

## Chapter 6

### Recovery and reconstruction

*Public policies to limit the longer term social and economic impacts of disasters are essential components of a holistic approach to civil protection. This chapter considers practices in support of business continuity planning, early recovery and reconstruction. It examines the actions of key industries to maintain operations and public policies in support of low income households affected by disasters. It also describes changes made over time to refine Mexico's innovative risk transfer mechanisms for financing the reconstruction of public infrastructure through the FONDEN Disaster Reconstruction Fund. This specific financial mechanism is tailored to the country's high exposure to hazards.*

## Introduction

Communities can suffer severe negative impacts in the short to medium term following a disaster due to losses of capital stock, lost economic growth and inflation due to the scarcity of goods. While direct damages such as lost lives, destroyed homes and damaged businesses capture public attention, negative economic impacts in Mexico result to a great extent from damage to public infrastructure. The typical landscape of a disaster includes roads that are washed away or encumbered with debris, faltering water purification and electricity plants, and damage to telecommunications. Businesses may suffer physical damage to buildings and inventory, lost orders, displaced workers, a reduced customer base and extended periods of interruption.

In addition to immediate relief needs such as basic shelter, cleanup efforts and business continuity, an integrated approach to disaster risk management should consider how medium-term objectives such as economic recovery and extensive repairs to infrastructure and housing can best be met. Economic recovery in the long run depends on how quickly such assets can be repaired, as well as the quality of the new capital stock compared to the pre-disaster state.

The longer a community takes to recover from a disaster, the less likely it is that the local economy will ever return to the productive level it had before the disastrous event. Ensuring the business continuity of key services such as health, telecommunications, energy or water supply, and implementing dedicated social programmes can help to minimise a disaster's impacts in terms of a prompt return to normality and preventing capital flight. In addition, the financial impacts of disasters can be mitigated *ex ante* through pro-active financial management tools, most notably risk financing and risk transfer tools and compensation arrangements provided by the private sector or government, as a complement to physical risk-reduction measures. These tools provide financial protection and may reduce costs by re-profiling risks across time so that they can be better managed or by transferring risks to those better able to absorb them. They hedge the economic impacts of disasters, thus averting potentially devastating drops in welfare, accelerate recovery and foster reconstruction; but striking the right balance is important to ensure that individuals and businesses have incentives to invest in preventative measures (OECD, 2012).

This chapter analyses *ex ante* financial arrangements to support rapid reconstruction and temporary relief policies to stimulate local consumption with targeted support for small and medium enterprises (SMEs). It considers whether the institutional arrangements for such measures reflect good governance practices and whether the strategy takes account of how such support can undermine the incentives to invest in better quality construction and non-structural prevention practices. The chapter also addresses the *ex ante* pooling arrangements adopted by Mexico to ensure adequate financial capacity to cover peak risks, as well as capital market solutions in catastrophic risk transfers, such as risk securitisation (OECD, 2010).

## Business continuity and early recovery as a civil protection objective

The aftermath of an emergency requires specific strategies to stem or limit secondary impacts. These include plans to ensure the continuous functioning of basic services and the economy of the affected area – business continuity – as well as a rapid return to a normal life for citizens at the household level to restore basic living conditions and avoid social unrest – often referred to as early recovery.

### ***Business continuity***

Business continuity planning constitutes a key element to reduce the potential disruption of the supply of goods and services, especially in vital systems such as hospitals, water and energy, public security, transport and communications. After a disaster, the economic recovery of a country or region may depend heavily on the continued productive capacities of such essential services and SMEs, and need to be accompanied by specific programmes. For public and private sector organisations alike, the first step in business continuity planning is to model the potential impacts and consequences of a hazard on the organisation’s entire range of activities and identify its essential parts and functions as distinct from what can be discarded temporarily. While efforts have been made in Mexico to improve and develop business continuity plans, especially at the federal level and by operators of critical infrastructures providing strategic services, implementation remains widely uneven at more local levels and in smaller organisations.

Business continuity planning works hand-in-hand with civil protection planning in Mexico, as it is a key aspect of the emergency plans developed at the three levels of government (see Chapter 5). All public sector members of Mexico’s National Civil Protection System (*Sistema Nacional de Protección Civil*, SINAPROC) have to develop business continuity plans in their internal programme of civil protection (see Chapter 5), and the General Directorate for Civil Protection (*Dirección General de Protección Civil*, DGPC) leads the strategy to develop these plans. In addition, the DGPC works with representatives from the social and private sectors to promote business continuity for governmental institutions so as to ensure government continuity, i.e. continued political leadership.

As in most OECD countries, business continuity planning is more developed and integrated in large enterprises than in SMEs. Mexican Cements (*Cementos Mexicanos*, CEMEX), the world’s third largest building materials supplier and cement producer, and Mexican Telephones (*Teléfonos Mexicanos*, TELMEX), the largest telecommunication company in Mexico, have developed specific services to support business continuity planning, specifically in the domain of data management, hosting and recovery. In the energy sector, Mexican Petroleum (*Petróleos Mexicanos*, PEMEX) maintains strategic stocks throughout the country to ensure that the oil supply for Mexico City and other major cities will not be disrupted in the event of a disaster. The Federal Electricity Commission’s (*Comisión Federal de Electricidad*, CFE) emergency plan focuses on electricity supply continuity in disaster-affected areas. In August 2012, for example, only one day after Hurricane Ernesto had interrupted electricity supply to 85 450 inhabitants in the states of Quintana Roo and Campeche, 60% of the damaged connections had already been restored. Business continuity of health and water services is planned for in the Safe Hospitals Programme (*Hospital Seguro* – see Chapter 4) and the National Water Commission’s (*Comisión Nacional del Agua*, CONAGUA) emergency plan (see Chapter 5).

The federal government supports business continuity in some economic sectors, such as tourism; the Ministry of Tourism (*Secretaría de Turismo*, SECTUR) places specific emphasis on supporting micro-businesses. Microcredit is provided through the Ministry of Economy in order to quickly reactivate the tourism industry in disaster affected areas. Among the effective practices in place to foster business continuity are the establishment of “supply committees”, which ensure the supply of consumer goods, and the

development of an official business continuity standard designed to foster broader uptake by SMEs.

### ***Public policies in support of early recovery***

Early recovery refers to actions that address the immediate needs of communities following a disaster; they are demand-side oriented (distinct from the supply-side focus of business continuity planning). These actions may involve financing the purchase of basic supplies for households, removing debris and cleaning streets, and providing job opportunities for people who have lost their livelihoods. Each of these actions helps households, businesses and communities to restore normal living conditions and operations.

The key to successful early recovery is the evaluation of needs and damages. A rapid, dependable and effective early recovery scheme sets the foundation for the reconstruction process during which long-term investments are made, such as repairs to infrastructure. Shortages of basic necessities and logistics bottlenecks may stir negative reactions among the population, which can generate social unrest, diminish trust in institutions and weaken public participation in participatory governance. An agile early recovery strategy reduces social tensions, may restore trust in government and establishes the legitimacy of risk management authorities. The maintenance or restoration of public order and security is also an important condition of the early recovery phase, together with the provision of basic supplies and immediate relief. Proactive and clear public leadership is necessary to address the needs of vulnerable populations and to ensure public order.

