evaluation: The primary objective in relation to DRM is to determine which disaster risk reduction measures achieve higher social sustainability and financial returns. When the monetary benefits of a particular project are difficult to estimate, an analysis of Cost Effectiveness is undertaken (employing cost indicators and cost-effectiveness ratios), assuring that all evaluated projects incorporate risk reduction measures, and are thus comparable. Cost Benefit Analysis is employed where benefits can be calculated in order to choose between alternative disaster risk measures. Benefits accrue where there is minimum loss of life and assets; less illness and injury; fewer costs of rehabilitation, reconstruction and emergency response (see figure 10); project continuity is guaranteed and indirect benefits are derived due to the continuance of the project. The higher net present value, after considering all costs and benefits, is the determining criteria for selecting the disaster risk reduction measure. Sensitivity Analysis is employed where uncertainty exists as to hazard and vulnerability dimensions. This allows an estimate of changes in indicators of social profitability due to changes in the period of return and magnitude of hazards and vulnerabilities.

FIGURE 10: INCORPORATING RISK MANAGEMENT IN PIPS – EVALUATION



Source: MEF, 2013

Some important aspects in the process of incorporating disaster risk management approach in public investment planning were:

- Initially, the methodological instruments focused on applying risk analysis. Since 2010, risk management, which in addition to risk analysis includes the identification and implementation of risk reduction measures, is taken into consideration.
- Whereas initially, only prospective risk management was considered, experience soon showed the need to integrate all three aspects of disaster risk management: prospective, corrective and reactive.
- Some (methodological) doubts regarding the formulation of public investment projects applying the disaster risk management approach included the incorporation of risk measures added to project costs which affected its profitability. Also, an unprofitable project could become profitable when the benefits associated with risk reduction were included. The solution lies in evaluating the social profitability of risk reduction measures considering social costs and benefits (costs avoided and benefits maintained) associated with the measures. The results are then incorporated into the cost flows of social evaluation.
- Disaster risk management is distinct from environmental impact analysis. While the analytical focus (the environment and the project) are the same, the approach differs. Disaster risk management analyses how the environment might affect a project, whereas environment impact analysis focuses on the impacts of the project on its surroundings.
- Where scientific information is scarce, the knowledge of local communities and historical disaster data as well as territorial planning instruments can be helpful.
- There is no such thing as a “risk management project”. Disaster risk should be managed in all public investment projects, in order to ensure the sustainable provision of high-quality public services. Security services projects have the objective of reducing existing disaster risk.

4.2 An example of Risk Analysis for Planning and Investment Decisions: The Machu Picchu Hydroelectric Facility

In this section an example of the application of the social evaluation of disaster risk management in the context of project planning is provided.⁶

In February 1998 the Machu Picchu Hydroelectric plant located on the Vilcanota River in Cuzco was severely damaged by flooding. A water, mud, ice and rock slide caused by rapid thawing of the glaciers on Mt Salkantay led to the depositing of 28 million cubic metres of material over an area of 720 thousand square metres, which blocked rivers and created a temporary lake that flooded the plant.

A decision was made to rehabilitate the facility, recover its generating capacity and reduce its vulnerability to future events of similar magnitude. Such rehabilitation constitutes a case of prospective risk management stimulated by evidence of prior event impacts. As such it also constitutes a case of post disaster risk analysis and higher quality reconstruction.

Project formulation and implementation considered a series of different types of structural and non-structural interventions. Dykes for containing the Aobamba River and for protecting the turbine house were posited, along with the construction of a discharge channel for excess water and a tunnel for discharging turbine house water back into the river. Monitoring of the river flow patterns and reforestation of slopes were also posited. Repair of existing mechanical and electromechanical equipment was included in the project proposal.

Disaster risk analysis revealed the possibility of repeated hazards from the two rivers where fragility was essentially related to the technical characteristics the exposed infrastructure. Relatively high resilience exists due to the insurance coverage available for the facility and functional interconnectivity of the electric system, which reduced impacts on customers. Any future similar event would lead to destruction of infrastructure and installations; loss of electromechanical equipment; interruption of energy supply and loss of a clean energy producer; as well as impacts on dependent activities.

ILLUSTRATION 3: THE MACHU PICCHU HYDROELECTRIC PLANT DURING AND AFTER THE FLOODING



Source: EGEMSA Photo Archive

6. The example is taken from (MEF, 2010), where it is used as a didactic example of how to conduct the social evaluation of disaster risk reduction measures. The intervention itself was implemented before disaster risk management had been introduced as an obligatory part of the planning process.

Here, the example of social evaluation of disaster risk reduction measures considers a percentage probability of occurrence of a major event (similar to the one that happened in 1998) of 100%, 75%, 50% and 25% over a five year period. The useful life of an investment is considered to be 10 years.

The project for rehabilitating the facility could be budgeted at 138.3 million soles⁷ with risk reduction measures and at 136.1 million without those measures - an incremental cost of only 2.2 million. Avoided future costs due to disaster risk reduction measures would include those required for: emergency attention, the substitution of energy sources through the interconnectivity system, taking into account the marginal costs of the substitution and estimated additional costs of an alternative system operation, and rehabilitation or reconstruction of the facility.

Incremental cost benefit analysis combined with sensitivity analysis (assuming a 100%, 75%, 50% and 25% probability of a five year return period for the 1998 damaging events), based on calculations of added expenses as well as avoided costs and derived benefits, revealed a positive situation for all scenarios where risk reduction investments are postulated. In the case of a 100% probability of a five year return period the total net present value is 8.4 million soles; the current value of benefits is 103.2 million soles; the current net value of benefits is 94.9 million soles and the internal rate of return is 101%. In the scenario with a 25% probability of a five year return period the respective figures are 8.4, 25.8, 17.5 and 51%. Therefore, the intervention is justified in terms of positive indicators of social profitability under all of the scenarios (see figure 11).

FIGURE 11: INDICATORS OF SOCIAL PROFITABILITY OF THE MACHU PICCHU PROJECT

Scenarios (probability of major event in year 5)	Total net present value (in million soles)	Current value of benefits (in million soles)	Current net value of benefits (in million soles)	Internal rate of return
100%	8.4	103.2	94.9	101%
75%	8.4	77.4	69.1	90%
50%	8.4	51.2	43.3	70%
25%	8.4	25.8	17.5	51%

Source: based on (MEF, 2010).

In fact, the disaster of 1998 was attributed to the combination of intense precipitation associated with the ENSO and excessive melt of Salcantay glacier associated with higher temperatures and climate change. Methodologies are described.

7. Equivalent to approximately 50 million USD (exchange rate May 2014).

5

CONCLUDING OBSERVATIONS

5.1 Climate change impacts and updates to concepts and methods

Disaster risk and the adverse effects of disasters have increased notably over the last 40 years. Infrastructure, production and services damaged or lost in disasters were once the result of public or private investment decisions. This understanding led to the incorporation of disaster risk management into public investment decision-making in Peru over the last ten years.

As explained in this Technical Note, in February 2011, the National System of Disaster Risk Management (SINAGERD) was created under the coordination of the Presidency of the Ministerial Council (PCM), and charged with the proposal, elaboration and presentation for approval of all major policies and actions on disaster risk management.

In 2004, the Ministry of Economy and Finance (MEF) started to incorporate the disaster risk reduction approach into the National System for Public Investment's (SNIP) instruments and methodologies. The initial focus was on risk analysis, but by 2008, it became clear that a broader risk management approach was necessary.

Despite some concerns regarding, for instance, the lack of trained evaluators and project formulators at local level, the overall process and advances are extremely encouraging and represent a significant attempt to provide key mechanisms for achieving disaster risk reduction in Peru.

Furthermore, since 2012, efforts are underway to include climate change considerations into the existing disaster risk management framework.