Mexico has put several early recovery mechanisms in place oriented primarily towards the most vulnerable social groups. After the Army and Navy complete the emergency phases of the DN-III Plan and Navy Plan (see Chapter 5), they also provide capacity for clearing rubble and removing debris. The presence of these military institutions in affected areas also helps to support public order and security. The Ministry of Social Development (*Secretaría de Desarrollo Social*, SEDESOL) manages a programme to create temporary employment in affected areas, which helps to increase local production and stimulate local demand while indirectly supporting recovery operations. Typically these include family or community projects to restore or rebuild housing, working in shelters cooking or cleaning. The programme is implemented for one month after the onset of a disaster and pays participants 99% of the minimum salary with a four-hour work day.

A specific fast-track financial mechanism was created in 2000 to make the supply of basic goods available to states and municipalities for early recovery. As soon as an emergency declaration is accepted by the Ministry of the Interior (*Secretaría de Gobernación*, SEGOB), the Emergency Fund (*Fondo Revolvente*) can be used within a few days to finance large amounts of food, protective sandbags, medical treatments, mattresses and blankets, cleaning tools and materials, etc. (see Annex I). In 2011, approximately MXN 580 million were disbursed by SEGOB through this mechanism managed through its Fund for Natural Disasters (*Fondo de Desastres Naturales*, FONDEN – see next section). Control mechanisms have been specifically designed to ensure transparency and limit the risk of malfeasance and mismanagement of these public funds. Moreover, some states have created their own funds to limit aid requests to the federal government in particular situations (Box 6.1).

### Box 6.1. State funds for civil protection

The recently enacted General Law on Civil Protection (2012) encourages the development of local funds for civil protection in the states and municipalities. Some states, such as Mexico and Jalisco, have also made efforts in this direction, thereby increasing their emergency preparedness capacities while reducing dependence on federal support.

In December 2010, the Congress of the state of Mexico approved a budget line of MXN 150 million to create the Fund for Disasters and Environmental and/or Anthropogenic Accidents of the State of Mexico (FDEAA). Similar to FONDEN funds, the purpose of this mechanism is to provide relief to the population during an emergency and to carry out prevention and mitigation activities beforehand to reduce any eventual impact caused by emergencies or disasters. The FDEAA is an additional mechanism which is parallel to the resources allocated individually by the state ministries and municipalities for emergency response and recovery. For the year 2012, the fund's endowment amounted to approximately MXN 200 million.

In Jalisco, funds for emergency response activities are included in the ordinary annual budget of the State Unit of Civil Protection and Firemen (Unidad Estatal de Protección Civil y Bomberos Jalisco, UEPCB); in fiscal year 2012 they amounted to MXN 102 million. The executive branch has also set up an Operational Trust Fund (MXN 1.5 million in 2012) and a special part of the civil protection budget is allocated for the State Emergency Fund, FONDEN (MXN 6.5 million in 2012). These funds are used to support emergency response when the state's capacities have not been exceeded, which is a condition for accessing federal funds. In this way, the State Emergency Fund enables municipalities to obtain financial support for search and rescue, evacuation and reconstruction activities when support from the federal government is unavailable.

*Source:* Jalisco state Civil Protection Law; information provided by the state of Mexico, Operation Rules of the Fund for Disasters and Environmental and or Anthropogenic Accidents of the state of Mexico.

An additional fast-track instrument to finance immediate needs is made available to states and municipalities once a disaster has been officially recognised. All tasks related to debris removal, water supply and distribution, provisional shelters, schools and bridges, i.e. everything related to the restoration of public services, can be immediately financed through the so-called “Immediate Partial Support” (*Apoyos Parciales Inmediatos*, APIN) a mechanism established by FONDEN and granted by the Ministry of Finance (*Secretaría de Hacienda y Crédito Público*, SHCP). The one and only condition is that provisional works should not last for more than 30 days and that their funding should be considered as part of the funding for reconstruction to avoid the federal government paying for the same expense twice. Co-ordination between FONDEN (SEGOB) and the Budgeting Policy and Control Unit (UPCP) of the Ministry of Finance is well established for this purpose. Finally, there have been instances, such as in 2011, when the federal government has made special financial resources available to states through the emission of zero coupon bonds.

The early recovery phase also entails conducting comprehensive damage assessments, both to identify the needs of the population and to initiate the reconstruction process. Assessing damages and the needs of the affected population is a crucial process in order to provide the appropriate support during the early recovery phase. The Red Cross follows a specific process of needs diagnosis (*Análisis de Vulnerabilidad y de Capacidad*, AVC), which has at times led to unexpected requests. For example, among the needs that isolated communities in the state of Tabasco identified after massive flooding in 2007 were boats for fishing, to continue their livelihoods, and also ice machines, to conserve

the fish they caught for sale rather than pay for ice from a separate producer, who could undercut their margins by selling them ice at a premium. Accurate needs assessment is key for authorities who need to gain the public's trust in the general recovery and reconstruction process, and is essential to ensure the population will receive the resources it needs when it actually needs them.

SEGOB, through the DGPC, is responsible for the implementation of the initial actions related to damage assessment and needs identification. The first situation report contributes to identifying the needs of the population and identifies damage to critical infrastructure and the emergency response capacities of the public authorities. It integrates information received from other federal government bodies and serves as the base document for taking decisions during emergency response. The methodology is established and standardised with the state system's of civil protection through a training process during the "Regional Days of Civil Protection" or upon specific demand from states or municipalities.

### **Financial mechanisms in support of reconstruction**

Large-scale disasters can severely affect public infrastructure, such as roads, bridges, schools, hospitals, dams, and the production and transmission of water and electricity. In Mexico, the federal government administers a comprehensive approach to disaster risk financing, with linkages to prevention, early recovery, reconstruction and risk transfer. Many countries have established disaster funds to finance the reconstruction of damages incurred during a disaster, rather than divert funds from devoted budget lines on an *ad hoc* basis. However, such schemes face complex challenges. First, they need to respond to public expectations of rapid disbursement, while at the same time ensuring transparency and oversight to guarantee that public funds are used for their intended purpose. Second, such schemes may lead to moral hazard with the unintended consequences such as a lack of investment by households and businesses in prevention measures or insurance.

#### ***Disaster risk management financial instruments: Programmes for reconstruction and prevention***

SINAPROC is guided by a vision of integrated risk management that incorporates several programmes and financial mechanisms to support early recovery from disasters, reconstruction of public infrastructure and even prevention projects. The FONDEN programme provides financial support for the costs of reconstruction and repairs to public infrastructures, investments in disaster risk prevention (the FOPREDEN) and early recovery transfers to low-income households (the Emergency Fund). Unlike many other countries, in Mexico the same ministry that co-ordinates emergency preparedness and response (SEGOB) also has key responsibilities for the administration of these programmes, which facilitates the full use of data and information collected about disaster damages.

The federal government established FONDEN in 1996 as a cost-sharing mechanism through which states and municipalities may access federal resources to rebuild their public infrastructure damaged by a disaster related to a natural hazard – it does not cover man-made events. Every year at least 0.4% of the annual federal budget must be made available for disaster risk financing, which represents approximately USD 800 million per year.<sup>1</sup> More specifically, the federal budget and Fiscal Responsibility Law states that there should be at least a minimum threshold of 0.4% of programmable expenditure

comprising both budgetary resources and funds available as reserves for FOPREDEN, FONDEN and CADENA (the Ministry of Agriculture’s catastrophic fund). Each programme draws from the same federal expenditure budget: FOPREDEN, the FONDEN Emergency Fund, the FONDEN trust fund and CADENA. At the end of the fiscal year, should there be any remaining budgetary resources either in the FONDEN programme or FOPREDEN, they are transferred to the FONDEN trust, and count as part of the minimum 0.4% of the following year’s budget allocation. The Ministry of Finance can intervene in case resources are insufficient to provide supplemental funds, drawing on resources from budget surplus income. During the period 2000-10, the average annual expenditure of FONDEN federal resources was MXN 4 627 million, including the 100% financing of federal infrastructure and the 50%, on average, of state infrastructure.

### ***Governance and process of FONDEN expenditures***

States do not have direct access to federal resources to reconstruct their infrastructure; these resources are available through the FONDEN trust, which pays out directly to specified contractors. The FONDEN trust is co-managed by SEGOB and the Ministry of Finance and holds the allocated reconstruction funds before they are approved for the reconstruction process (see Annex J). All of the resources for federal infrastructures are provided through the FONDEN.

The fiduciary of the FONDEN trust is the state-owned development bank BANOBRAS, which operates according to the mandate of the Ministry of Finance. It disperses approved expenditures to the businesses contracted by the federal and state entities with responsibility for the infrastructure according to scheduled reconstruction operations. In some cases, state government resources have had to be deposited in the FONDEN trust to initiate the reconstruction of their infrastructure. The FONDEN trust does not transfer resources for reconstruction to the federal ministries or to state governments, but directly to contractors in order to ensure efficiency and transparency in the use of public resources.

SEGOB is responsible for managing the process to access FONDEN’s resources and issuing disaster declarations. SEGOB reviews the related funding applications, determines the appropriate allocations and requests the Ministry of Finance and Public Credit to convene the FONDEN Technical Committee to authorise the transfer of funds to a subaccount for the reconstruction programme in the FONDEN Trust. BANOBRAS transfers funds from this subaccount to the contractors implementing the reconstruction works. Previously, invoices showing reconstruction advances could be submitted.

The process for declaring a disaster and for allocating reconstruction funds from FONDEN has been improved over the years to ensure transparency, efficiency and accountability. After the onset of an event that exceeds its own resources and operational capabilities, a state can request assistance from FONDEN to co-finance reconstruction. The Technical Committee is convened to determine precisely which municipalities are in a state of disaster and can therefore be subject to a formal disaster declaration.

As a preliminary step, the Technical Committee, composed of technical agencies such as CENAPRED or CONAGUA, assesses the intensity of the event in order to evaluate whether it is a recurrent or a non-recurrent natural hazard based on pre-established criteria. If the declaration of disaster is accepted by the committee, a Damage Assessment Committee is convened to determine the needs of immediate support for early recovery to be financed through the FONDEN’s APIN fast-track scheme.

Next, SEGOB publishes the official disaster declaration (four days after the disaster), which allows federal resources to be spent to finance recovery and reconstruction. SEGOB also makes available the damage assessment tool *FONDEN online* to conduct a multi-sectoral damage assessment. This online password protected tool enables each federal agency and entity to present detailed damage reports through pre-established forms including estimated costs of reconstruction, and to geo-reference damaged infrastructures with four photographs of each asset. The damage diagnosis should be completed within ten days and can be extended for ten days if necessary. After that, each line minister and federal agency in charge of every industrial and lifeline sector should send the final diagnosis of the damages and the resources needed under its sector to SEGOB within the next seven days. This standardised approach allows more efficient control of these multiple requests by the Damage Assessment Committee, as well as by FONDEN and the SHCP before they authorise the allocation of the funds.

The Ministry of the Interior co-ordinates the transfer process with federal agencies and states who own damaged infrastructure from the onset of a disaster until the approval of expenditures. Its responsibilities include monitoring the correct application of the resources in every reconstruction programme, including at federal and state level. Federal agencies and states have responsibility for contracting with the third parties who actually carry out the reconstruction work.

#### Box 6.2. Changes to FONDEN's operational rules

One of FONDEN's strengths has been the ability of its managers to identify challenges facing its administration and to design improvements. In 2010, the General Rules of FONDEN introduced several important changes:

- the timing for an official “Declaration of natural disaster”, as well as the number of days involved to request and authorise funds were significantly reduced;
- support for DRM was enhanced in the case of state governments and the disincentives for non-insured public infrastructure were reinforced;
- there has been a gradual acceptance of financial requests for the improvement of public infrastructure using FONDEN resources. It has been necessary to differentiate requests for reconstruction of public infrastructure from those for improvement or upgrading, since there were so many cases in which the ratio of expenses between reconstruction to improvements was one to ten;
- to increase transparency and build a policy of checks and balances, civil society representatives can intervene as observers through all of the processes involving public resources for reconstruction (*tercero independiente*).

In order to avoid delays to reconstruct state infrastructure, the federal government finances up to 50% of the approved costs. Since the reconstruction of public infrastructure can take from six months to two years (or even more because of technical delays), there is no need to allocate all of the financial resources at once in one disbursement, which would reduce the immediate availability of funds for other purposes. Instead, all reconstruction resources are disbursed according to a calendar presented by the technical authority involved, depending on the specific infrastructure. As a consequence, FONDEN resources may continue to be disbursed to finance the reconstruction of public infrastructure damaged by disasters that occurred several years earlier. For example, in 2010, MXN 41.5 million were approved by the Technical Committee to rebuild public infrastructure but only MXN 13.4 million were disbursed in that year.



### *Distribution of FONDEN funds since 1999*

As per the 2009 FONDEN rules of operation, FONDEN finances 100% of the reconstruction costs of federally owned infrastructure damaged by natural events such as earthquakes, floods and hurricanes. Since the establishment of FONDEN, the federal government has financed on average 50% of the total reconstruction costs of state and municipal infrastructure damaged by such natural events. Every state in Mexico received funding from FONDEN at some point between 1999 and 2010 (Figure 6.1). The amount of funds disbursed by FONDEN to co-finance reconstruction costs is between 50% and 60% of the total direct damages estimated for all of Mexico when we exclude two states: Quintana Roo – where numerous economic damages are related to private tourism infrastructure – and Tabasco – where other significant reconstruction resources were approved after the 2007 flooding. A major proportion of FONDEN resources (92%), goes to three sectors: transport infrastructure (mostly roads and bridges), hydraulic infrastructures, and housing and urban areas (Figure 6.1).

FONDEN expenditures are highly variable from year to year, which is a challenge in terms of ensuring the availability of resources required for reconstruction. For example, 2010 was a peak year, with major disasters impacting 18 out of 31 states and 850 out of 2 500 municipalities. The annual allocation for FONDEN resources was below the level required to cover all funding requests, but in such cases the Ministry of Finance can allocate more resources to FONDEN; in 2010, MXN 20.3 billion were allocated through this mechanism. Mexico has also turned to insurance and other risk-transfer mechanisms, taking advantage of access to international markets to deal with the challenge created by this uncertainty (Figure 6.4). Figure 6.1 also shows that between 2002 and 2009, most of FONDEN resources came from its trust fund.

Figure 6.1. **FONDEN (1999-2010)**

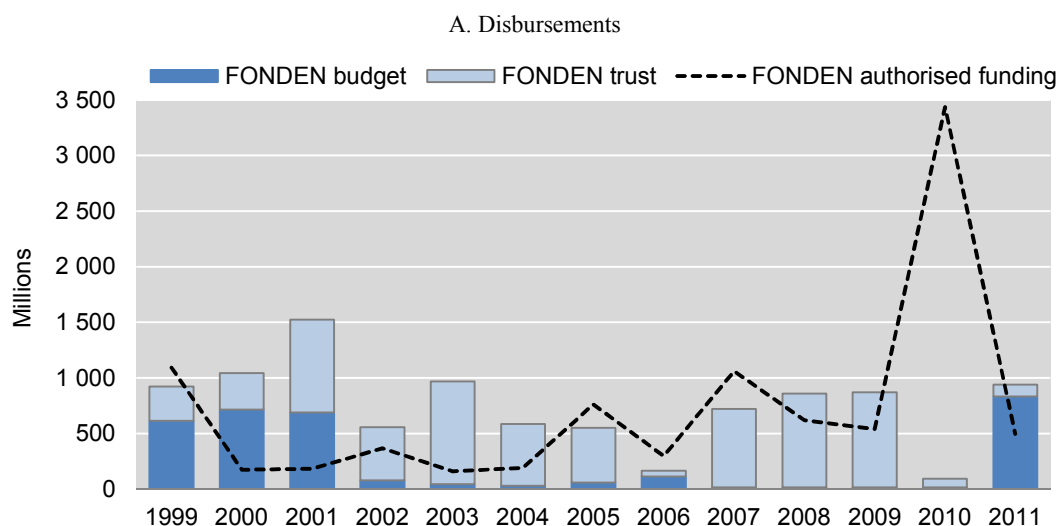
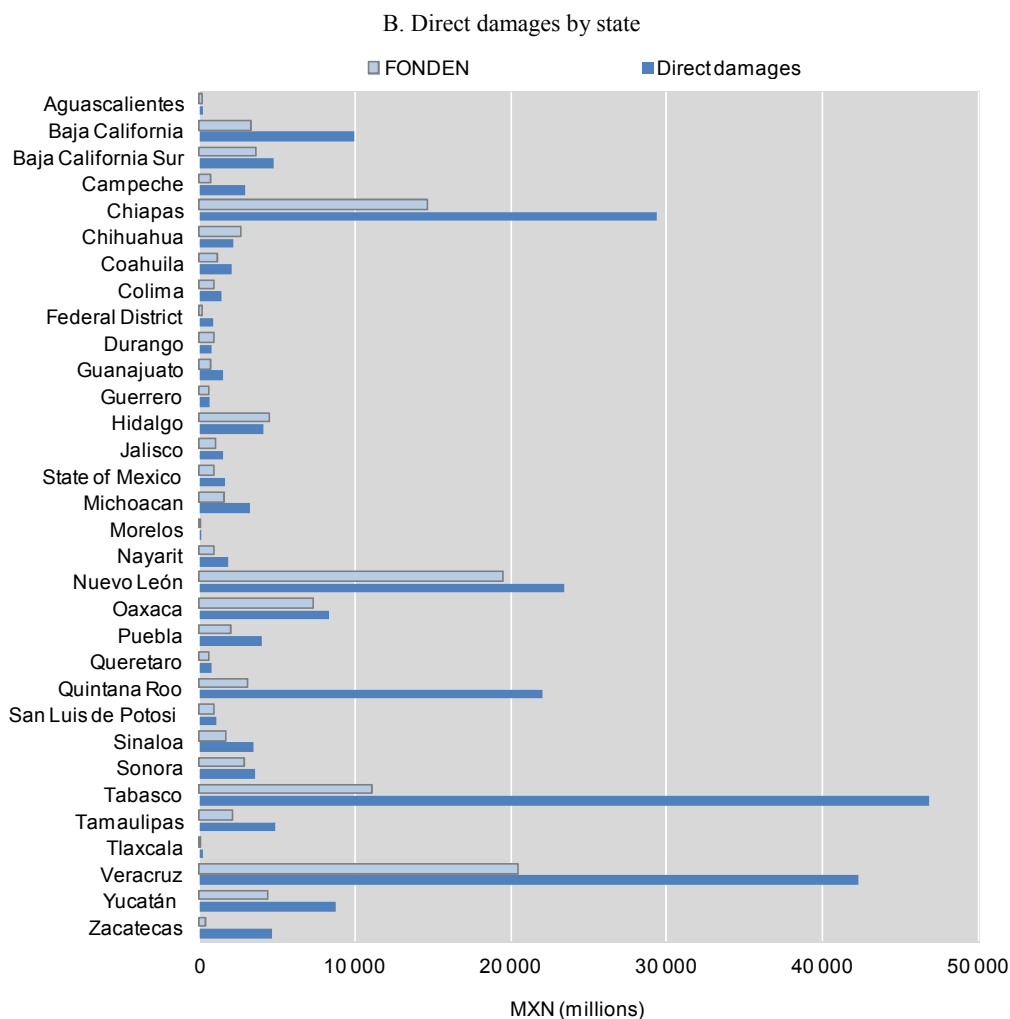
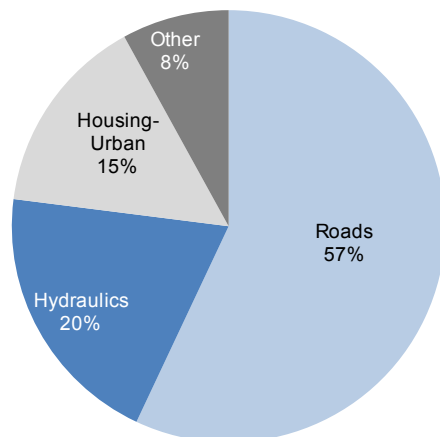


Figure 6.1. FONDEN (1999-2010) (cont.)



C. Direct damages by type of infrastructure



Notes: Reconstruction funding takes into account the contributions from the states. The economic losses are CENAPRED consolidated data and do not take into account secondary effects.

Source: Based on information provided by CENAPRED and the General Directorate of FONDEN (May 2012).

### *Financing reconstruction versus financing disaster risk prevention*

One of Mexico's long-term objectives is to establish a coherent balance between resources for prevention *ex ante* and for recovery *ex post* to achieve an optimal use of public resources. In 2004, it created a Disaster Prevention Fund (FOPREDEN) to co-finance state and federal projects related to risk assessment, risk reduction and capacity building for disaster risk prevention. With this support, Mexico encourages agencies to invest in areas where returns may only become apparent over the long term (see Chapter 4). These investments, when appropriately planned, should strengthen the resilience of society and robustness of infrastructures, and thereby reduce spending on disaster reconstruction and recovery costs. One important aspect of FOPREDEN is that it requires states to complete a risk assessment (including the development of a risk atlas) as a pre-condition for eligibility for financing any other type of qualified project. This policy is highly laudable as it promotes informed decision making about investment in risk reduction.

The use of FOPREDEN by eligible parties has not reached the level anticipated; its expenditures are equal to only 2% of the FONDEN expenditures and have fallen over the past three years (Figure 6.2). This may be due to the conditions for access to FOPREDEN resources, which depend on states and municipalities submitting proposals of acceptable quality, and willingness to co-finance a certain share of the project costs. Many proposals do not meet acceptable standards of quality set by FOPREDEN's Scientific Advisory Committee. The solution to this challenge is not to lower the standards, but to promote awareness of the fund throughout the civil protection community and to encourage applicants to develop quality disaster risk prevention proposals. Despite promotional efforts made in civil protection workshops and the Regional Days of Civil Protection, there still are not enough proposals made and resources go unspent for many years. Recent changes to the FOPREDEN operational rules, however, have simplified the process for states and municipalities to apply for these funds, and it is expected that the number of applications will increase with help from SEGOB to counsel and guide project proposals.

Figure 6.2. **FONDEN-FOPREDEN**

A. Total expenditures for the 2004-2011 period

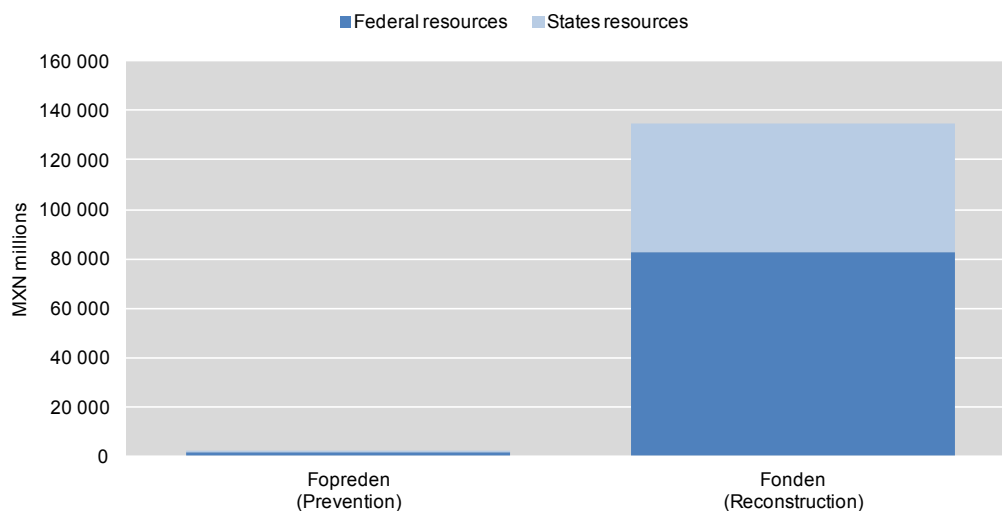
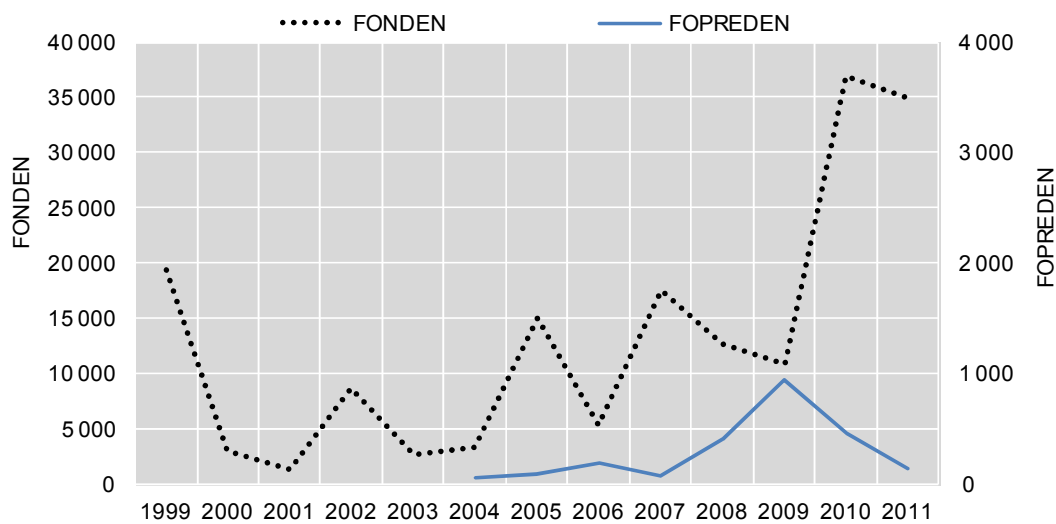
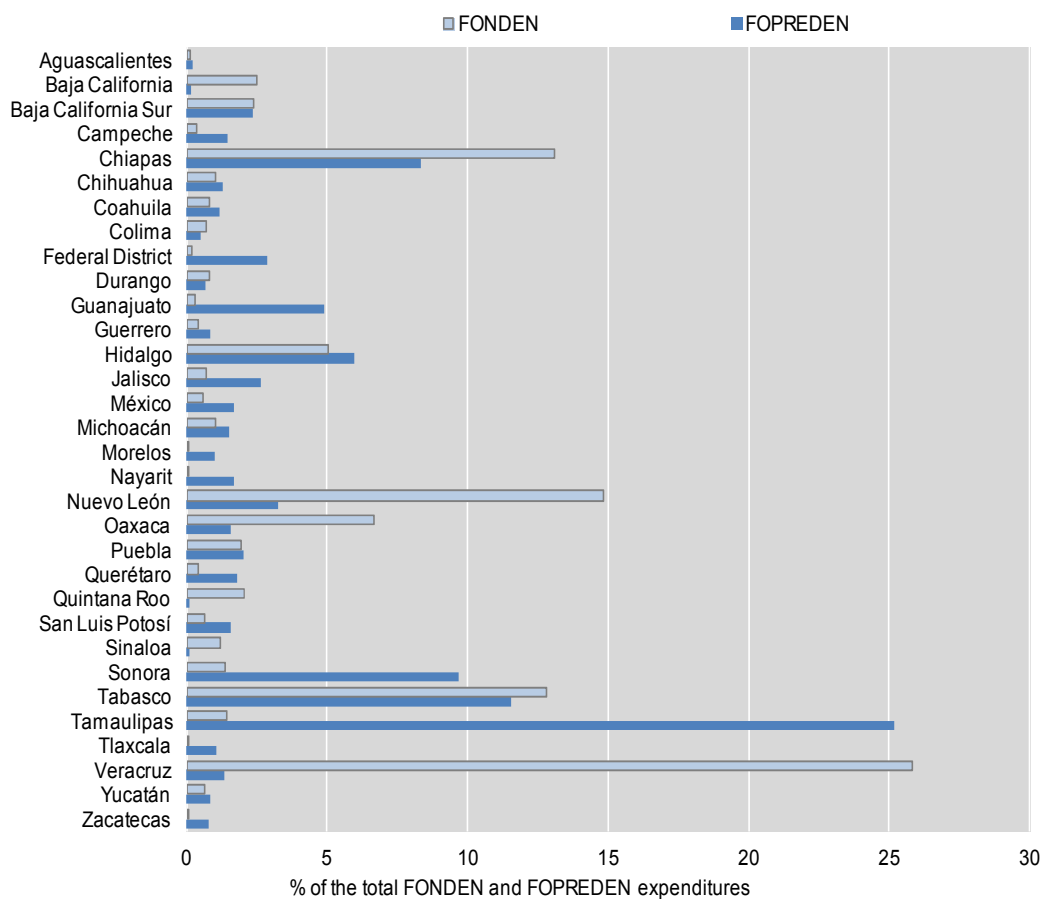


Figure 6.2. FONDEN-FOPREDEN (cont.)

B. Yearly expenditures for the 1999-2011 period



C. Yearly expenditures per state

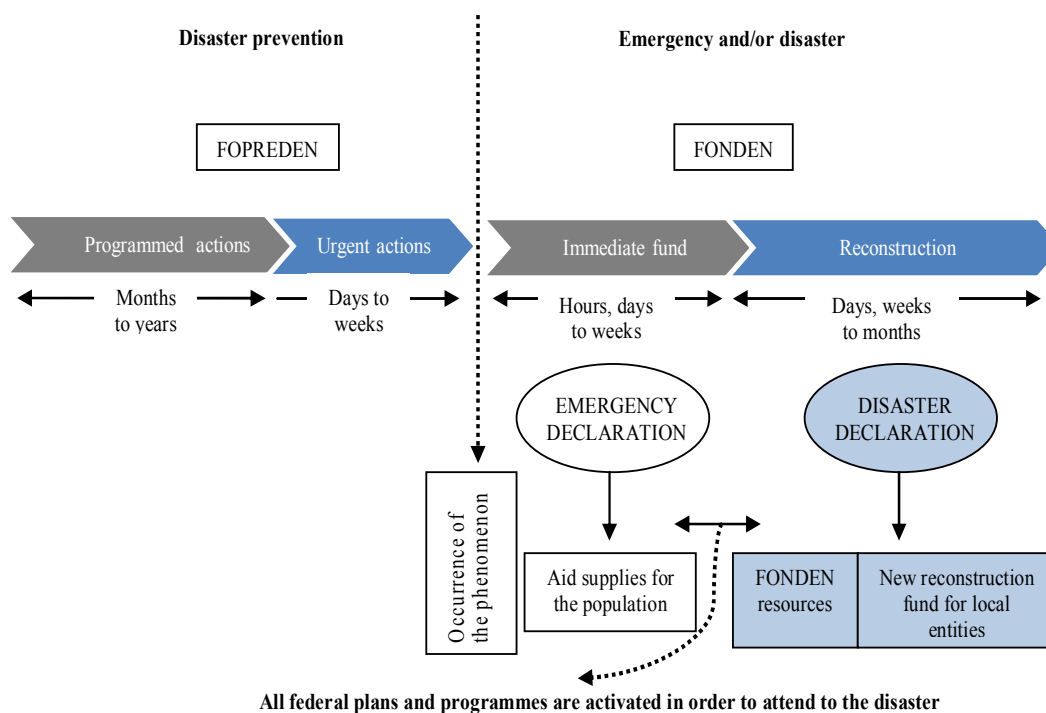


Source: Based on information provided by the General Directorate of FONDEN (May 2012).

As with FONDEN, all states have received at least some financial support from FOPREDEN. While FONDEN investments are directly commensurate to the costs of repairs, there is no such guide for FOPREDEN disaster risk prevention expenditures. The state of Veracruz, for instance, has received comparatively low financial support from FOPREDEN, despite having suffered the highest economic losses over the last decade, whereas the state of Tamaulipas has received the highest amount of FOPREDEN funding, while financial damages during that period were close to the national average. There is no co-ordinated line of action between FONDEN and FOPREDEN funding, which may imply that states affected by natural hazards do not sufficiently recognise the need to invest in prevention.

Regarding the broader objective of using FOPREDEN to funnel a greater proportion of resources toward investing in disaster risk prevention, it should be noted that FONDEN inherently includes some aspects of risk prevention. Infrastructure repairs, for example, are supposed to comply with updated building norms that improve safety and make them more resistant to disaster damages. Concerns have been voiced, however, that contractors sometimes use inferior building materials to repair infrastructures, which leads to recurrent losses when the same infrastructure is damaged by a subsequent natural hazard. Greater monitoring and control of the materials used by contracted third parties might be required to avoid this in the future. Second, FONDEN can also finance housing relocation, and it finances a SEDESOL reconstruction programme to relocate poor households, schools and hospitals outside hazard-prone areas to safer locations.<sup>2</sup>

Figure 6.3. Financial instruments to prevent and respond to disasters



Source: Information provided by the General Directorate of FONDEN.

FONDEN has no specific budget, however, to improve infrastructures: when a natural hazard damages or destroys infrastructure, FONDEN is used to finance its reconstruction,

but there is no financial track specifically related to the additional costs of improving infrastructure besides the application of the updated building standards. The 2009 FONDEN rules, as well as the 2010 general rules, both explicitly cope with requests for infrastructure improvement or upgrading by giving first priority to reconstruction. Requests for improvements to “build back better” have been substantial in some years, and though they are conditioned on the availability of financial resources, it is estimated that some years they may amount to as much as 25% of FONDEN resources. In the future, such expenses could become one of the main challenges facing FONDEN as infrastructure ages and if community development leads to greater exposure to natural hazards.

Ensuring adequate funding for FONDEN remains crucial, especially if future damages are expected to increase as a consequence of climate change and increased vulnerability. In this respect, anchoring the FONDEN budget allocation in the annual Federal Budget Law is an important element of SINAPROC. In addition, complementing FONDEN resources through risk financing and transfer instruments has become a stable aspect of Mexico’s risk financing strategy.

## **Risk transfer and insurance**

Insurance can transfer a certain level of the direct financial costs of disasters and enhance certainty about liquidity during the crucial periods of recovery and reconstruction. This is true for businesses and households, but can also apply to governments that need to rebuild infrastructure but do not have sufficient fiscal capacity. In Mexico, the insurance market is not very well developed for households and businesses, and the government has opted to subscribe to innovative insurance products such as excess losses insurance and multi-risk catastrophe bonds, to protect itself against adverse consequences. One of the challenges it faces is further developing risk transfer tools to diffuse the culture of insurance more broadly in society through appropriate policy and incentive mechanisms.

### ***Ensuring the availability of federal finance for reconstruction through innovating risk transfer mechanisms***

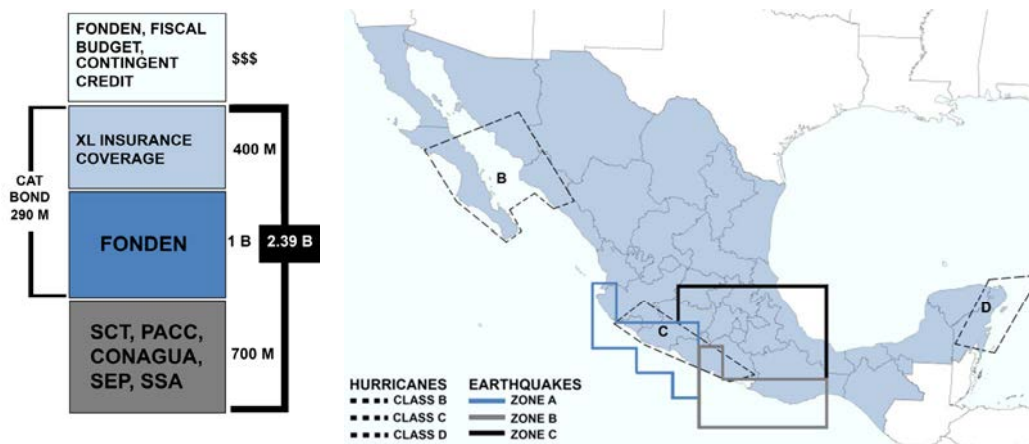
The key to the effectiveness of FONDEN is the capacity to secure sufficient funds when a disaster strikes. Furthermore, as shown in Figure 6.1, large-scale disasters can largely exceed FONDEN resources, even with stable budget allocations of at least 0.4% of the annual federal budget. In this context, risk transfer mechanisms can offer innovative solutions. Since 2006, Mexico has developed insurance mechanisms to cover FONDEN resources through two schemes.

#### ***Mexico’s parametric catastrophe bond***

In 2006, FONDEN issued its first catastrophe bond called Cat-Mex, which was designed by the Ministry of Finance with support from the World Bank. Catastrophe bonds are risk-linked securities that transfer a specified set of risks from a sponsor to investors. Cat-Mex was the first catastrophic bond in Latin America. It relied upon a combination of a parametric reinsurance scheme and a cat bond covering earthquakes in specific zones of the Mexican territory. With coverage up to USD 450 million for 3 years, the insurance claim may be triggered by a declaration of disaster if an earthquake occurs that meets specified threshold criteria, e.g. magnitude, depth and with its epicentre located in specific zones.

Mexico launched a larger catastrophe bond, the Multi-Cat Mexico 2012, covering extended earthquake zones as well as hurricanes from two zones in the Pacific and one in the Atlantic. Specific indexes on the pressure of the tropical storm and the magnitude, depth and location of the earthquakes can trigger a payment of the coverage up to USD 315 million, with USD 140 million for earthquakes, USD 100 million for Pacific coast hurricanes and USD 75 million for Atlantic hurricanes (Figure 6.4). Mexico paid a premium of USD 95 million for the period 2009-2012, and FONDEN financed USD 15 million of studies for its design.

Figure 6.4. FONDEN insurance coverage



Source: Information provided by the General Directorate of FONDEN.

### *Mexico's excess loss scheme*

Mexico purchased an excess loss scheme (XL coverage) designed to cover against disaster losses by using the deeper resources of international capital markets. The XL coverage was launched in 2011 on the reinsurance market. When funding requests to FONDEN exceed USD 1 billion, the XL coverage can provide additional financial resources up to USD 400 million. The premium paid by Mexico reached USD 100 million and represents 25% of the coverage. The high cost of the premium can be explained by the significant disaster losses registered in 2010, a catastrophic year with close to USD 3.5 billion in funding requests to FONDEN. The number of reinsurance companies participating in the programme is expected to increase, and the ratio of premium to coverage is expected to improve with subsequent issuances of this product.

The development of risk-transfer products requires extensive analysis and modelling. Investors want to quantify with precision the risk they would be taking by investing in a cat bond or an excess loss scheme. Risk analysis tools have been developed in Mexico since 2007 to quantify risks and develop loss estimates based on risk scenarios (Box 6.3). Significant synergies exist between this analytical work and the risk atlas efforts that CENAPRED promotes at the national level (see Chapter 3), which could be further leveraged for an integrated risk assessment and management process in Mexico.

FONDEN and the Ministry of Finance have developed impressive efforts to design, promote and issue risk-transfer products on the international insurance-reinsurance market and to develop related technical tools in the last five years, such as R-FONDEN. Ultimately, if insurance products were to become more widely used in Mexico, FONDEN

could limit its interventions to the development and financing of specific risk-transfer schemes for large-scale disasters. This would require broader take up of insurance products by federal and state entities, businesses and households.

### Box 6.3. R-FONDEN: An innovative tool for risk analysis

FONDEN and the Ministry of Finance created a tool called R-FONDEN (Loss Estimation for Federal Risk System) with the support of the Institute of Engineering of the UNAM to quantify risks and develop loss estimates based on risk scenarios. Based on a database of public assets containing geo-coded information about infrastructures, their building characteristics and replacement cost, R-FONDEN can estimate disaster losses through probabilistic simulations of historic and potential hazards (earthquakes, hurricanes and floods) and modelling of their impact on the referenced infrastructures. This probabilistic modelling of losses is fundamental to design and issue risk-transfer products.

*Source:* Based on information provided by the General Directorate of FONDEN.

### *Other insurance coverage for public infrastructures*

FONDEN creates incentives for states to insure infrastructure against damage from natural hazards. While FONDEN covers up to 50% of the reconstruction cost the first time an infrastructure is damaged, it will only cover 25% the second time it is damaged if no insurance has been subscribed, and no funding will be granted the third time. Over time, this should lead to a situation where all states will have insured their infrastructure or they will be ineligible for FONDEN cost sharing to finance repairs. States should consequently insure 50% of the value of their infrastructure, even though FONDEN rules do not mention a minimum value. In theory, states could take advantage of FONDEN by insuring their infrastructure for a very small amount and still receive the maximum federal coverage against recurrent losses. FONDEN also provides financial support for the development of infrastructure inventory databases at the state level, similar to its own database of federal infrastructures. Loss estimates can then be performed with R-FONDEN, so that states can develop the information needed to subscribe their own insurance and risk-transfer scheme at the state level.

The use of insurance coverage by states is still relatively limited compared to federal assets, but there are examples of good practice that could serve as a model. The state of Jalisco subscribed to a state infrastructure insurance policy in 2011 which covers housing, state and municipal roads and bridges, hydraulic and urban infrastructures reconstruction costs in case of geological and hydrometeorological risks. For a premium of USD 15 million, 50% of the state and municipal infrastructures are covered as well as housing reconstruction and eventually relocation. Reimbursements are made based on a pre-established table which summarises all reimbursements for each type of infrastructure and damages. The state of Chiapas has also contracted a state and municipality infrastructure insurance, which was utilised in 2010 when Chiapas issued nine declarations of disasters, which all led to reimbursements after detailed analysis of the reinsuring companies. Furthermore, insuring new infrastructures is mandatory in Chiapas under its new State Law for Civil Protection. As of 2011, however, only five states had contracted an insurance policy (Table 6.1). Article 18 of the 2012 General Civil Protection Law makes it mandatory for states to obtain insurance coverage for their assets and infrastructure. It is expected that the strong incentives set up by FONDEN such as the ongoing asset inventory initiated in ten states will facilitate this development.



Table 6.1. State insurance coverage and asset inventories

State disaster insurance policy in 2011					
State	Chiapas	Guerrero	Hidalgo	Jalisco	Veracruz
Duration	1 year	1 year	1 year	2 years*	1 year
Sectors	Housing Hydraulic Roads Urban	Housing Roads	Housing Hydraulic Roads Urban	Housing Hydraulic Roads Urban	Education Housing Hydraulic Roads
Insurer	Interacciones	Banorte – Generali	Inbursa	Inbursa	Interacciones
Covered risks	Geological and hydrometeorological	Any direct physical loss or damage caused by natural disasters recognised by the federal government (geological and meteorological events)	Geological, hydrometeorological, the coverage is not restricted to the list	Any risk of physical loss or damage caused by a natural disaster declared by the federal government as an emergency or disaster for the state of Jalisco	Any risk of physical loss or damage caused by a natural disaster and recognised as such by the federal government

Status of state inventories of infrastructures				
State	Nuevo León	Sonora	Tabasco	Baja California Sur, Chiapas, Chihuahua, Coahuila, Colima, Hidalgo, Oaxaca, Puebla, San Luis Potosi, Veracruz
Date	N/A	2011	2011	Ongoing with technical support from FONDEN
Sectors	Education Health Urban Roads	Health Housing Hydraulic Roads Urban Coastal areas	Housing Hydraulic Roads Urban	
Actions	Asset inventory	Asset identification Risk studies	Asset identification	
FONDEN support		MXN 13 104 000 (70%)	MXN 3 825 205 (60%)	

Note: \* Jalisco: Including the 2012-13 one-year insurance covering renewal.

Source: Based on information provided by the General Directorate of FONDEN.

As FONDEN resources finance 100% of the reconstruction costs of federal assets, it is crucial for FONDEN to ensure that these infrastructures are covered by insurance in order to protect its resources. Such insurance remains uneven, however, across federal ministries. For example, CFE's electricity infrastructures are insured through a specific insurance scheme financed by its own budget. Therefore, CFE does not need FONDEN support for its reconstruction. CFE carries out a risk analysis for industrial security for every power plant on a yearly basis, with the methodology demanded by international insurance companies. The case of the federal roads, however, is the opposite as they have not been insured by the Ministry of Communications and Transport (*Secretaría de Comunicaciones y Transportes*, SCT) since 2000. This may change as insurance for disaster damages to highways is positioned to be acquired through the Road Insurance Project. For the development of specific insurance coverage for infrastructures, federal

agencies count on the Ministry of Finance Insurance Unit for technical support. A comprehensive insurance policy for federal agencies does not exist. Obviously FONDEN and its risk-transfer instruments represent a form of insurance mechanism for public infrastructures, but there is still a need to better articulate FONDEN global coverage and the specific insurance schemes contracted by federal agencies.

### *The promotion of insurance at the level of households and businesses*

Governments can alleviate some of the pressure that disasters place on public budgets by fostering conditions for the uptake of private insurance amongst households and businesses. Increasing insurance coverage for households and SMEs, however, is a key challenge for Mexico; the property insurance penetration rate is second lowest amongst OECD countries (Swiss Re, 2012). The SHCP has initiated a pilot programme to promote insurance at the household level through TELMEX offices, to have closer access to the citizens. Five thousand life insurance policies were sold during this six-month programme, which offered the population low-cost insurance schemes, demonstrating that reluctance to purchasing insurance can be overcome.

Extending such initiatives to households as well as to SMEs is highly valuable as the low coverage rate induces adverse selection, making insurance products too costly compared to current household income levels. Existing insurance regulations for earthquake coverage place significant reserve requirements on insurers, which creates disincentives for the insurance industry to extend the penetration of property and casualty insurance. Incentives to promote the insurance culture should be established, or some form of compulsory household insurance could be considered to address this situation. To foster such a mandatory scheme in Mexico, a clear mandate needs to be established by law and capacity for monitoring and sanctions as demonstrated in the case of mandatory liability insurance coverage for automobile accidents would need to be provided.

## **Conclusion**

SINAPROC contributes broadly to business continuity planning through oversight of emergency planning requirements, including support for the development of internal civil protection units in large buildings and places of large gatherings. These units have demonstrated effectiveness to enhance safety, and therefore protect human resources, which are key to business continuity.

Establishing FONDEN within SEGOB presents advantages. By integrating the administration for disaster risk financing directly within the public body responsible for co-ordinating emergency responses, data and information collected in the course of damage assessments can more easily be leveraged to reassess risks, develop risk atlases and emergency plans as well as estimate the financial resources needed to support recovery and reconstruction of future disasters. The current funding arrangement provides clarity and reliability to a key aspect of disaster risk management, and should be maintained. The governance of the FONDEN trust and its procedures for disbursements have proven their effectiveness in balancing the need to ensure accelerated recovery and reconstruction funds with the need to ensure transparency and accountability in the use of public funds.

The improvement or upgrading of public infrastructure should be an integral part of disaster risk prevention, but each instrument within FONDEN has its particular purpose. The improvement of public infrastructure is the responsibility of the federal and state

governments. Specific financial mechanisms need to be considered to achieve that goal. FONDEN should focus on reconstruction, and FOPREDEN could play a more important role in prevention by financing the upgrading of public physical infrastructure, since resources can be transferred between these funds. Federal agencies should also take responsibility by allocating their own resources for the maintenance and improvement of their infrastructures, not only when a disaster hits, but as an ongoing policy.

FONDEN has been a driving force in encouraging states to insure their assets, going as far as to condition repeated reimbursement of reconstruction costs related to damaged infrastructure dependent upon the asset being insured. Mexico could consider, however, earmarking federal contributions to states to ensure that they pay insurance premiums on their public infrastructure.

### Recommendations

- Implement the integration of FONDEN and FOPREDEN financial instruments to allow investing more in prevention, especially in years when disaster losses are relatively low.
- Sustain FONDEN resources through a clear and accountable disaster risk financing instrument.
- Promote the development of the insurance culture through incentives or regulatory changes to enlarge household insurance coverage.
- Broaden business continuity planning efforts in the public and private sectors, particularly for SMEs.
- Continue to periodically review FONDEN to ensure its efficiency as a cornerstone of the national risk financing strategy.

## Notes

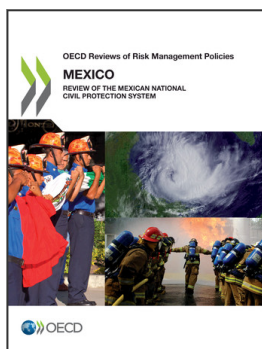
1. Article 37 of the federal budget and Fiscal Responsibility Law (FBFRL).
2. With the following budget: MXN 8 000 for the land, MXN 8 000 for basic services (water, electricity) and MXN 120 000 for the reconstruction of houses.

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