Two factors explain the recent move to incorporate climate change adaptation concerns in updated conceptual and methodological documents: 1. the rapid emergence and consolidation of the climate change adaptation challenge over the last ten years and 2. the fact that the original conceptual and methodological frameworks developed in 2006 and 2007 to guide the public investment decision making process did not take climate change into consideration. This process will signify the publication of a second edition of existing documents and adjustments to the process and techniques of analysis used to substantiate investment decisions.

An updating and adjustment of concepts and methods will take into account:

- The stress associated with possible increases in the intensity, magnitude or spatial impact of potentially damaging hydro-meteorological events (extremes and other non-routine events).
- New stresses associated with gradual processes such as sea-level rise, glacial melt, soil salinization and increases in disease vectors; and with changing climate factor averages (temperature, rainfall, winds and humidity).
- Variations in vulnerability levels due to the post-impact influence of events on livelihoods where such events may be more frequent, thus leading to greater accumulative effects on society.
- Greater uncertainty as to the return period of non-routine events and as to the rhythm of change in average climate factors.

Definitions, concepts and methods are taking into account the results of the recent IPCC Special Report on Managing the Risks of Extreme Events and Disasters (IPCC, 2012).

These changes, to be achieved through the Ministry of Economy and Finance in collaboration with other relevant government agencies, particularly the Ministry of Environment, are supported financially and technically through the Public Investment and Climate Change Adaptation-IPACC Project. This project seeks to promote the use of cost benefit analysis and other relevant approaches for public decision-making regarding climate change adaptation.

5.2 Challenges for the future

While various OECD countries and international financial institutions like the World Bank and the Inter-American Development Bank use cost-benefit analysis routinely for assessing disaster risk management interventions, several criticisms and doubts as to cost-benefit approaches are present in recent discussions and literature (see IPCC, 2012, for a short summary of some of this debate). One of the major criticisms of the cost-benefit approach is the fact that intangibles and other items that are difficult to value are often left out. Also, limited knowledge as to hazard and vulnerability patterns at a local level and uncertainties as to the internal discount rates that should be applied further complicate the process of analysis. Therefore, some argue that quantitative models are necessary but not sufficient to define adequate disaster risk management policies and interventions when intangibles play a significant role. In these cases, calls for the application of other complementary techniques or substitutive techniques exist, such as multi criteria analysis and robust decision-making tools within no regrets frameworks (IPCC, 2012).

In the Peruvian context, the process by which risk reduction criteria are applied in public investment has also been commented on and future needs have been identified (Campos and Narvaez, 2010). Calls are made for the project to have a basis where risk analysis is achieved together with more comprehensive, multi-sector, territorial based planning and information gathering approaches. The pressure to take decisions leads

to the bypassing of norms and requires greater consciousness, raising efforts and consensus among local actors. Therefore, one of the future challenges in this context consists in improving the information basis and continuing capacity building efforts with project planners and evaluators, especially at the local level.

So far, the overall process and advances made are extremely encouraging and represent a significant attempt to advance disaster risk reduction in public investment decision making in Peru and provide key mechanisms for achieving this. Improvements will be made as time passes and with persistence and experience existing obstacles will be overcome. Public investment considered in a holistic, integral planning framework must be the objective of risk analysis. Moves to extend this more widely to the private sector must also be promoted in the future. Experience to date can only help promote these processes and overall improvements in disaster risk and climate change adaptation practice in Peru.

ACRONYMS

BMUB	German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit)
CENEPRED	National Centre for the Estimation, Prevention and Reduction of Disaster Risk (Centro Nacional de Estimación, Prevención y Reducción del Riesgo de Desastres)
CEPLAN	National Centre for Strategic Planning (Centro Nacional de Planeamiento Estratégico)
CEPREDENAC	Coordinating Centre for the Prevention of Natural Disasters in Central America (Centro de Coordinación para la Prevención de los Desastres Naturales en América Central)
COSUDE	Swiss Agency for Development and Cooperation (Agencia Suiza para el Desarrollo y la Cooperación)
DESINVENTAR	Disaster Information Management System (Inventario de Desastres)
DIPECHO	European Commission's Humanitarian Aid and Civil Protection General Directorate (ECHO) Disaster Preparedness Programme
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
GIZ	German Development Cooperation (Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH)
GTZ	German Technical Cooperation (Deutsche Gesellschaft für Technische Zusammenarbeit GmbH) – nowadays GIZ
HFA	Hyogo Framework for Action
IPACC	Public Investment and Climate Change Adaptation Project (Proyecto Inversión Pública y Adaptación al Cambio Climático)
ICI	International Climate Initiative of the German Federal Ministry BMUB
INDECI	National Civil Defense Institute (Instituto Nacional de Defensa Civil)
IPCC	Intergovernmental Panel on Climate Change
MEF	Peruvian Ministry of Economy and Finance (Ministerio de Economía y Finanzas)
NGO	Non-governmental Organization
OECD	Organization for Economic Cooperation and Development
PCM	Presidency of the Ministerial Council (Presidencia del Consejo de Ministros)

PDRS	Sustainable Rural Development Programme (Programa de Desarrollo Rural Sostenible)
PIP	Public Investment Project (Proyecto de Inversión Pública)
PREANDINO	Regional Andean Programme for Disaster Risk Prevention and Reduction (Programa Regional Andino para la Prevención y Reducción de Riesgos de Desastres)
PREDECAN	Disaster Prevention in the Andean Community (Prevención de Desastres en la Comunidad Andina)
PREDES	Centre for the Study and Prevention of Disasters (Centro de Estudios y Prevención de Desastres)
PREVAED	Budgeting Programme for the Reduction of Vulnerability and Attention of Disaster Emergencies (Programa Presupuestal de Reducción de Vulnerabilidad y Atención de Emergencias por Desastres)
SINAGERD	National System of Disaster Risk Management (Sistema Nacional de Gestión del Riesgo de Desastres)
SNIP	National System for Public Investment (Sistema Nacional de Inversión Pública)
SINADECI	National Civil Defense System (Sistema Nacional de Defensa Civil)
UNISDR	United Nations Office for Disaster Risk Reduction, former United Nations International Strategy for Disaster Reduction

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IPACC PROJECT OBJECTIVE

Political decision makers and relevant technicians at national level and in two priority regions are informed about the possible costs and benefits of climate change impacts in two selected sectors and orient public investment by adaptation to climate change (ACC) criteria and risk reduction associated with climatic phenomena.

1. INFORMATION

Existing information on the risks and positive effects of climate change for the two priority regions and sectors is updated and systematized. On this basis studies on vulnerability and risk maps are prepared. Methodologies are validated and studies of cost-benefit analysis in the two regions and priority sectors are carried out.

2. GUIDELINES AND CRITERIA

Based on cost-benefit analysis at least two catalogues of criteria and guidelines for the consideration of climate change and possible adaptation measures in the prioritization of public investment projects in two selected sectors are prepared. Additionally, an incentive proposal for funding of public investment that incorporates the guidelines and criteria is designed.

3. INSTITUTIONALIZATION

The makers and evaluators of public investment projects will be supported in the process of incorporating catalogues of criteria for climate change adaptation in the National System of Public Investment. Technical-administrative personnel will be trained in the application of the criteria catalogues both nationally and in the two prioritized regions.

In selected regions, tools for the ACC and risk reduction associated to climatic phenomena in the framework of planning projects of public investment are tested and validated. The incorporation of adaptation to climate change measures is applied on a pilot basis in at least one existing policy instrument at regional level.

Also, there is a monitoring mechanism available for the application of the ACC in public investment and political guidelines exist for the priority regions which promote their application.

4. KNOWLEDGE MANAGEMENT

A digital platform that summarises the relevant information for the adaptation of public investments to climate change is available. In addition, there is an inventory of existing networks in the priority regions.

Through the management of knowledge and the exchange of experiences, relevant stakeholders from other Latin American countries are sensitized in the topic of climate change economics.



The Public Investment and Climate Change Adaptation Project is part of the International Climate Initiative (ICI) of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB).