STRENGTHENING THE FINANCIAL SYSTEM FOR WATER IN MEXICO
From a Conceptual Framework to the Formulation of Pilot Initiatives

Alessandra Campanaro and Diego J. Rodriguez
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# Table of Contents

Acronyms and Abbreviations ......................................................................................... v
Executive Summary ........................................................................................................ ix
Introduction .................................................................................................................. xiii

## Part 1: Background and Concepts .............................................................................. 1
1. Starting Point ................................................................................................................. 3
   1.1 Legal Foundations of the SFA .................................................................................. 3
   1.2 Towards a Definition ................................................................................................. 4
2. Conceptualization of The SFA .................................................................................. 7
   2.1 SFA Components ..................................................................................................... 8
   2.2 Projects and Programs Portfolio of the Water Sector ............................................. 17
   2.3 Management, Performance, and Results Indicators .............................................. 19
   2.4 Mechanisms to Guarantee the SFA’s Sustainability ............................................. 19
3. Towards the Formalization of the SFA ........................................................................ 21
   3.1 The SFA and CONAGUA’s Scope of Competence ................................................. 21
   3.2 Formalization of the SFA ....................................................................................... 24

## Part 2: Sectoral Initiatives Under The SFA ................................................................. 27
4. Hydro-Agricultural Sector Initiatives ........................................................................... 29
   4.1 Background .............................................................................................................. 29
   4.2 Overview .................................................................................................................. 29
   4.3 Initiative 1: The Water Fund .................................................................................... 31
   4.4 Initiative 2: The PPP scheme ................................................................................... 34
5. Disaster Risk Management Initiatives ........................................................................ 39
   5.1 Background .............................................................................................................. 39
   5.2 Initiative 1: The Contingent Line for Priority Investments ..................................... 40
   5.3 Initiative 2: The Climate Change Investment Fund ................................................. 41
6. Water Rights ................................................................................................................ 45
   6.1 The Water Rights Market ....................................................................................... 45
   6.2 Water Bonds .......................................................................................................... 48
6.3. Directing the Income Generated by Water Use Rights ................................................. 50
6.4. Legal Reform ........................................................................................................... 51
7. Water Supply and Sanitation ..................................................................................... 53
7.1. Program for Reimbursing Water Levies (PRODDER) .............................................. 54
7.2. Bulk Water ............................................................................................................. 55
7.3. Water Supply and Sanitation Services ................................................................. 55
8. Conclusions .................................................................................................................. 59
References ..................................................................................................................... 63

Figures
Figure 1. General SFA Scheme. ...................................................................................... 7
Figure 2. SFA Conceptualization ................................................................................... 9
Figure 3. Finances of a Service Provider ...................................................................... 11
Figure 4. Management Approach for the Ojo Caliente aquifer, Aguascalientes .......... 18
Figure 5. SFA and the Planning Process ..................................................................... 19
Figure 6. National Water Planning System .................................................................. 22
Figure 7. Diagram of the Water Fund Mechanism ...................................................... 32
Figure 8. Volume of Transfer Applications and Demand for Water Rights ............... 46
Figure 9. Water Bonds According to Freig (2011) ...................................................... 49
Figure 10. Composition of Levies ................................................................................. 50
Figure 11. Financing Policy in Water and Sanitation .................................................... 56

Tables
Table 1. Current Financing Mechanisms ..................................................................... 10
Table 2. Pros and Cons of the Water Fund ................................................................. 34
Table 3. Pros and Cons of the PPP .............................................................................. 37
Table 4. Victims and Damages due to Disasters in Mexico (1980–99) ...................... 39
Table 5. Pros and cons of the Contingent Line for Priority Investments ................. 42
Table 6. Pros and Cons of the Climate Change Investment Fund ............................ 43
Table 7. Change in the Use of National Waters in 2008 (in Cubic Meters) .............. 47
Table 8. Collection by Type of Use (in 2007 Millions of Pesos) ............................... 51
Table 9. Financial Challenges in Water and Sanitation .............................................. 54

Boxes
Box 1. Tariffs and Subsidies ......................................................................................... 57
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
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<td>APAZU</td>
<td>Pension Funds Administration</td>
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<td></td>
<td>Programa de Agua Potable, Alcantarillado y Saneamiento en Zonas Urbanas</td>
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<td>BOT</td>
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<td></td>
<td>Construir-Operar-Transferir</td>
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<td>Build-Operate-Transfer</td>
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<tr>
<td>CENAPRED</td>
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<td>CFE</td>
<td>National Center for Disaster Prevention</td>
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<td>FONDEN</td>
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<td>Fondo de Desastres Naturales</td>
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<td>Acronym</td>
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<tr>
<td>FOPREDEN</td>
<td>Fondo para la Prevención de Desastres Naturales</td>
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<tr>
<td>GIRH</td>
<td>Gestión Integrada de Recursos Hídricos</td>
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<td>IMTA</td>
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<td>LAN</td>
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<td>LFD</td>
<td>Ley Federal de Derechos</td>
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<tr>
<td>MASAS</td>
<td>Manejo Sustentable de Aguas Subterrâneas</td>
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<tr>
<td>MDP</td>
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<td>O&amp;M</td>
<td>Operación y Mantenimiento</td>
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<td>OBA</td>
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<td>OCDE</td>
<td>Organización para la Cooperación y el Desarrollo Económico</td>
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<td>PADUA</td>
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<td>PEF</td>
<td>Presupuesto de Egresos de la Federación</td>
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<td>PIB</td>
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<td>PREVDA</td>
<td>Programa Regional para la Reducción de la Vulnerabilidad y Degradación Ambiental</td>
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<td>PMTUR</td>
<td>Programa de Modernización y Tecnificación de Unidades de Riego</td>
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<td>PRMDR</td>
<td>Programa de Rehabilitación y Modernización de Distritos de Riego</td>
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<td>Acronym</td>
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<tr>
<td>PRODDER</td>
<td>Programa de Devolución de Derechos</td>
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<td>PRODEP</td>
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<td>REPDA</td>
<td>Registro Público de Derechos de Agua</td>
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<tr>
<td>SAGARPA</td>
<td>Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación</td>
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<tr>
<td>SHCP</td>
<td>Ministry of Agriculture, Livestock, Rural Development, Fishery, and Food</td>
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<tr>
<td>SFA</td>
<td>Sistema de Financiamiento del Agua</td>
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<tr>
<td>SMN</td>
<td>Servicio Meteorológico Nacional</td>
</tr>
<tr>
<td>SRL</td>
<td>Sociedad de Responsabilidad Limitada</td>
</tr>
<tr>
<td>TIT</td>
<td>Limited Liability Company</td>
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<td></td>
<td>Tarifas, Impuestos y Transferencias</td>
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Executive Summary

The main objective of this report is to contribute towards the formulation of a coordinated vision for Mexico’s Financial System for Water (Sistema de Financiamiento del Agua or SFA) by laying down definitions, a conceptual framework, and a set of concrete proposals and recommendations that will allow the SFA to operate effectively under the leadership of the National Water Commission (Comisión Nacional del Agua or CONAGUA) and with the support of the Ministry of Finance and Public Credit (Secretaría de Hacienda y Crédito Público or SHCP). The importance of addressing this issue from a medium- and long-term perspective stems from the need to understand the growing challenges faced by Mexico’s water sector as an engine of economic development and poverty alleviation.

The water sector in Mexico faces many challenges and properly addressing them requires an analysis of the financing sources available for the sector and of their viability as a tool to reach the sector’s objectives. This analysis should be embedded in a model of integrated water management to ensure the rational use of water at local and regional levels. Against this backdrop, formalizing the SFA is seen as a means to integrated management of water resources rather than an end in itself.

This report presents a proposal to formalize the concept of an SFA supported by the World Bank, providing CONAGUA with solid conceptual foundations, and offering suggestions to achieve the strategic coordination of the flow of financial resources towards the water sector. The next step to this report would be to formalize the SFA, and then devise a financial strategy and implementation tools.

The report examines the SFA through basic concepts and its current legal framework, and defines the SFA as follows: “A subsystem of the Mexican financial system composed of (public, private, and social) institutions that channel resources from different financing sources (public and private) to the various (public, private, and social) programs and investment projects aimed at the development and management of water resources and associated water systems; these financial resources are channeled through a range of instruments and mechanisms, in accordance with relevant legislation and regulations, and taking into account sustainability, economic efficiency, and equity criteria.”
Given the above definition, this report reviews the existing instruments and mechanisms that provide and could provide access to various sources of financing. These include fiscal funds from the federal government and resources from state and municipal governments; federal contributions to state and municipal entities; special funds from federal programs (subsidies); revenues from tax collection; funds from FONDEN (the Fondo de Desastres Naturales or Natural Disasters Fund)\(^1\) and FOPREDEN (the Fondo para la Prevención de Desastres Naturales or Fund for the Prevention of Natural Disasters); external credit; Public-Private Partnerships (PPPs);\(^2\) funds from FAIS (the Fondo de Aportaciones de Infraestructura Social or Social Infrastructure Contribution Fund); from FFRES (the Fideicomiso Fondo Revolvente Sonora or Sonora Revolving Trust Fund); and debt market funds (subnational bonds, regular bonds). It should be noted that an in-depth analysis of each of these financial mechanisms\(^3\) lies outside the scope of the analyses undertaken; this report therefore only discusses these mechanisms in general terms and assesses their potential as an integral component of the SFA.

The transactions involving sources and destinations of financial resources that are discussed in this report relate mainly to programs and projects aimed at increasing the supply of water to meet the various end-user demands, including those associated with preserving the quality of water and vital ecosystems. However, some transactions included in the SFA definition—such as the implementation of economic incentives and initiatives to increase the efficiency in the use of water are mechanisms to manage demand.

The analysis of the water sector in Mexico sector shows that the financing needs of water programs and projects can in principle be met, even when taking into account the additional challenges resulting from climate change, provided different sources of financing are tapped to reach the medium- and long-term objectives of this sector. Given the variety and complexity of financial mechanisms for water, the formalization of the SFA is seen as an instrument of coordination and support that will increase the efficiency and effectiveness of the use of public resources; it is also expected to increase the SFA’s multiplier effect by leveraging other sources of financing.

This analysis elaborates on the elements that are necessary for the SFA’s formalization, among others, the SFA and the responsibilities of CONAGUA; the portfolio of programs and projects that is part of the national system for water planning; the role of CONAGUA in the operation of these financial mechanisms and in the coordination with the competent authorities (that is, the agricultural sector, institutions responsible for urban development, and the Federal Electricity Commission); the coordination with the SHCP; the catalogue of existing and new financial mechanisms introduced by CONAGUA; the improvement of the existing operating rules; the strengthening of the project cycle; and the creation of indicators that will allow for the monitoring and follow-up of the SFA’s objectives.

The first part of this report focuses on processes and steps, such as the drafting of legal frameworks and establishment of working groups that are required to implement the SFA. The second part of the report, discusses a number of initiatives on hydro-agricultural infrastructure, disaster risk management, water

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1. For more information see http://www.proteccioncivil.gob.mx/es/ProteccionCivil/Libro_FONDEN which is a FONDEN joint publication with the Ministry of Interior (SEGOB) and the WB.
2. The widely used English acronym PPP rather than the Spanish acronym APP will be used throughout this report.
3. A financial mechanism, also known as a financing mechanism, is a method or source through which funding is made available. Both terms will be used interchangeably in this report.
and sanitation, and water rights. The issues of hydro-agricultural infrastructure and disaster risk management are highly relevant in the context of the proposal including in this report to create a special Water Fund.

Based on an analysis of the effectiveness of the main existing financial instruments and market-support systems, a series of concrete actions are proposed to support agricultural producers. The proposals presented are motivated by the results of the analyses conducted and the recognition that the agricultural sector needs business models and long-term credits that facilitate the effective financial participation of all parties involved, as well as interest rates that are affordable for agricultural producers. One potential action is the creation of a special component within the Water Fund to provide financial support to the agricultural sector; another option is the development of special PPP schemes. The pros and cons of these two alternatives are reviewed in detail.

The creation of a component within the Water Fund specifically dedicated to the modernization and technological upgrading of irrigation systems, along with other instruments and sources of public and private financing, would allow for the structuring of different financing schemes involving recoverable funds (capital injections, guarantees, and subordinated credits) as well as non-recoverable funds (resources provided by the Water Fund). The second proposal envisages the creation of PPPs for the upgrading of irrigation systems in the broader regulatory framework of the Public Private Partnerships Act (Ley de Asociaciones Público Privadas or LAPP), which came into force on January 18, 2012. In a PPP, a private investor assumes responsibility for operating and maintaining a certain infrastructure that meets pre-established quality standards. In the case of irrigation systems, there is room for innovative PPP setups, to be devised in coordination with CONAGUA, SAGARPA, and the SHCP. These schemes would ensure that the project risks are duly distributed, risk mitigation mechanisms exist, and that conditions facilitating the financing and implementation of projects are promoted.

In Mexico, disaster risk management is increasingly demanding economic and technical resources. In 2010 alone, actions to mitigate the effects of the 40 main disasters, which affected 18 states, accounted for nearly Mex$23 billion. To meet this growing demand for resources, tools must be available to respond efficiently to specific funding requests. For disaster risk management, the analysis suggests two possible instruments: (i) a contingent credit line for priority investments and (ii) an investment component to specifically address climate change, to be created within the Water Fund mentioned above.

The contingent line for priority investments would provide each state with a current account credit line, contracted with development banks. Such a line of credit would enable the states to immediately meet their obligation vis-à-vis the federal government to contribute counterpart funds and cover the costs of operating the equipment to be provided by CONAGUA in case of an emergency. It would also make it possible for states to make the investments needed to respond to an emergency or mitigate the impact of an imminent disaster.

The component of the Water Fund earmarked for investing in climate change and variability preparation—through measures aimed at prevention and long-term adaptation—would comprise federal resources and a share of the federal revenues that each state is entitled to. This component would cover investments in infrastructure, primarily to mitigate the impact of floods, and investments in climate change adaptation projects in the context of disaster risk management.

The second part of the report assesses the financing options derived from the revenues
generated by charging for the right to use water, including the strengthening of the market for water rights and the creation of so-called Water Bonds. It is recommended that the Federal Levies Act (Ley Federal de Derechos or LFD) be reformed in order to guarantee the sustainability of all activities related to water management and facilitate the signing of agreements that would allow for the convergence of public and private financing schemes. In water and sanitation, a priority for the medium and long term is how to structure and implement a public policy of tariffs and subsidies, including (i) the mechanisms and incentives needed to progressively fine-tune the degree of cost recovery via tariffs and (ii) the type and size of subsidies that will eventually balance expenses and revenues.

The analysis of the existing SFA in Mexico shows that major challenges remain. However, the effective implementation of an SFA constitutes a critical tool to ensure sustainable water management and reduce the water demand-supply gaps projected for the next 20 years. Mexico has to take concrete steps and set up pilot experiences to lay a sound foundation for an SFA that can respond efficiently to the country’s needs.
The abundance of financial resources that characterized the second half of the 1970s and early 1980s, originating in the country’s rise as an oil power, and the relatively large supply of external credit, made it possible to significantly extend the country’s water infrastructure. Among other things, the total irrigated area was expanded and existing irrigation systems were rehabilitated; the development of the humid tropics was given a boost; and several bulk water supply systems were built for urban centers and industrial ports. However, changes in the financial conditions, severely affected investments and operations and maintenance of water infrastructure.

In the late 1980s, the overreliance on fiscal resources for the development of water programs further exacerbated its financial problems. Aside from funding provided by international development banks—by then already limited—no other funding sources were available. The sectors that benefited the most from the water works and associated services as well as the benefiting state and municipal governments were encouraged to shoulder a larger share of the burden, but with limited success. The declining revenue from service charges for water supply and sanitation services, the low service tariffs in relation to total costs (mainly covering the cost of operations and maintenance), and the cost of irrigation services in certain agricultural areas strained the federal government’s limited resources.

In 1986, the LFD introduced a set of fiscal reforms that included charges for the exploitation, use, or usufruct\(^4\) of the nation’s water resources and their inherent public goods.\(^5\) However, the lack of clarity of the new regulations, along with the delay in updating the charges on water rights\(^6\), limited the financial resources collected in real terms. In 1990, the Contribution to Improvements in Public Water Infrastructure

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\(^4\) Usufruct is the legal right to use and enjoy the fruits or profits of something belonging to another person or held in common ownership.

\(^5\) Article 27 of the Mexican Constitution states that all surface and groundwater, except water that flows through a single property or lies beneath one, belongs to the Nation. It also lists the “national waters,” which include territorial seas, lagoons, lakes, rivers and their tributaries, etc. The “inherent public goods” refer to so-called federal zones (land close to waters) and sand and gravel found in river beds.

\(^6\) While there is no universally agreed definition of a water right, it is usually understood to be a legal right to withdraw and use a quantity of water from a natural source such as a river, stream, or aquifer.
Works Act (Ley de Contribución de Mejoras por Obras Públicas de Infraestructura Hidráulica) went into effect, with the purpose of enhancing the cost recovery of federal investments. The enforcement of this legislation has run into major obstacles, mainly due to political factors and gaps and lack of precision in its formulation.

Despite their initial limitations, the 1986 fiscal reforms laid down some fundamental principles that today are part of the country’s water policy. On one hand, the establishment in Mexico’s water law of an intrinsic economic value of the resources and that all users, merely by virtue of being a user of water, must contribute to its development and conservation. On the other hand, the economic value of water was linked to its availability—a greater economic value to reflect scarcity. Effluent discharge charges were also established to improve water quality. These measures results in a renewed water pricing system based on the net water supply in the country’s various watersheds and the respective quality. Revenues from the collection of water-use charges have become a major source of income for the federal government, which are implicitly or explicitly reinvested in this sector.7

Against this background and the need to address the sector’s financial problems, the 1989 reforms imparted a fundamental role to water-related finances. Along with the creation of CONAGUA,8 to bring together all responsibilities of the federal government related to national waters in a single authority, the fiscal policies on water management were updated. The latter was mainly done for two reasons: (i) to strengthen the tools allowing an economic value to be placed on water and send a clear signal about the social and political will to make efficient and equitable use of the resource; and (ii) to clean the country’s rivers, lakes, and other water bodies. On the occasion of the installation of CONAGUA, the president stated the following:

“The National Water Commission is the instrument to comprehensively manage the expenses, financing, and revenues, in order to efficiently organize the national efforts in the creation of water works and systems for the supply, distribution, use, and usufruct of water; it shall strike a balance between the quantity and quality of water, and shall address the different uses of this resource at the watershed level with equity and consideration for the future.”9

This is how the idea of an SFA was born, with the aim of providing financial sustainability and self-sufficiency for the development and management of water resources. Following the creation of CONAGUA, a water policy was drafted based on the following principles:

- All members of society must contribute towards the cost of water works and services; their contribution shall be directly proportional to the benefits they derive from these.
- Users shall pay levies for the use or usufruct of water, based on their ability to pay and the volume of water used, and relative scarcity.
- Those responsible for wastewater discharges shall fully assume the costs of preventing and, if relevant, eliminating the pollution they generate.

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7 As no clear policy existed to specifically allocate the revenues from the collection of water-use tariffs, the efficiency of this instrument was reduced. These revenues should in the first place pay for managing the quantity and quality of the water resources; secondly, they should support the development of water infrastructure in line with government policies. This is precisely one of the areas where the SFA could make a contribution: spell out the allocation of these resources so they can serve as a policy instrument.


9 Installation ceremony of CONAGUA.
Proceeds resulting from the application of the above principles shall be earmarked for the sustainable development of the country’s water resources, that is, “unto water that which is water’s.”

Besides establishing a modern legal framework, the implementation of the above principles also demanded the creation of a financial system that would allow for a comprehensive response to the water sector’s structural problems, under the premise that water is a resource with a quantifiable value and whose preservation in terms of quantity and quality constitutes a national priority. Consequently, the financial strategies adopted by CONAGUA over the course of more than 25 years, have been developed along three lines:

- Strengthening the finances of the different water users (mainly the water utilities and the water user associations of irrigation systems),\(^\text{10}\) based on a policy of financial sustainability that seeks to progressively phase out unnecessary subsidies and redirect those that can be justified.

- Systematic strengthening of the fiscal water policy, based on the ongoing adjustment of the levies charged for water use and wastewater discharge, along with adequate levels of collection.\(^\text{11}\)

- The diversification of funding sources,\(^\text{12}\) in order to secure a broad range of financing options for programs to develop and manage national water resources. Of particular importance is the fact that these financing options include measures to ensure that the beneficiaries of such programs contribute and that the private sector participation is increased.

It is possible to discuss an SFA, even when it does not have a formal operational definition and this is the current status in Mexico; it is an informal system that has developed and strengthened over time to meet the increasingly complex challenges faced by the water sector. However, the financing schemes potentially available are so diverse and complex that the institutionalization of the SFA will reap additional benefits. CONAGUA could coordinate the flow of resources to the sector; draw on its experience for the benefit of subsectors other than water supply and sanitation; and apply its expertise experience to the tasks associated with the management and preservation of national water bodies, all done ensuring the long term financial sustainability and that resources are adequately allocated.

The focus of this report is on those rules, processes and instruments under the responsibility of CONAGUA. If the SFA is considered an instrument for the water sector as a whole, the inventory of financial mechanisms should be extended to cover topics beyond water supply and sanitation. While CONAGUA currently plays no role in the financial operations of these other topics, it does act as an agent of information and coordination. This is the case, for example, in power generation, industry, and tourism.

This report seeks to contribute to building a consensus on what the SFA’s profile and scope should be, and the way in which it could operate under CONAGUA’s leadership, with the support and guidance of the SHCP.

\(^{10}\) The other water subsectors, such as energy and industry, meet their water-related financial needs by themselves.

\(^{11}\) In some years, the collection of these tariffs represented 80 percent or more of CONAGUA’s budget.

\(^{12}\) A mix of resources involving, among others, federal programs (subsidies), trust funds, private participation schemes, development and commercial bank credits, asset management, and lease arrangements.
Mexico’s water sector is currently facing a severe crisis, despite the substantial increase in investment funds allocated to it. This crisis is characterized, among other things, by an increase in the number of overexploited aquifers; the deterioration of the quality of water in rivers and other water bodies; the increase in the number of conflicts over water; the growth in the coverage of water supply and sanitation services, be it with services that are inefficient and of relatively low quality; and the hidden threat to dams and other important water infrastructure, in light of extreme hydro-meteorological events that are becoming more frequent and intense.

The current crisis is very likely to escalate if corrective measures are not taken. In essence, it is necessary to tackle a series of weaknesses that afflict the entire sector, among others, the low efficiency and effectiveness of the numerous investment projects and programs that operate in an uncoordinated manner. This lack of coordination, in turn, has led to overlapping programs, inefficient use of public resources, and a lack of comprehensive policies.

The Financial Challenge

Analyses of possible future scenarios suggest that in order to successfully address the future challenges in water, an annual investment of over Mex$50 billion will be necessary over the next 20 years. The most likely scenario corrected for the climate change impact would increase the gap between supply and demand of water by 58 percent, which would require additional annual investments of Mex$12 billion a year. Other estimates (for example, Fernández, 2011) show that the above figures could be on the low side if the financial requirements to rehabilitate and/or replace the existing infrastructure, and the costs of addressing extreme events, in particular floods, are also taken into account.

13 CONAGUA. 2030 Water Agenda.
Given the financial limitations of the public sector, which even under the most optimistic scenarios would not be able to allocate substantially more resources to the water sector, it is evident that the investments required are considerable. Financing these investments will require resources from different sources. At present, the financial resource mix appears to rely excessively and increasingly on taxpayers, something that is definitely not sustainable and should be corrected; the funding provided by users should be increased significantly.
1.1 Legal Foundations of the SFA

The amendments and additions to the 1992 National Water Act (Ley de Aguas Nacionales or LAN), which took effect in 2004, include the Title Eight Bis (Título Octavo Bis), consisting of a single chapter entitled “The Financial System for Water”.

Article 111 Bis of the LAN provides the legal basis for the creation of an SFA. In fact, the third paragraph of this article clearly establishes what is expected of the SFA. Article 112 of the LAN has been aligned with the provisions of the LFD regarding the payment obligations of the users of national waters, for the exploitation, use or usufruct of such waters and their inherent public goods—bodies of water that are used for the discharge of wastewater. Thus, by charging levies for water use, article 112 Bis to a large extent sustains the funding of actions and programs undertaken by the water sector to reach its medium- and long-term objectives.¹⁴

Even if the provisions of the LAN are confined to “the rates of the levies charged for the water use as well as other federal taxes and tariffs established for the use or usufruct of water, or for the provision of services related to water infrastructure works,”¹⁵ including the contributions to partially or totally recover the cost of federal investments in this area, the Act itself leaves open the possibility of extending the SFA to achieve a coordinated funding mix that also includes other public and private resources (article 111 Bis, second paragraph), as is currently the case through different mechanisms.

The challenge for the government is to make the provisions of the LAN operational and incorporate them into the various programs and projects at the federal, state, and municipal level. As stated in the first paragraph of article 111 Bis, the federal executive shall define, create, and implement the SFA. The fastest legal path to attaining this would be the regulation of articles 111 Bis, 112, and 112 Bis.¹⁶ This would confer legal status on the SFA, thereby securing its long-term sustainability.

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¹⁴ The provisions of article 112 Bis of the LAN in a way provide a solid legal argument to earmark the revenues resulting from the provisions of the LFD on the exploitation, use, and usufruct of national waters.
¹⁵ Article 112 Bis of the LAN.
¹⁶ It is not necessary to wait until all the articles of the LAN have been implemented. The federal executive may issue regulatory provisions regarding these three articles.
1.2 Towards a Definition

Much of the literature reviewed mentions the SFA. However, aside from what is stated in the LAN, the literature focuses on explaining the existing financing mechanisms for the various programs and projects carried out in CONAGUA’s realm. Such programs and projects are not coordinated and no mechanism is in place to avoid overlaps among them. Most of these analyses discuss mainly or exclusively public funding sources, barely considering private sources. Moreover, most of the national and international literature focuses on the subsector of water supply and sanitation; no major attention has yet been given to other water subsectors, despite the fact that the financing of other subsectors is beginning to draw more interest.

In view of the above, a pretty broad definition was formulated as the starting point for this report and for the dialogue with CONAGUA officials as well as financial authorities (essentially the SHCP). This definition is based on a more general concept of a financial system and draws heavily on definitions used by other government entities, international organizations, and the private sector.

For the Mexico Central Bank, the domestic financial system ensures the efficient allocation of resources among savers and parties in need of credit. According to the Bank of Mexico, a healthy financial system requires, among other things, effective and solvent intermediaries, complete and efficient markets, and a legal framework that clearly establishes the rights and obligations of all the parties involved. The Bank of Mexico oversees the activities of the institutions that make up the financial system, encourages amendments to existing legislation, and issues regulations that fall within its sphere of competence.

For the OECD/IMF, a financial system comprises the institutional units and the financial markets—which are continually engaged in complex interactions with each other, with the aim of mobilizing funds for investments—as well as the special facilities, including payment systems, for the financing of all commercial activity.

Banco Santander defines a financial system as one consisting of a set of mechanisms that allow specific operations to take place; these operations ensure that the dispersed savings of the economy are consolidated as resources, transferred, and made available at the place and time, in the amount, and in the timeframe in which they are needed, thereby facilitating investment projects and commercial transactions; in short, the financial system contributes to the efficient functioning of the real sector.

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17 For example, Aguilar (2007), World Bank (2009), and CONAGUA (2005).
18 Refers to the financial flows from the governments and contributing organizations through taxes and transfers.
19 Refers to the financial flows from service users, private service providers, and private financial agents such as banks, investors, and bondholders.
24 The role of financial institutions within the system is primarily to mediate between those who provide the funds and those who need them. This generally involves the transformation and management of risk. Especially for depository institutions, this risk derives from their role in the transformation of maturities, where liabilities are generally short-term (for example, demand deposits), while assets have a longer maturity and are often liquid (for example, loans). Financial markets provide a forum where financial assets can be negotiated according to certain rules of conduct and can facilitate the transformation and management of risk.
In general, a country’s financial system is made up of the institutions, markets, and instruments, whose fundamental goal is to channel the savings generated by lenders or spending units with a surplus towards the borrowers or spending units with a deficit. In a market economy, the financial system plays the key role of capturing the surplus finances of savers and channeling them towards public or private borrowers.

With the feedback received through the dialogue with CONAGUA executives and specialists, as well as specialists from other government institutions and water sector stakeholders, the following consensus was reached on the essence of an SFA:

“In the context of the financial system in Mexico, the SFA may be considered a subsystem of the former and is made up of (public, private or social) institutions that channel resources from different (public or private) financing sources to the various (public, private or social) investment projects and programs aimed at the development and maintenance of the water resources and associated systems; these financial resources are channeled through a range of means and mechanisms, in accordance with relevant legislation and regulations, and taking into account sustainability, economic efficiency, and equity criteria.”

The above definition may be expanded to the different levels of government (state or local) and even to that of a private entity. For instance, the concept of an SFA in the context of a state could constitute a policy tool to duly arrange the implementation of different instruments meant to ensure the water sector’s financial sustainability at the state level, given the respective competences of the three levels of government. The LAN stipulates that CONAGUA is responsible for the SFA’s operation (coordination/organization), under the supervision and with the support of the SHCP.

Taking the above definition as its starting point, the next chapter elaborates a conceptual model of the SFA and discusses how it could function in practice. Chapter 3 presents some concrete ideas about the way the SFA could be formalized under CONAGUA’s wing.

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26 During a workshop held at the facilities of CONAGUA on July 27, 2011, a first draft definition of the SFA was discussed. The definition presented in this report incorporates the ideas and comments that surfaced during the discussions.
Based on the definition proposed in the previous chapter, the SFA can be schematically conceptualized as an institutional arrangement that gives rise to the flow of resources shown in figure 1.

**Figure 1: General SFA Scheme**

Based on the definition proposed in the previous chapter, the SFA can be schematically conceptualized as an institutional arrangement that gives rise to the flow of resources shown in figure 1.


Notes: (1) The general tax concept includes the proceeds from the collection of the water use and wastewater discharge levies. (2) Water Resources Management includes all the actions necessary for the comprehensive management of the water resources (to control water quantity and quality), as well as those necessary to preserve vital ecosystems. (3) The resource flow derived from SFA is not static; it should be seen as a financial flow in a given timeframe.

As pointed out in figure 1, although the SFA is to a large extent linked to CONAGUA’s sphere of competence, it should also include the investment programs and projects related to other subsectors that use water such as the energy, industry, and tourism sectors.
As shown in the figure, the SFA operates in a domestic environment marked by political, social, and economic factors, which in turn are influenced by a series of global factors (for example, the financial, food prices, and energy crises.). All these factors affect both the demand for and supply of financial resources hence, affecting their availability for different economic sectors.

The mode of operation and range of action of the different actors active in water is determined by of laws and regulations, which go beyond the LAN. These legal provisions, in turn, determine the nature and scope of the means and mechanisms of transaction between the sources and destinations of resources.

Figure 1 also highlights the role of CONAGUA (with the SHCP) as operator/coordinator of the SFA and the fact that many parties intervene at both ends of the financing flow. All these parties interact with each other through different mechanisms or processes. Among these parties are federal government agencies, state and local governments, national financial institutions, and private investors, to name just a few.

According to the LAN, the SFA aims to “support all actions related with the integrated management of water resources in the country...” and will also set “...spending and recovery criteria, where relevant, for those financial resources, financial accountability and management indicators, as well as targets resulting from the use of those resources and financial instruments.” Consequently, another two components are added to the initial conceptualization of the SFA: the portfolio of programs and projects in the water sector27 and the SFA’s system of indicators.

As shown in figure 2, parties offering resources and parties demanding resources are linked through various transaction means or mechanisms that are subject to specific ground rules. These mechanisms set the feasibility and eligibility criteria for accessing the different sources of funding (separately or combined) and also establish the rules that must be followed by those searching for financial resources.

### 2.1 SFA Components

Conceptually, the financing demands of each water subsector form the starting point for the source-destination link, based on financial projections regarding their assessed needs within a given time frame. These projections give rise to specific initiatives that require financing.28 These initiatives jointly make up a pipeline of projects and programs (see figure 2). Once in the pipeline, they are classified by different eligibility, feasibility, and prioritization criteria, so they can be presented to various public29 and private30 suppliers of financial resources for their consideration.

In the next stage, financial resources are allocated in accordance with established rules; information flows from those responsible for the allocation of resources (see figure 2). This flow of information allows for the design and identification of indicators necessary to comply with the LAN provisions regarding monitoring of results and performance evaluation. In addition, these indicators provide sufficient information to fine-tune or optimize existing transaction

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27 It should be pointed out that financing for the destinations as shown in figure 1 refers not only to water infrastructure projects (for expansion or rehabilitation and replacement), but also to the investments needed to keep the country’s water systems in optimum condition, in terms of quantity and quality. This implies that investments aimed at strengthening the capacities of institutions involved in water management at any level of government are also included.

28 Research, projects, equipment, and non-structural actions.

29 For example, the initiatives included in PEF or those that are managed through the federal programs, the schemes established through BANOBRAS, and other special funds that involve fiscal resources.

30 In addition to the initiatives that are managed in the fee-setting process for the delivery of services, other initiatives are brought under totally or partially private capital financing schemes.
mechanisms or create new ones. In turn, these changes inform the pipeline of projects and programs so that eligibility and feasibility criteria can be adjusted accordingly. The most important aspects of each SFA component are discussed in more detail below.

Sources of Financing

It is widely recognized that the use and exploitation of water resources for human and economic development bring important benefits. However, insufficient financial resources are currently allocated to manage water in many countries, Mexico being no exception. Closing the financing gap requires that resources be mobilized from various sources. These resources may also derive from cost reductions (resulting from higher efficiency or less costly service options), an increase in basic financing sources,31 and the mobilization of reimbursable funds provided by the market or the public sector.

The World Bank (2009), CONAGUA (2005), and Aguilar (2007), among others, have described the existing financial mechanisms in Mexico, as well as the eligibility criteria, operating rules, and other procedures governing access to available funding sources for different types of investment programs and projects in water.32 Nowadays, investment programs and projects, along with the cost of their associated services, are financed through different transaction modalities and mechanisms.

31 Tariffs, Taxes, and Transfers (commonly known as the “3Ts”), or “TIT” (Tarifas, Impuestos y Transferencias) in Spanish.
32 These references represent some, but not all, of the financing mechanisms currently applied in Mexico. Generally speaking, the financing needs of the water sector are covered by taxes that are channeled in different ways through public expenditures and surplus funds resulting from the delivery of goods and services (for example, water and sanitation services, and irrigation services).
### Table 1: Current Financing Mechanisms

<table>
<thead>
<tr>
<th>Sources</th>
<th>Transaction Mechanism</th>
<th>Destinations</th>
</tr>
</thead>
</table>
| Federal Government Fiscal Resources (particularly Areas 08, 16 and 20 of the PEF) | • Federal legislation  
• PEF legislative Process  
• Rules established by the Investment Unit, SHCP | • Programs and projects from the water sector incorporated in different budget categories |
| Fiscal Resources from State and Local Governments (including federal contributions of Area 33) | • Federal and local legislation  
• PEF legislative process | • Direct financing from local projects and programs  
• Projects co-financed with federal resources |
| Federal Contributions for Federal and Municipal Entities (Area 28) | • PEF allocations  
• Local legislation  
• SHCP obligations registry  
• Credit rating  
• Master Trust | • Issue of securities  
• Debt service of bank loans  
• Payment guarantee for projects with private participation |
| Federalized Programs (Subsidies) subject to Operating Rules:  
Federal Resources + Own Resources (Water utilities, user associations) + State and local resources | • PEF allocations  
• Rules established by the Investment Unit, SHCP  
• Rules of Operation and make-up of mix of resources | • APAZU, PROSSAPYS, PAL and Fund subject to bid, in the water supply and sanitation subsector  
• PRODEP, PRMDR, and PMTUR in the agricultural subsector |
| Revenues from tax collections | • Criteria established by law  
• Rules of Operation  
• Specific agreements | • PRODDER  
• PROSANEAR  
• FIDEICOMISO 1928 |
| FONDEN  
FOPREDEN | • Regulations | • Emergencies  
• Disaster prevention |
| External Credit | • Contractual conditions for credit | • PATME (credit is complemented with state, local, and internal generation resources of Operating Organisms, OO)  
• PROSSAPYS  
• SMN modernization (in progress) |
| Private Public Participation (FONADIN/BANOBRAS + risk capital + private debt) | • Specific requirements by project type  
• Public-Private Partnerships Act | • PROMAGUA  
• Specific projects |
| FAIS  
FFRES | • Credit rating  
• Authorizations from the various Congresses  
• Contractual conditions and repayment bonds | • Financing of sector projects by states and municipalities |

*(continued on next page)*
Service Providers

Figure 3 illustrates the case of a water utility or an irrigation system managed by user associations (for the time being referred to as a “service provider”) that cannot cover their financial needs in a given timeframe and must seek alternative funding sources.

The service provider faces somewhat unpredictable future costs vis-à-vis a predictable flow of revenues—derived from the charges for services or products provided, from tax-related resources, and through transfers such as donations, grants from development agencies, subsidized loans, etc. Such a situation is typical of most, if not all, water utilities and user associations managing irrigation systems. Moreover, these service providers face today a gap between costs and revenues, resulting in a negative financial gap. This financing has resulted in the inability to adequately maintain, rehabilitate and

<table>
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<th>Table 1: Current Financing Mechanisms (continued)</th>
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<tbody>
<tr>
<td>Sources</td>
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<tr>
<td>Capital market (e.g., AFORES, bond issuance)</td>
</tr>
</tbody>
</table>

Source: Original production from bibliography.

Source: Adapted from OECD (2009).
build water infrastructure systems. The funding gap can be closed by intervening both on the demand and supply sides.

On the demand side, the service provider’s costs can be reduced by enhancing operational efficiency (physical and commercial), which raises net income (in addition to generating savings in physical resources, particularly in areas where water is scarce). Additionally, proper investment planning can generate substantial savings and support the design of more realistic investment programs. Sometimes lower-cost options, better suited for local conditions, are available; alternatively, more realistic (non-standard) service levels that better reflect local conditions may be adopted (OECD, 2012). In any case, the key point in this context is to prioritize those investments whose financing needs can be duly covered, as well as to those that contain provisions to manage demand efficiently.

On the supply side, additional resources may be mobilized by raising the 3Ts or turning to refundable sources—through a better allocation of resources or the reduction of risks to attract private investments. According to the OECD (2010), the costs of water-related services may in principle be covered by three revenue sources (the 3Ts, introduced earlier):33

- **Tariffs.** The data available for Mexico show that, with very few exceptions, the tariffs charged are too low to cover the full cost of water-related services (management, operations, as well as maintenance and capital costs, including infrastructure replacement) and often do not cover basic operations and maintenance (O&M) costs. To some extent, the fact that these tariffs are too low is due to relatively low physical and commercial efficiencies: the former increases the production costs by m³ delivered to the end user34 while the latter reduces actual revenue with respect to the total associated potential revenue.35 This explains the need for high subsidies for the water utilities and service providers, which, to a certain degree, have become “perverse incentives,” by providing a political way out rather than substantially increasing the tariffs for these services.

- **Taxes.** At present, the expansion of water and sanitation services and those systems providing irrigation and drainage services in Mexico rely heavily on federal tax money. States provide some additional financing and municipalities contribute with limited amounts of resources. Limited revenues from taxes, due to macro-economic factors, have imposed severe constrains in the flow of financial resources going to the sector. Scenarios regarding future overall funding needs show demand by far exceeding the expected available fiscal resources, even under favorable conditions:

  - Since the early 1990s, federal funds have been raised by combining resources from state governments, users, and the private sector. As to the latter, rather than representing additional resources, the effect of private sector participation is that the flows of revenues and expenditures are balanced by devising schemes that have a predetermined repayment

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33 The private sector’s participation in the water and sanitation subsector includes the direct investments from property developers or the industrial sector, which are amortized indirectly and represent a special case.
34 For example, to recover the costs of a production unit in a system with a 70 percent efficiency coefficient (that is, 30 percent of the volume produced is lost to leaks), the user would have to be charged 1.43 times the cost of each cubic meter produced.
35 If, in the previous example, aside from the physical losses, only 80 percent of the volume delivered were charged, the price to the end consumer would be 1.78 times the cost of every cubic meter produced.
time frame (between 10 and 30 years, depending on the useful life of the assets to be developed).

- According to the diagnostic report prepared by the 2007–12 National Infrastructure Program (PNI, 2007), the breakdown of total required investments is based on a most likely baseline scenario in which the investments in infrastructure represent 4 percent of GDP. Of the total investments, only 8 percent are for water, even though another portion of the investments in water infrastructure is incorporated in the investments of the power subsector for hydroelectric projects.

- Transfers from international donors or private charities. According to the OECD (2009), official development assistance (ODA) must be equated to taxes because such aid is provided in the form of budget support, which implies that most of the funds will be disbursed in the same way as the federal budget. Although this source of income is significant in less developed countries, in Mexico this source is relatively small; nonetheless, it can have a major impact on the development of marginal communities or in the formulation and implementation of public policies.

At the sector and service provider level, the combination of tariffs, taxes, and transfers determines who pays for the services (users, taxpayers, or donors). The composition of the 3Ts also determines the solvency of water utilities and service providers and, with that, their access to additional financing sources.

Closing the Financing Gap

Other sources of financing (loans, bonds, or funds from public and private investors) may assist to cover initial investment costs, leverage additional sources of income, and, eventually, reduce financing costs. However, these funds ultimately have to be repaid.

As shown in figure 3 above, three alternatives exist to close the financing gap, and they all imply an eventual repayment to be covered by the various sources of basic revenue:

1. Repayable financing. This type of financing is the most common in Mexico to finance infrastructure projects with the participation of the private sector (BOT agreements in wastewater treatment plants and aqueducts, or service agreements and, more recently, PPP agreements), where a percentage of the investment (risk capital and credit), as well as the O&M costs, are recovered through tariffs.

2. Market financing. This type of financing refers to a subset of repayable financing that is implemented through the market by

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36 PNI believes that the figure for investments that are financially feasible ranges from 2.5 to 5.5 percent of GDP, which means that if the share of total investments in the water sector is maintained, disregarding what could be destined for hydroelectric projects, this figure would range from 0.2 to 0.5 percent of GDP.

37 This is the case, for instance, of the resources from international development banks dedicated to technical assistance.

38 Commercial banking, bond issuing, risk capital, and mixed funds.

39 Water and sanitation service providers generally seek to mobilize repayable financing to fund the capital costs of the rehabilitation, renewal, or expansion of water supply and sanitation systems, while they usually finance the ordinary costs of O&M with a mixture of the 3Ts (OECD, 2010). In developing countries, the water utilities use bank loans to finance capital investments, although generally these are soft loans from development institutions (OECD, 2012).

40 At the end of 2009, the federal government introduced a series of structural reforms to increase private sector participation and funding in the various investments that the country requires, including the water sector. These measures include a bill offering a modern and flexible framework to regulate PPPs, as well as legal reforms that will make it possible to implement or advance infrastructure works and facilitate initiatives to increase investments in this sector.
private participants. These sources of financing include: debt financing (commercial bank loans, bonds issued through capital markets, and project financing) and capital financing (through the capital markets or private equity funds). The debt-financing mechanisms have formed the backbone of infrastructure investments for developed countries (OECD, 2010); these mechanisms have taken the form of bonds or loans, depending on the development of the local bond markets and the debtor’s economic capacity. Access to these funding sources has been limited by the current financial environment and the perceived risks associated with the politicization of water services, particularly regarding the criteria for setting the tariffs for the delivery of those services and the robustness of payment guarantees to be offered.  

The commercial banks in Mexico have had limited participation in water; the operating conditions of most service providers do not meet the requirements of the leading funding providers, who perceive the water sector as one of “high risk and low return.” This may seem somewhat counterintuitive, given the sector’s economic fundamentals—assets with a long useful life, and a relatively stable and almost recession-proof demand for services. The sector’s weak institutional and legal frameworks, coupled with insufficient cash flow to cover costs, are at the root of the commercial banks’ reluctance to finance the sector. Even though the country today has over 2,000 water utilities, only a handful are deemed creditworthy. Nevertheless, access to commercial banking is obtained indirectly, through specific projects with private sector participation.  

At the same time, bond issues have been a recurring source of financing for state governments, who in turn subsidize some of the water investments. It should be noted that under the current rules and regulations, there is an incentive to work only with those providers that are in good financial health. The existing criteria do not provide any incentives for financial entities to support those service providers that require assistance to eventually become creditworthy. 

Two main types of subnational bonds are issued: (i) bonds that are secured by general government revenue and taxes, and (ii) bonds that are secured by a particular asset. The latter type is used for investments in infrastructure, which in turn generate enough resources to cover operational and financing costs. Service providers have used this type in very few cases; one conspicuous exception is Tlalnepantla, whose financial deal in 2003 was the first in the country’s water sector not to use government transfers as guarantees, but rather the revenues from the tariffs to cover financing costs. Other parts of the country are looking at similar mechanisms and their analysis can be considered of interest for the development of the SFA. 

In 2009, the state of Quintana Roo formalized a special initiative around a regular

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41 At present, measures are being implemented in the agricultural sector to try and ensure that agricultural producers have access to different sources of financing.  
42 At the beginning of the last decade, CONAGUA arranged a loan with the IDB aimed at reversing this situation; however, this effort failed, mainly due to the institutional weakness of local governments. Even at present, CONAGUA remains committed to designing similar support programs. 
43 This is the case of most Build-Operate-Transfer (BOT) and service contracts implemented in Mexico.  
44 Mexico’s 31 states and 70 municipalities have a credit rating (it is actually the second-largest market for credit ratings outside the US and Canada). A law introduced in 2001 made it easier for local governments to expand their debt-management capacity by requiring that states and municipalities establish trusts for the repayment of bonds financed with federal contributions—taxes collected by the federal government and redistributed to states and municipalities. These funds earmarked for debt repayment are separated from the general accounts of local governments, thereby lowering transaction costs and interest rates.
bond, the first of its kind in Mexico, which combines the issuance of bonds with state and some municipality support to finance infrastructure projects in the state, including water projects. By creating a common fund, the participating municipalities were able to achieve greater liquidity and thus paid lower interest rates than if they had issued bonds on their own. The state of Campeche is preparing an ambitious program to attract commercial financing for infrastructure, including water infrastructure projects, through the creation of a PPP Capital-Raising Vehicle for the entire state (CONAGUA, 2011a); this will be a company with a specific purpose that will develop infrastructure and take out loans on the capital markets based on compensations from the state government for this special-purpose company. The latter scheme gives the state access to private funding without increasing its debt, though it still remains to be seen whether this will entail lower financing costs than the alternative of issuing a government-backed regular bond.

3. **Concessional loans.** Generally refers to loans provided at below-market interest rates by way of guarantee funds and/or government policies that support particular sectors, implemented through official banks (for example, support to the agricultural sector through soft loans and/or guarantee funds). This category would include a good number of the credits granted by national and international development banks. It also includes CONAGUA initiatives for the creation and implementation of guarantee mechanisms that facilitate access to credit for agricultural producers.

It is important to point out that the sources of financing highlighted above do not generate any revenue additional to that derived from the 3T components. These sources of financing are proposed in a multi-temporary context, where the financial burden (repayments) is distributed over time to balance the flow of revenues and expenditures. Herein lays the value of these resources.

### Water Resources Management

The approach used to describe the provision of services also applies to the financing of the programs and actions associated with water resources Management (or WRM), which in Mexico is conducted by the executive branch through CONAGUA. According to the OECD (2012), water resources management offers a range of direct benefits to water users such as farmers, power-generation facilities and industrial plants, as well as homes. For the various economic sectors, these direct benefits often take the form of higher economic production, but overall risk reduction is also an important benefit. Another direct benefit is the conservation of biodiversity and the ecosystems.

As in the case of the service provider presented in Figure 3, the tasks associated with the management of national waters require financial resources for the following:

- Construction and O&M of infrastructure in order to optimize the use of water resources in specific basins (regulation reservoirs, flood control, restoration of river beds, etc.).
- Equipment and O&M for measuring and monitoring networks for the different components of the water cycle, in terms of quantity and quality.
- Equipment and operation of the systems in place for conducting the different regulatory tasks (concessions, water allocations and licenses, the Public Registry of Water Rights or REPDA) and command and control tasks, as well as financial incentives (collection of levies, water markets, and water banks), all required for the
management of national waters under the existing legal and regulatory frameworks.

Closing the financing gap that currently exist to manage the water resources entail an array of actions pertaining to both the costs and the sources of financing. In fact, some of the programs implemented by CONAGUA are specifically aimed at increasing and improving the efficiency in the use of irrigation and water systems. Moreover, charging for the right to use water promotes a more judicious, frugal use.

When discussing activities associated with WRM, the revenues from the collection of levies for the use of water and for the discharge or disposal of wastewater are similar to tariffs charged for services provided by the country’s water systems (to supply water, receive wastewaters, or support vital ecosystems), as well as for the construction of regulation and control infrastructure for optimal use of the water resources in a basin or aquifer (public goods).

Given that the management of the national water system is the responsibility of CONAGUA, access to repayable financing is limited under current conditions. However, some financing schemes could be viable indirectly if private-participation mechanisms were considered only for some aspects of this management. Two examples of this are the structure that has been proposed for the expansion and O&M of the radar network of the National Meteorology Service (Servicio Meteorológico Nacional or SMN), and the outsourcing scheme to strengthen and maintain the national network for monitoring water quality. Furthermore, revenues from charging for water use rights and wastewater discharge could be channeled towards schemes that potentially have access to repayable financing.

Subsectors

The financial situation of the water subsectors may be analyzed using the same broad conceptual framework. This analysis should be based on a forecast of the flow of fiscal resources to be allocated to a specific subsector (for example, as a proportion of GDP), as well as on desirable but realistic scenarios for the evolution of revenues deriving from service charges (evolution of the tariffs) and from improvements in technical and commercial efficiency. The resulting financing gap would be the starting point for identifying realistic financial structures to balance and make viable revenue and expenditure flows in a given subsector.

Other Experiences

The experience to date in Mexico with financing programs and projects in water confirms the vast potential there is for various financial resources to be combined and thereby attain the sector’s medium- and long-term objectives. In the international realm (OECD 2009, 2010, and 2012), there is a wide range of financial mechanisms and structures to draw lessons from, both regarding options that work and options to avoid (Anderson, 2011; Department for the Economics, Assessment and Integration of Sustainable Development, 2011; Marín, 2009; OECD, 2010 and 2012). Some of these schemes could be adapted and applied in Mexico, particularly where meant for financing non-traditional schemes (Baker, 2002; Ward, 2010; OECD, 2012), such as strengthening hydro meteorological services (PREVDA, 2010). Other cases that could be candidates for these schemes are the outsourcing of measurement systems for the different variables involved in the water cycle or for water-quality analysis; the insurance mechanisms in high-risk flood areas; the creation of PPPs to deliver bulk water in metropolitan areas;

45 Due to many factors including lack of incentives for banks and private sector to participate, high margins on interest rates and short maturities, requests of liquid guarantees and collateral guarantees, and so on.
and the issuance of debt by water utilities. The World Bank has gained vast experience in this area, covering aspects ranging from the financing of large infrastructure works (Head, 2006) to the financing of schemes to serve rural communities (World Bank, 2010 and 2011).

Mexico has also considered new approaches. A case that is relevant due to its potential as a source of financing is related to the proceeds from the collection of levies for the use of water and the discharge of wastewater (Aguilar, 2010). It would be worthwhile analyzing the usefulness and viability of implementing securitization schemes, where a specific percentage of the proceeds would support different programs and projects. For instance, experiences like the one of the French financing agencies, where revenues from water-related levies are linked to 5-year equipment plans, could be valuable for Mexico.

A Mexican experience that illustrates the difficulties to design innovative financing schemes for projects that generate primarily public goods is the case of Ojo Caliente basin in the state of Aguascalientes (CONAGUA, 2002), supported by the program for the Sustainable Management of Groundwater (Manejo Sustentable de Aguas Subterráneas or MASAS). For the implementation of the Ojo Caliente aquifer management plan, a special “Water Valuation Trust” was proposed, in which various kinds of resources would be brought together for the financing of activities that are part of the management plan. These kinds of financing schemes should be duly incorporated in the SFA.

Figure 4 below summarizes the results of studies conducted for the development of a management plan for the aquifer, which involves a comprehensive strategy for the different programs entrusted to CONAGUA, along with government and user initiatives. A similar approach was used for the Lerma-Chapala watershed, where various structural and non-structural actions were combined to ensure a balance between the supply of and demand for water (World Bank, 2007).

### 2.2 Projects and Programs Portfolio of the Water Sector

The programs and projects portfolio of the SFA may be considered an expanded and enhanced version of the Portfolio of Investment Programs and Projects (Cartera de Programas y Proyectos de Inversión or CPPI), managed by the Investments Unit of the SHCP. Doing so ensures that all programs and projects identified in the water sector would be included, regardless of their source of financing and the object benefiting from the financing. Moreover, this would ensure mechanisms for appropriate follow-up of the stage of the project cycle that the various initiatives are at (research, evaluation, financial management, final design, procurement, execution, start of operations, and monitoring).

The Portfolio would be composed with initiatives identified as part of the planning processes of CONAGUA at different levels (local, state, regional, national) and for all water sectors. This would allow for a more upstream and programmatic identification and prioritization of programs and projects that contribute to meeting the long-term financial needs of the sector, given certain medium- and long-term macro-economic variables, as well as various social and environmental priorities.

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47 The portfolio would include investment projects as well as non-structural programs and projects linked to the management of water resources and the administration of national waters. The investment projects would cover all subsectors of the water sector.
**Figure 4: Management Approach for the Ojo Caliente Aquifer, Aguascalientes**

**Core Objective**
Securing water resources necessary for socioeconomic development and quality of life, for present and future populations in the Aguascalientes Valley

**Global Strategy for Integrated Water Management With Subsidiarity**

**PMIR**
**PROMMA**
**PROMAGUA**

**Users**
Alianza para el campo

**CFE—SHCP**

**Other Institutional Programs**

**Three Action Programs**

**Implementation, Evaluation**

**Three Instruments for Assessing, Coordination, and Monitoring**

**One Implementation Support Unit**

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To manage project resources, it is necessary to establish a Water Rating State Fund

The Fund will enable reconstruction of the State’s Strategic Reserve

**Members:**
- CNA
- SHCP
- CFE
- SAGARPA
- State Government
- COTAS

**Operation:**
Technical Criteria and Social Communication Elements
- SHCP 09
- CFE
- PHIR
- State Gov’t.
- Federation

**Create the Water Rating Trust in Aguascalientes**

**SHCP – Trustee (NAFIN) Contract**

**Technical Committee Structure**

**Control & Evaluation**

**Decision on actions to be funds**

**Fund ($)**

**Implementation, Evaluation**

**Source:** CONAGUA (2002).
2.3 Management, Performance, and Results Indicators

For the SFA to function effectively it is necessary and essential that management, performance, and results indicators be identified early in the process. These indicators would allow for feedback into the system and make the SFA more transparent, facilitating the adjustment of criteria, the assessment of the different financing mechanisms, and the development of a monitoring and evaluation system. Some of the indicators currently in use are based on the Operating Rules governing the federal programs or on the indicators established for the evaluation of programs and projects. The SFA in its final form should take into account all the indicators applicable for each and every one of the proposed financing mechanisms. The SFA must consolidate all the information found in the different government units and entities at various levels (federal, state, and local) as well as in the private sector. First and foremost, these indicators should improve transparency and accountability. Data on tariffs and subsidies should also be incorporated in the SFA’s information component. These data could serve as the basis for policy recommendations aimed at strengthening the SFA.

2.4 Mechanisms to Guarantee the SFA’s Sustainability

Medium—and long-term planning, in combination with the prospective analyses conducted by CONAGUA, constitute a solid foundation for decision-making with regard to the allocation of public funds and provides a stream of benefits:

![Figure 5: SFA and the Planning Process](image)

**Source:** Original production (adapted from PNH 1975).
**Budgetary certainty.** The sustainability of the SFA depends largely on the assumption that, even in times of austerity, the legislative processes associated with water sector-related budget approvals command sufficient financial resources, considering other national priorities, and are consistent with the medium- and long-term vision arising from the planning processes. It is particularly important not to overlook the fact that most programs, projects, and actions in the water sector take more than one year to implement and sometimes more than one administration.

**The revenues from the collection of tax contributions as established by the Federal Levies Act could become the permanent funding source for SFA operations, provided these revenues were explicitly earmarked for specific programs and projects. This earmarking should include clearly defined objectives, especially for those projects and programs that are generate public benefits, such as in water management and regulation, flood control, hydro meteorological systems, etc.**

**Recoverable investment.** Alternatively, the bottom part of figure 1 (at the beginning of this chapter) assumes that recoverable investments (repayments) would be reincorporated into the SFA via pre-established mechanisms (debt repayment, special funds, etc.), to aid in its sustainability. This does not necessarily mean that the recoverable investments would be collected in a special fund, given that the repayments would be destined for the original source of financing (banks, private investors, and bondholders, among others). Recoverable investments become an additional source of financing within the SFA to the extent that the credit commitments are met in time, the perception of risk is reduced and, with it, the willingness to make resources available in the market increases.

**Specific fund.** It is possible to consider the creation of a Water Fund linked to the SFA, funded with a share of the revenues from the collections of levies for the use of water and the charges for effluent discharges, which would be destined to structure financing mechanisms for projects/programs specifically earmarked for water resources management. This fund could also incorporate the financial resources allocated to federal programs and other special funds currently managed by CONAGUA. The existence of such a fund would entail two large advantages: (i) provide greater realism and permanence to the SFA, and (ii) lay the foundations for a system that would provide greater consistency, transparency, and effectiveness to those resources provided by the federal government.
Towards the Formalization of the SFA

Programs, projects, and activities in water are currently implemented through different financing mechanisms, without having to resort to an SFA. However, the financing is channeled through a large number of federal programs with overlapping operating rules and eligibility criteria. Furthermore, the financing gap is increasing so a framework to coordinate and improve the efficiency in the public spending is required. The formalization of the SFA could contribute to improve the abovementioned and will also ensure the compliance of the LAN. Formalizing the SFA would facilitate the encoding of experiences and, thereby, the creation of a permanent system for reviewing, updating, and improving the different transaction mechanisms, aside from promoting the adoption of new and innovative forms of financing.

The need to manage the financial arrangements for the sustainable development of water resources and its associated services has been highlighted in a recent report by the OECD (2012), which points out that there are several opportunities for Mexico to raise the efficiency of public spending in the water sector. In this context, one of the aims of formalizing the SFA would be to create an instrument that would make it easier to improve the efficiency and effectiveness, as well as the multiplier effect of the public resources applied to the programs implemented in this sector.

3.1 The SFA and CONAGUA’s Scope of Competence

According to the conceptual framework presented in Figure 2, CONAGUA coordinates the relationship among the institutions providing financing and those demanding resources to finance their programs and projects, including CONAGUA itself as administrator of the national waters. As shown in the conceptual

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48 Although initially the SFA would operate in the realm of programs that are under CONAGUA’s care (water supply and sanitation, agricultural irrigation and drainage, flood control, and IWRM), it would be possible and desirable to extend the concept to other sectors.
framework, in addition to its coordinating function, CONAGUA has three mechanisms/instruments to carry out its task in relation to the SFA: (i) the pipeline of programs and projects in water that enables to organize and prioritize actions in accordance with short-, medium-, and long-term financial restrictions; (ii) the Operating Rules that include eligibility criteria of different federal programs; and (iii) an information system that includes a series of indicators to monitor the performance of the water supply and sanitation sector.

**Programs and Projects Portfolio**

The programs and projects portfolio that CONAGUA is responsible for is part of the National Water Planning System. In this context, the portfolio gathers all structural and non-structural initiatives that arise from water programming at the national, regional, and local level. As depicted in Figure 6, all these initiatives are assessed, ranked, and prioritized based on technical, social, environmental, and economic feasibility. Once prioritized, these initiatives received financing from one of the existing federal programs. These financing is usually through grant resources for capital investments and, in some cases, the grants also include subsidies for operations and maintenance.

It is proposed that CONAGUA’s current responsibilities be expanded under the SFA to include not only those programs and projects being support by public resources, but rather all programs in the sector, regardless of their funding source. This approach will ensure that CONAGUA has a strategic overview of the entire financial needs of the sector and can establish a dialogue with financial institutions to encourage their sustained participation in the financing of priority programs and projects.

Article 9 of the LAN provides the legal basis for the incorporation of the programs and projects portfolio of the water sector into the SFA:

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**Figure 6: National Water Planning System**

![Diagram of National Water Planning System](CONAGUA_diagram)

*Source: CONAGUA (2011).*
“V. Propose criteria and guidelines that will ensure harmony and consistency of the actions of the federal government regarding national waters and their inherent public goods, as well as ensure and monitor the consistency among the various programs and the allocation of resources for their implementation;”

“VIII. Develop and implement technical and administrative guidelines in order to prioritize investments in federal public works of water infrastructure and, at the request of states, the federal district, and the municipalities, provide guidelines for prioritizing investments in this area;”

“XVIII. Establish national priorities regarding the administration and management of national waters and the inherent national public goods referred to in this Act.”

**Financing Mechanisms**

As explained in section 2.1, a whole range of financing mechanisms and their corresponding operating procedures exist at present for an array of different programs financial with federal resources. These mechanisms range from the simple allocation of resources through the federal budget to complex financing packages in which fiscal resources from states and municipalities are brought together alongside funding from users and the private sector. CONAGUA currently plays an important operational role in most of these mechanisms and in other cases it has a coordinating role.

The ground rules governing the transaction mechanisms to access different funding sources and, where necessary, the criteria for full or partial recovery of investments could be collected in a catalogue for distribution among interested parties. Moreover, this catalogue could be used to determine the mechanisms’ effectiveness and efficiency, as well as the measures required for improving them. Both the eligibility criteria and the ground rules should be updated periodically. Bringing together the different mechanisms into one catalogue would allow CONAGUA to conduct a comprehensive analysis with a view to harmonizing these tools and, if necessary, set specific criteria to further improve the effectiveness of these mechanisms.

**Operating Rules**

Improvements in the Operating Rules governing federal programs (grants), such as FONADIN and other programs that promote private sector participation, can lead to the implementation of projects that are socially and economically viable, and meet the criteria of fairness, transparency, and accountability. As part of this effort, it is important to align these operating rules to ensure efficient and financially sustainable targets and objectives. The revised rules can also promote policies that entail financial co-responsibility on the part of the beneficiaries of the infrastructure in question and the users of the associated services.

**Coordination with the SHCP**

Modifying any of these operating regulations requires consultation and coordination with the SHCP and other authorities. CONAGUA’s role in this context should be one of leadership and coordination to ensure that all proper stakeholders are involved and to implement any proposed recommendations.

**Project Cycle**

In addition to modifications to existing operating rules, it is necessary to strengthen the portfolio of projects through the various steps of the project cycle. Clear procedures and methods have to be formulated to ensure the strategic alignment of projects and programs with national objectives.

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TOWARDS THE FORMALIZATION OF THE SFA
and their technical, financial, institutional, economic, environmental and social feasibility. In this context, it is essential that the different entities and agencies formulating programs and projects receive financial and technical support required to strengthen their capacity to access funding and prepare viable projects.

**Indicators**

At present, the weakest point of the conceptual framework presented refers to the lack of information to duly meet the SFA objectives, as stated in the third paragraph of article 111 Bis of the LAN, in terms of establishing clear “[…] spending and recovery criteria, where relevant, for those financial resources, financial accountability and management indicators, as well as targets derived from the use of those financial resources and instruments.”

CONAGUA has a basic set of data embedded in an array of different databases and systems that would allow it to design and implement an information system for the SFA in a relatively short period of time. This system would systematically gather information related to the tariffs charged for services and to the subsidies that affect the sector’s financial policies. The challenge lies in standardizing the various databases operated by CONAGUA so that a single information system for the SFA may be created.

### 3.2 Formalization of the SFA

The formalization of the SFA is not an easy task and will comprise a series of necessary steps:

- Consider the creation of an advisory board or similar figure composed by key stakeholders of the private and public sectors.
- Specify the design of the different SFA components (based on the conceptual framework introduced earlier), to comply with the provisions of article 111 Bis, 112, and 112 Bis of the LAN.
- Draft a bill based on the provisions of article 111 Bis through 112 Bis of the LAN to establish the SFA by Presidential Decree. These provisions, together with the definition of the components referred to in the previous paragraph, would clarify CONAGUA’s and SHCP’s roles and responsibilities; the coordination mechanisms with the various institutions that are part of the financial system; and the potential recipients of funding.
- Prepare arguments—to be presented to the competent fiscal and legal authorities—in support of legal amendments that will allow changes to the provisions of the LFD. The changes in the latter act should specify the destination of revenues from the collection of water levies and tariffs charged for water consumption and associated services. This would support to the idea of a Water Fund (see Chapter 3).
- Define the way in which the SFA’s functioning would be set up within CONAGUA, based on the responsibilities currently assigned to the major technical areas in order to, if necessary, lay out the transition process from the current situation to one that would guarantee the SFA’s due functioning.

To work out the above steps in detail, it is suggested that a temporary working group be set up within CONAGUA, made up of representatives of all technical areas, if necessary.

49 Although initially the SFA would operate in the realm of programs that are under CONAGUA’s care (water supply and sanitation, agricultural irrigation and drainage, flood control, and IWRM), it would be possible and desirable to extend the concept to other sectors.
supported by a group of experts. This working group would carry out the activities outlined above to formalize the SFA. Other key parties (financial authorities, bank representatives, and private investors, among others) would gradually be incorporated into the SFA. To this end, the working group would further proceed to:

- Take stock of the experiences with the financing of programs and projects in water.
- Identify the current public policies, the corresponding financing mechanisms, the system for the collection of levies, general regulations, and the different federal and state water programs that make up the pipeline of projects, among other things.
- Lay the groundwork for the design and implementation of the information system of the SFA.
- Produce an operational manual for the SFA, which would include the role to be played by each functional area of CONAGUA.

Identify initiatives that could be implemented in order to draw lessons and conclusions on innovative and financing mechanisms that could be scaled up.
Part 2: Sectoral Initiatives Under The SFA

As part of the work that led to this report and as a result of the dialogue with CONAGUA officials, a number of initiatives were analyzed that could be incorporated into the SFA. Four of these initiatives (technological upgrading and modernization of irrigation and emergency services for floods) are further presented here and could be implemented as pilot projects. The report presents general considerations for potential initiatives on water and sanitation and on the development, management, and usufruct of national waters, as well as the use of public domain goods as wastewater-receiving bodies.
4.1 Background

Water for agriculture is channeled through irrigation districts and irrigation units, designed to transport large volumes of water to the fields under a shift-irrigation system. At present, producers who use irrigation systems still employ practices and technologies that were adequate at one time but nowadays are no longer acceptable due to their low efficiency, combined with the shortages of water and conflicts over this resource.

However, farmers are reluctant to change their current irrigation practices. The reason for this is twofold: (i) the high cost of modernizing an irrigation system, which cannot be financed with easily accessible credit; and (ii) the fact that mandatory water-saving and efficiency actions have been undermined by policies that enable farmers to get their water and energy relatively cheaply. There are just not enough business mechanisms and innovative, long-term credit instruments that allow for a more effective financial participation of all the parties involved; moreover, the financial participation of farmers, particularly small, will require subsidize interest rates to make the credit affordable.

A series of proposals and tools to optimize available resources and facilitate access to credit for investments in the upgrading of irrigation infrastructure and plot technological upgrading will be discussed briefly. These tools, as well as the existing ones, would not be mutually exclusive: combinations involving different mechanisms, resources, and parties can be made to create the best fit for every specific situation or project.

4.2 Overview

In rural areas, water management is usually characterized by practices that promote water to be wasted, as well as the overexploitation of aquifers. To reverse this situation, the federal government

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50 The “irrigation districts” are areas of land linked to a principal project. The “irrigation units” are systems that receive irrigation from water sources (including wells and springs) that are somewhat dispersed. The main difference between the two lies in their origin. The infrastructure of the irrigation units was built primarily by the federal government and right at the start handed over to the users for its administration, and O&M. While the irrigation districts were also built by the federal government, their administration, and O&M were the responsibility of the federal government until being transferred to the users in the 1990s.
has promoted a series of policies aimed at rationalizing the consumption of water in order to cope with the effects of climate change and rising demand for food in the coming years. It is recommended that the SFA incorporate concrete actions in support of agricultural producers so that efficiency and the rational use of water are enhanced. These programs should involve subsidies and credits, while at the same time entailing an improvement in the producers’ net income.\textsuperscript{51}

The main existing financing policies and mechanisms for the modernization of irrigation infrastructure, include the instruments currently being implemented through FIRA, FONAGA, and FINCA. The issue to be addressed in principle is the balance between supply of and demand for water, particularly in those regions where irrigation agriculture lays the greatest claim on water; further, the supply-demand gap is increasing due to population growth, the inefficiency of agricultural systems, and climate change.

Closing the existing gap between water supply and demand requires the modernization and upgrading of irrigation systems. It is recommended that:

- The local and federal authorities (primarily CONAGUA and SAGARPA) determine the regions in need for modernization and technological upgrading, and prioritize them. Furthermore, it is important to identify and assess the technological options available, their respective costs, and the parameters to be used in their evaluation.
- Agricultural producers be persuaded to adopt modern technology for their irrigation systems (by pointing out the benefits) in order to increase agricultural productivity and personal incomes, as well as raise the efficiency in the use of water. The agricultural producers should also be informed of the means they have at their disposal to reach these objectives.
- A solid argumentation be developed and communicated to agricultural producers on the benefits of the use of certain technologies that will be targeted to particular contexts and needs.
- CONAGUA rely on a financing mechanism that: (i) maximizes the use of public budgetary to ensure an increase in funding for water infrastructure and improve implementation; (ii) is clear, specific, and easy to access, and that allows for the participation of private investors, credit institutions, and producers; (iii) may be combined with other financial structures in the market and is compatible with public policies; and (iv) fosters the efficient use of water.
- There be due supervision of the granting of credits and the monitoring of portfolios; construction oversight of infrastructure works is also required.
- There be a financial and technical mechanism to ensure infrastructure is maintained in the long term.
- State and local governments be involved in policy formulation as they have high political and economic stakes. Doing so would create more possibilities for actions aimed at implementing complementary water and agricultural policies, and facilitate private sector participation.

This report substantiates the need to identify new instruments that complement and/or address the limitations of existing schemes, particularly to promote the participation of the private sector in hydro-agricultural projects.

\textsuperscript{51} The objectives of generating income, in the context of greater efficiency in the use of water, would be incorporated in the eligibility and feasibility procedures of the SFA.
feasibility of the latter could be tested through one or more pilot projects under one of the proposed structures. This requires changing the prevalent short-term perspective to a medium- and long-term business plan.

4.3 Initiative 1: The Water Fund

The size and implementation period of infrastructure works and other structural and non-structural measures for the modernization and technological upgrading of irrigation, require that these processes be institutionalized and financial resources made available over a multi-year period.

In order to have a permanent instrument with sufficient resources, it is proposed that a special fund be created; the Water Fund52 (see Figure 7). One of the Fund components would aim to modernize and technologically upgrade irrigation.53 This component should be complemented by other public and private financing instruments and will have the following characteristics:

- Designed as a long-term institutional instrument, with enough flexibility to structure different financing mechanisms, involving a mix of public and private resources, subsidies and credits, as well as investment schemes and guarantees and with the capacity to finance multi-year activities.
- Established through the transfer of public funds to a public trust fund that is not government-owned.
- Founded on an agreement with SHCP, stipulating that a portion of the annual allocation of budgetary allocations to CONAGUA and SAGARPA be allotted to the Water Fund. As a starting point, some of the resources currently allocated to federal programs could be transferred to the Water Fund.
- Operating Rules that clearly establish the terms and conditions for the use of resources, taking into account the characteristics of each project and the need for its continuity, according to a financial plan. These rules will provide incentives for the financing of multi-year programs and projects.
- A Technical Committee, composed primarily by representatives of CONAGUA and SAGARPA, established and with the capacity to authorize long-term investment projects.
- Funds would be disbursed through private administrative and payment trusts, to be created expressly for each project, irrigation unit or district, to carry out specific investments. The investments would be financed through different financing mechanisms and/or recoverable and non-recoverable contributions (i.e., subsidies).
- The use of resources would be arranged through financial support agreements, signed between the Water Fund and the projects’ trust funds. These agreements would set out the terms and conditions for the management of federal resources destined for specific, authorized projects, in compliance with relevant legislation.
- The Fund’s resources would come from:
  - Initially, from the existing budgetary resources of CONAGUA and

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52 The creation of a Water Fund does not necessarily imply substantial increases in the budget currently allocated to CONAGUA. Rather, it would imply a restructuring of the budget and an improvement in the rules for its exercise, so that the combination with other resources would add to the budget’s multiplier effect.

53 In this context, reference is made to a component because the scope of the Water Fund is not restricted to hydro-agricultural projects but extends to the entire water sector. In fact, the Water Fund’s creation would be associated with a new idea of the process for programming and allocating investments.
SAGARPA, with previous approval from SHCP.

- In a second phase, financial resources must become available from State and local governments for specific projects. These financial resources could come from or be guaranteed with shares in federal revenues, budgetary resources, levies for water use, general taxes, and other contributions.

- Private resources from (i) producer associations; (ii) private companies or companies benefiting from the Fund; and (iii) investment funds.

- Development and/or commercial banks, with guaranteed repayment sources.

- The Water Fund will have the capacity to use an array of financial schemes:
  - Recoverable funds which are resources backed by one or more of the following recovery mechanisms: (i) capital contributions; (ii) guarantees; and (iii) subordinated credits and/or credits convertible to capital;
  - Non-recoverable funds provided by the Fund for projects financed with a mix of resources and with the participation of the private sector.
The Fund’s contribution—in its various forms—to specific projects shall never reach 100 percent. Various percentage contributions could be considered, based on particular purposes or objectives set for in the Operating Rules.

**Prerogatives**

The Fund will have a series of prerogatives:

- Promote the coordination among the entities involved in financing the country’s irrigation modernization and technological upgrading programs and projects.
- Grant subordinated and/or convertible credits, guarantees, and contributions, to encourage private sector participation.
- Support, through guarantees, the participation of construction companies and/or other suppliers of goods and services (beneficiary companies) in the project tenders.
- Mobilize private capital for project financing.
- Assume risks that the market is unwilling to assume, in order to encourage private sector participation, including user associations and Limited Liability Companies (LLCs) of the irrigation districts, as well as other associations legally established in the irrigation units.54
- Promote the participation of banking and non-banking financial brokers in the financing of projects for the modernization and technological upgrading of irrigation.
- Grant non-recoverable contributions for the elaboration of master plans for public works.
- Provide recoverable and non-recoverable funding to promote the construction, financing, and transfer of infrastructure projects.

- Offer technical assistance for the evaluation, structuring (of financing), financing, and implementation of irrigation modernization and technological upgrading projects.
- Depending on the obligations whose fulfillment is guaranteed, the Fund may provide, among other things, the following guarantees:
  - “Credit guarantees,” the guarantee that a creditor will be paid a certain percentage of the credit he extended, in the event of default by the debtor. Also, a certain amount may be guaranteed, corresponding to the flow of resources on account of one or more debt repayments in a given period, where the aim would be to avoid the guaranteed credit is pre-paid. Such guarantees may be given for a specific period of time, to boost longer-term lending.
  - “Performance guarantees,” the guarantee that a company participating in the development of a project will comply with one or more of its particular contractual obligations.
  - “Political risk guarantees,” the guarantee that a creditor will be paid a certain percentage of the credit he extended.

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54 The initiative should maintain its capital structure and objectives as open as possible to ensure flexibility. This means, for example, that the fund capital could be strengthened with assets from other entities related to projects for modernizing irrigation infrastructure. If at any given time certain conditions warrant doing so, the Water Fund should have the flexibility to access and manage assets requiring a specialized administration, in case the franchisee or service provider, for whatever reason, is unable to do so. Similarly, in accordance with the corresponding legal status and relevant legislation, it should be entitled to obtain concession rights, licenses, and powers granted to the Fund or its trustee. If necessary, it has to be possible to have these transferred to enhance its assets and expand available resources to finance infrastructure, as well as to build, manage, operate, maintain, and exploit franchised goods.
in the event of non-compliance by a company benefiting from the Water Fund or participating in the development of an infrastructure project that includes a beneficiary company, provided the corresponding breach of contract is the result of a legal regulation issued by a competent authority.

**Pros and Cons**

Table 2 summarizes the arguments in favor of the creation of a Water Fund, and the obstacles that would have to be overcome to ensure its viability.

### 4.4 Initiative 2: The Public Private Partnership (PPP) Scheme

#### Background

PPPs have been around globally since 1992. The first schemes of this kind were introduced in the United Kingdom. At present, 25 countries are using this kind of financing for investment projects; the main projects are located in Europe, South Africa, Australia, Canada, and more recently, in Mexico as well.

Several international organizations support PPPs in the hydro-agricultural sector in countries around the world. For example, the World Bank is supporting PPP experiences in Ethiopia, and Brazil, which are by now at an advanced stage of development and implementation. In Mexico, the federal government promoted a new type of PPP for project development, called the Service Provision Projects (SPPs). In 2003, the SHCP established the corresponding regulatory framework, which has allowed for the implementation of projects in health, transportation, and education. Since January 18, 2012, these contracts have been under the framework of an expanded regulatory framework set by the LAPP.

#### Scheme

Through the PPPs, a private investor operates and maintains a certain infrastructure that meets pre-established quality standards. The investor designs, builds, finances, maintains, and operates all the facilities needed to provide a defined service during a specified period of

<table>
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<th>Table 2: Pros and Cons of the Water Fund</th>
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<tr>
<td><strong>Pros</strong></td>
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<tr>
<td>• Maximizes budget resources for the water sector.</td>
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<td>• Allows for the development of projects in the medium and long term.</td>
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<tr>
<td>• Facilitates the implementation of different financing mechanisms, recoverable and non-recoverable contributions, and risk capital.</td>
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<tr>
<td>• Allows for the participation of new investors in the industry and promotes commercial credits.</td>
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<tr>
<td>• Allows for the development of a larger number of projects, of a wider scope.</td>
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</table>
time or receives a periodic payment from the government as compensation, based on the quality of the services provided. Payments to the investor are recorded as running expenditures and can come from a mix of public and private resources. Public participation must be authorized in the budget and, if financial resources are used for payments covering a period longer than one year, they must have a multiannual budget authorization.

In Mexico, PPPs already exist in the irrigation districts; the water users associations (private) rely on the federal government and sometimes state governments, to rehabilitate, maintain, and preserve the systems. However, new schemes that go beyond the current, short-term conceptions need to be designed, to make investment projects of a relatively wide scope (which demand large investments, and different financing and repayment schemes) more efficient and effective.

For the development of PPPs in the hydro-agricultural sector, innovative schemes must be devised, in coordination with CONAGUA, SAGARPA, and the SHCP. These PPPs will have the following characteristics:

- The projects are carried out for the irrigation districts and units.
- Private investors must design, build, maintain, insure, and operate the infrastructure and equipment in question for a period of time as derived from the corresponding financial model, considering it is a long-term investment (in accordance with article 2 of the LAPP).
- The infrastructure can be publicly or privately owned, depending on the specifics of the case. For example, the infrastructure for distribution in the irrigation districts is public (similar to the water supply network), while at the parcel level it is private.
- The services to be provided by the private investor will include water transport and delivery; maintenance; insuring the facilities; and providing services.
- Depending on the characteristics of individual projects, other services such as technological upgrading; training; agricultural extension; marketing support; and equipment can be provided.
- The funds necessary for the implementation of PPP projects will be established separately for each project and may come from public resources, the purchase of equipment and technical facilities on installment plans, capital contributed by producers, and private investment.

**Required Actions**

In order to ensure the success of the PPPs schemes, the following actions must be properly undertaken:

- Clear definition of the Reference Project (Project Definition Report or something similar for irrigation units), based on the regulatory and legal framework.
- Define the PPP in question, its payment source(s), and project characteristics. To this end, and according to the LAPP, the objective of using the infrastructure provided by the private sector must be to improve social well-being and increase investment levels. Moreover, in the case of the water sector, the sustainability of water resources must be ensured and food production increased.
- Identify retained and transferable risks.
- Determine the guarantees, coverage, and insurance to be contracted by the provider.
- Determine the optimum term of the contract, taking into consideration the input
costs, the life cycle of the materials, the maintenance periods, etc.

- Determine property and real estate needs, as well as the fiscal requirements to be paid to develop the project.
- Prepare a financial model to support a comparative analysis.
- Conduct a comparative analysis of the scheme versus the current situation.
- Conduct a legal analysis to determine the project’s viability.
- Define the methods and formulae that will be used to evaluate the providers’ performance; defining the form and terms to be used in establishing, calculating, and implementing the applicable discounts.
- Demonstrate the PPP scheme’s financial advantage vis-à-vis other financing options.
- Ensure that risks are properly distributed between the government and the private investor (the principle of the best qualified agent).

A cost-benefit analysis will justify a PPP scheme if the project generates benefits (net, equal or greater than a traditional investment project subsidy/public work). The assets may be owned by the private investor or the government, depending on the agreement under a long-term contract and in accordance with the applicable legislation. The LAPP stipulates that the previous information must be posted on the Internet and presented to the House of Representatives. Likewise, the projects must be authorized by the Inter-secretarial Commission on Public Expenditures, and Financing, and Privatization.

**Pros and Cons**

Table 3 summarizes the arguments in favor of implementing PPP projects, and the obstacles that would have to be overcome to ensure their viability.

It is proposed that a series of pilots be selected that could be implemented under a PPP scheme; this will demonstrate the conditions under which such a scheme could be viable.

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55 Article 17 of the LAPP.

56 LAPP, Article 14: “The Ministry of Finance and Public Credit, when presenting the draft Expenditure Budget of the Federation must include, under article 24 of this Act and article 41 of the Federal Budget and Finance Responsibility Act, an assessment of the impact of the PPP projects on public finance during their life cycle. Likewise, the SHCP shall report in its Quarterly Reports on the economic situation, public finance, and public debt situation, in terms of the applicable provisions, the description of each authorized project, the amounts disbursed and to be disbursed based on the relevant forecasts and estimates, the progress made in its implementation, implementation schedule, as well as annual payments committed.”

57 LAPP, Article 21: “Based on the analyses mentioned in article 14 of this Act, the agency or entity shall decide if the project is viable or not and, if considered viable, shall proceed with its implementation and development, following the analysis and authorization of the Inter-secretariat Commission on Public Expenditures Financing, and Privatization, for purposes of article 34 of the Federal Act on Budget and Fiscal Accountability, and article 24 of this Act.”
Table 3: Pros and Cons of the PPP

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Allows for multiannual investments, thereby making the planning of larger-scale projects feasible.</td>
<td>• Once the running expenditure budget is committed (substituting for the investment expenditures), there is a risk that the entity may not be able to move on to other projects because the expenditure has already been committed. On the other hand, this could avoid the politicization of the project.</td>
</tr>
<tr>
<td>• Longer-term financing may be provided and are covered with running expenses(^a) or through different repayment schemes, structured differently for each project.</td>
<td>• It could have some political impact, because it does not follow the traditional public work scheme. However, it is already supported by the LAPP:(^b)</td>
</tr>
<tr>
<td>• The investments’ source of payment is a compensation included in later budgets, allowing the investment to be made by a private party and to be covered during the period the service is provided.</td>
<td>• If the projects in question have a mixed payment source (that is, involving public and private funds), a cash payment source will be required from the private component in the long term, to ensure the project is bankable.(^d)</td>
</tr>
<tr>
<td>• Allows for the compensation to be used for the service provision, duly guaranteed as payment source for the credits; this, in turn, makes the projects “bankable,” reduces financing costs, and enhances the quality of credits, thereby lowering interest rates.</td>
<td>• A solid technical and financial capacity is required in order to avoid guaranteeing high-risk projects.</td>
</tr>
<tr>
<td>• The applicable regime is the LAPP and, consequently, the PPP is not subject to the Public Sector Procurement, Leasing, and Services Act or the Public Works and Related Services Act.(^c)</td>
<td></td>
</tr>
</tbody>
</table>

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\(^a\) The fifth paragraph of article 24 of the LAPP points out: “In the draft decree of the Expenditure Budget for each year, the multiannual spending commitments deriving from PPPs shall be provided in a specific chapter and by sector, so that, where necessary, such commitments may be approved by the House of Representatives in order to proceed with the contracting and execution of the projects. In addition, a description of each project must be provided, including the amounts disbursed and to be disbursed based on the relevant forecasts and estimates, the progress made in its implementation, the implementation schedule, as well as annual payments committed.”

\(^b\) LAPP, article 105: “The construction, equipping, maintenance, conservation, and rehabilitation of the infrastructure of a PPP project shall be done according to the program, characteristics, and technical specifications agreed on in the relevant contract, as well as comply with regulations regarding environmental protection, preservation and conservation of the ecological balance, human settlements, urban development, and other applicable federal, state, and municipal regulations. The infrastructure works and services implemented by private parties to comply with their obligations in a PPP project shall not be subject to The Public Works and Related Services Act, or to the Public Sector Procurement, Leasing, and Services Act, or to provisions derived from these Acts.”

\(^c\) Ibid.

\(^d\) Under article 110 of the LAPP, the non-public goods related to the service provision may be used as a guarantee and, in case of foreclosure, the banking institutions are entitled to the revenues generated by the projects in question.
5.1 Background

Mexico is exposed to different types of disasters. The geographic location of the country makes it particularly vulnerable to seismic and volcanic activity, while its location in the inter-tropical region makes it susceptible to tropical storms along the coasts of the Caribbean, the Pacific Ocean, and the Gulf of Mexico. These tropical storms periodically affect the populations by causing strong winds and significant amounts of rainfall, leading to severe damages and widespread flooding. CONAGUA plays a key role in the prevention of and response to disasters caused by these extreme hydro-meteorological events.

According to the National Center for Disaster Prevention (Centro Nacional de Prevención de Desastres or CENAPRED), in the period 1980–99, Mexico suffered 75 disasters of a significant size, causing over 10,000 deaths (see table 4) and hundreds of thousands of victims suffered from displacement and the loss of valuable assets. The cost of direct damages in that period reached US$9.6 billion, giving a yearly average of approximately US$500 million. If indirect damages are also taken into account, that is, the interruption in the production flows of goods and services, at least another US$40 million a year would have to be added.\textsuperscript{58} Table 4 shows that the total number of fatalities caused by hydro-meteorological phenomena is 2,767 persons. Total direct damages for these weather-related disasters have been estimated at US$4.4 billion.

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|c|}
\hline
Type of Phenomenon & Fatalities & Direct Damages (US$ million) & Indirect Damages (US$ million) & Total Damages (US$ million) \\
\hline
Hydro-meteorological & 2,767 & 4,402.3 & 144.9 & 4,527.2 \\
Geological & 6,097 & 4,043.7 & 516.4 & 4,560.1 \\
Chemical and environmental & 1,250 & 1,149.7 & 133.6 & 1,283.3 \\
Total & 10,114 & 9,595.7 & 794.9 & 10,390.6 \\
\hline
\end{tabular}
\caption{Victims and Damages Due to Disasters in Mexico (1980–99)}
\end{table}

\textsuperscript{58} Overview of victims and damages caused by disasters in Mexico by type of event (in millions of US dollars; source: CENAPRED).
Natural disasters require increasing amounts of public resources. According to the SHCP, the average amount spent on national disasters has gone up from Mex$28 billion in 2001 to Mex$11,937 billion between 2007 and 2009. In 2010 alone, the year with the highest number of natural disasters ever registered in Mexico, the 40 main disasters, which affected 18 states, cost around Mex$23 billion. It is expected that the number of natural disasters in Mexico will increase in the coming years. Due to its geographical location, Mexico is highly vulnerable to natural phenomena due to (i) its location in the “Ring of Fire”, where 80 percent of all seismic and volcanic activity takes place; (ii) its location in four of the six cyclone-generating regions of the world; and (iii) the consequences of global warming.

The Natural Disasters Fund (Fondo de Desastres Naturales or FONDEN) is an inter-institutional instrument and financial mechanism aimed at channeling resources to mitigate the effects of natural disasters. The General Rules of the Natural Disasters Fund (henceforth “the Rules”) regulate access to the Fund, according to principles of complementarity, timeliness, and transparency. The FONDEN resources are limited, considering they are an instrument of national coverage. Therefore, it is recommended that new instruments be developed to complement the resources available through FONDEN to respond to national disasters and invest in disaster prevention and mitigation. In addition, local governments should contribute resources, and savings should be pursued by harmonizing policies and good practices.

FONDEN has proved to be a fundamental instrument in responding to disasters and must remain a fund to respond to the impacts of natural disasters and not be considered an instrument to merely have access to additional federal resources, given the low investment capacity of local governments. For this reason, it is important to ensure that, in addition to federal resources available from FONDEN, local governments commit to provide resources should they be required to respond to the impacts of disasters. It is important to emphasize that FONDEN as well as other existing and/or new financing instruments, should begin promoting a culture that emphasizes prevention, which will be further strengthened by the active participation of local governments and civil society.

The rising claims on public funds due to a growing number of disasters calls for a permanent strategy to promote the design of legal and financial instruments to address prevention and mitigation activities related to natural disasters. This applies to emergency and non-emergency situations, when investments are needed for adaptation measures and the strengthening of non-structural actions that will contribute to mitigating the effects of global warming. During emergencies, water supply and sanitation services suffer from disruptions and must be normalized rapidly in order to avoid adverse health impacts. While CONAGUA does have emergency equipment, sometimes it does not have enough budgetary resources to duly operate them when emergencies strike. On many occasions, local water infrastructure is not adequately insured, so the costs of reconstruction are not contemplated. As such, there is a need for public resources, both federal and local, for emergency response, which covers both investment and operating costs. Timely and adequate financial contributions are usually hindered by budgetary and political considerations, primarily because the institutional and financial instruments have yet not been designed.

5.2 Initiative 1: The Contingent Line for Priority Investments

The first initiative consists of the creation of a contingent line for each state with a development
bank, which will allow it meet its immediate obligations as counterpart to the federal resources and cover the operating costs of the emergency equipment provided by CONAGUA, and the needs for investments in infrastructure. The contingent line should be destined to: (i) cover the operating costs of the equipment provided by CONAGUA when required; (ii) cover the local counterpart financing required for reconstruction of infrastructure; and (iii) complement public and private resources used for infrastructure works aimed at mitigating the impact of future natural disasters.

The contingent line should be set up along the following criteria:

- **Amount of the contingent line:** To be determined on a case-by-case basis, based on the incidence rate of natural disasters in each state, its population size, and debt capacity.
- **Payment sources:** Budgetary resources from the fiscal year immediately following the year that the emergency occurred.
- **Guarantee:** The share of the federal income that the state and/or municipalities are entitled to.
- **Drawdown:** The state must arrange with FONDEN the right of access to the contingent line, according to the terms and conditions of the Coordination Agreement.
- **Interest Rate:** 0-percent interest rate during a maximum term of 12 months from the date of the first drawdown.
- **Commissions:** To be negotiated with the development bank in question.

It is suggested that the line of credit be guaranteed through the shares in federal income that the state and/or municipalities are entitled to. This will ensure a bankable instrument as the creditor is given the guarantee of repayment of the drawdowns against the line. This would, in turn, create a revolving credit line, ensuring a long term sustainable instrument. The line could also be used as a guarantee mechanism or alternative payment source for other PPP or financing projects.

The contingent line could be implemented in the short term with those states that have a higher probability of being impacted by natural disasters. However, the Agreement must be negotiated separately between a development bank and each participating State.

**Pros and Cons**

Table 5 summarizes the arguments in favor of the creation of a Contingent Line for Priority Investments, and the obstacles that would have to be overcome to ensure its viability.

### 5.3 Initiative 2: The Climate Change Investment Fund

In order to have a long-term instrument efficiently addressing investments infrastructure needs and to minimize the impact of climate change, it is suggested that a Climate Change Investment Fund (CCIF) be established, as a component of the Water Fund (see section 4.1), funded by the federal income allocations to the States. The creation of a CCIF would provide a new, long-term, institutional financing instrument, with enough flexibility to implement different financing schemes. Through this Fund, the States could finance investments required to deal with the imminent effects of climate change.

**Characteristics**

- The Fund would be established as a Management and Payment Source Trust Fund in a development bank. It would be constituted and financed with resources corresponding to the participations in...
federal income that each State and several municipalities are entitled to, as well as federal budgetary resources. Additionally, it would be convenient to have an ad-hoc fund to finance the investments required to address the effects of climate change (for instance, increasing the supply of water, increasing the efficiency in the use of water, disaster prevention). Alternatively, the fund could be created as a sub-account for Climate Change Investment within the National Infrastructure Investment Fund (Fondo Nacional de Inversión en Infraestructura or FONADIN), to be managed by FONADIN. This would require a modification of the Operating Rules and other legal instruments.

- It would annually receive a percentage of the participations from the States and some municipalities. The percentage should vary according to the incidence of natural disasters in the entity in question and its development level.
- The States, municipalities, and various federal government agencies will define the type of projects that could be funded by the CCIF and plan their implementation, giving priority to investments in higher-risk and more vulnerable zones.
- Can receive participation from different financing schemes to leverage funding.
- It could be used as a payment source for PPP contracts.

**Pros and Cons**

Table 6 summarizes the arguments in favor of the creation of a CCIF, and the obstacles that would have to be overcome to ensure its viability.

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**Table 5: Pros and Cons of the Contingent Line for Priority Investments**

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>- The participation of the local governments is properly institutionalized.</td>
<td>- Possible resistance on the part of the States to participate in the scheme.</td>
</tr>
<tr>
<td>- Contribution of local resources in emergency response, normalization, and urgent works is encouraged.</td>
<td>- Resistance to indebtedness.</td>
</tr>
<tr>
<td>- Resources are available for immediate use to cover the operating costs of emergency equipment.</td>
<td>- Lack of political support in some States.</td>
</tr>
<tr>
<td>- There would be no delay in the contribution from the local counterpart for works undertaken during the normalization phase and urgent reconstruction works.</td>
<td></td>
</tr>
<tr>
<td>- Greater commitment from the States.</td>
<td></td>
</tr>
<tr>
<td>- More efficient management for the contracting of services and for ensuring the participation of the private sector.</td>
<td></td>
</tr>
<tr>
<td>- Necessary and urgent works are completed.</td>
<td></td>
</tr>
<tr>
<td>- Investment planning may be improved.</td>
<td></td>
</tr>
<tr>
<td>- Contingent line may be used as guarantee or alternative payment source for PPP schemes.</td>
<td></td>
</tr>
</tbody>
</table>

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STRENGTHENING THE FINANCIAL SYSTEM FOR WATER IN MEXICO: FROM A CONCEPTUAL FRAMEWORK TO THE FORMULATION OF PILOT INITIATIVES

Part 2
Table 6: Pros and Cons of the Climate Change Investment Fund

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The CCIF represents a long-term, institutional financing scheme that could be used to finance investments in vulnerable conditions.</td>
<td>• Negotiations with federal entities on the proposed scheme may prove difficult.</td>
</tr>
<tr>
<td>• The active and committed participation of States and municipalities would be institutionalized.</td>
<td>• Not all States and municipalities may be willing to participate, especially if they perceive low vulnerability to natural disasters.</td>
</tr>
<tr>
<td>• The CCIF is a financial instrument that would effectively and specifically address the investments needed to deal with the effects of climate change.</td>
<td>• Some states and municipalities are at high risk for natural disasters, which could generate an imbalance in the allocation of resources.</td>
</tr>
<tr>
<td>• Resources available for investments would be maximized through collaborating with financing schemes.</td>
<td>• The proposed scheme may lack political support.</td>
</tr>
<tr>
<td>• Private participation in investments would be encouraged by having a secure and permanent payment mechanism.</td>
<td></td>
</tr>
<tr>
<td>• Investments could be implemented under a PPP arrangement.</td>
<td></td>
</tr>
<tr>
<td>• The CCIF could be used as a guarantee or as an alternative source of payment to the PPP.</td>
<td></td>
</tr>
</tbody>
</table>
The 1992 legal reform of the LAN incorporated a series of economic instruments to manage the water resources of the country in order to encourage a more efficient allocation and use of water. One of those instruments are water rights and by creating the possibility of transferring the rights associated with their respective concession titles, the LAN established a market for rights. This is a regulated market, since third parties and water quality are invariably affected—externalities that prevent the market from operating adequately when left alone.

### 6.1 The Water Rights Market

The basic characteristics of the water rights market, established in 1992 and amended in 2004, are the following:

- Article 25 of the LAN states that “The concession holder may totally or partially modify the use of the water licensed, as long as the consumptive use established in the corresponding title is not altered, provided the change is final and the concession holder provides timely notice to the Water Authority for the purpose of updating or modifying the respective discharge permit and, where needed, updating the REPDA.” Authorization will always be required when changes are made to the consumptive use stated in the corresponding title; the point of withdrawal; the discharge site; or the volume or quality of wastewaters.

- General provisions (articles 33 to 37 of the LAN) regulate the transfer of water rights outside the irrigation districts and units.

- The possibility of “establishing final or temporary agencies to manage the regulated operations of the transfer of water rights, called water banks, is defined. The Bank’s functions will be

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59 The process of abstracting water from any source, either temporarily or permanently; most water is used for irrigation or treated to be safe for consumption. Water withdrawal is also known as water abstraction or water extraction.

60 This is an important restriction of the free transfer of water rights, meant to ensure that the rights of third parties are not affected nor is the quality of the water that down-stream users benefit from. It should be noted that what is set forth in this article concerning the regulation of water right transfers has not been put in practice.
determined in the respective regulations” (article 37 Bis of the LAN).

- A special regime for the transfer of water rights for agricultural use (articles 49 and 51 of the LAN), with specific modalities for irrigation districts (article 70 of the LAN), as well as for irrigation units (article 58 of the LAN).

The implementation of the water rights market, as envisaged by the LAN, is linked to the REPDA, and the necessary administrative infrastructure for monitoring and controlling the existing titles and the transfers made. Despite some of the limitations that the national waters administration faces today, the volume of water right transfer applications and the demand for water rights show an upward trend.

Of all the applications for a transfer of water rights received in the period 2002–09, a total of 73.73 percent were granted, 16.33 percent were turned down, and 9.95 percent were reported pending (CONAGUA, 2010a). According to information provided by REPDA (CONAGUA, 2009), agricultural users show the highest volumes of water rights transferred (see table 9). Informally it has been reported that in some cases the recipient of the transferred rights does not formally register the change of use (for example, from agricultural use to public-urban use). Ninety three percent of the water right transfers corresponded to groundwater and 7 percent to surface water.

The data on transfers registered in the REPDA do not include the value of those transactions nor those rights transferred to non-agricultural uses. Based on informal sources, the value of the transactions range between Mex$20 to Mex$50 per cubic meter.

In accordance with a limited interpretation of the LAN, CONAGUA has established Water Banks with the responsibility to assist and record the voluntary transactions of water rights. The registration helps ensure that these transactions comply with the law and that the stakeholders have legal certainty regarding the validity of the acquired rights. Presently, the limitation of the Water Banks is the lack of clear links with other processes to manage the regime of concessions that would

![Figure 8: Volume of Transfer Applications and Demand for Water Rights](image)

**Source:** CONAGUA (2010a).

**Note:** Volumes in m$^3$. 

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**Part 2**
### Table 7: Change in the Use of National Waters in 2008 (in Cubic Meters)

<table>
<thead>
<tr>
<th>Initial use</th>
<th>Agricultural</th>
<th>Agro-industrial</th>
<th>Multiple</th>
<th>Domestic</th>
<th>Industrial</th>
<th>Livestock</th>
<th>Aquaculture</th>
<th>Public Urban</th>
<th>Services</th>
<th>Hydropower</th>
<th>Total initial use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural</td>
<td>216,675,290</td>
<td>240,000</td>
<td>5,188,284</td>
<td>78,000</td>
<td>4,905,657</td>
<td>1,541,273</td>
<td>1,300,000</td>
<td>6,072,319</td>
<td>3,028,203</td>
<td>802,259,000</td>
<td>239,029,026</td>
</tr>
<tr>
<td>Agro-industrial</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Multiple</td>
<td>2,839,558</td>
<td>0</td>
<td>30,653,083</td>
<td>84,455</td>
<td>1437,447</td>
<td>459,662</td>
<td>0</td>
<td>964,000</td>
<td>463,212</td>
<td>0</td>
<td>36,901,417</td>
</tr>
<tr>
<td>Domestic</td>
<td>1,040</td>
<td>0</td>
<td>1,531</td>
<td>23,418</td>
<td>0</td>
<td>319</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>26,308</td>
</tr>
<tr>
<td>Industrial</td>
<td>70,490</td>
<td>0</td>
<td>10,000</td>
<td>20,450,720</td>
<td>319</td>
<td>0</td>
<td>0</td>
<td>6,000</td>
<td>0</td>
<td>0</td>
<td>22,217,817</td>
</tr>
<tr>
<td>Livestock</td>
<td>203,280</td>
<td>0</td>
<td>14,873</td>
<td>41,610</td>
<td>3,301,122</td>
<td>0</td>
<td>0</td>
<td>7,200</td>
<td>0</td>
<td>0</td>
<td>3,568,085</td>
</tr>
<tr>
<td>Aquaculture</td>
<td>0</td>
<td>0</td>
<td>100,000</td>
<td>0</td>
<td>0</td>
<td>1,203,760</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1,303,760</td>
</tr>
<tr>
<td>Public-Urban</td>
<td>0</td>
<td>0</td>
<td>900,000</td>
<td>81,690</td>
<td>0</td>
<td>2,008,009</td>
<td>120,000</td>
<td>0</td>
<td>3,109,600</td>
<td>0</td>
<td>11,307,798</td>
</tr>
<tr>
<td>Services</td>
<td>4,074</td>
<td>0</td>
<td>2,553</td>
<td>10,000</td>
<td>231,826</td>
<td>0</td>
<td>150,000</td>
<td>10,909,345</td>
<td>0</td>
<td>11,307,798</td>
<td>802,259,000</td>
</tr>
<tr>
<td>Hydropower</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>802,259,000</td>
<td>1,119,722,910</td>
</tr>
<tr>
<td>Total final use</td>
<td>219,793,733</td>
<td>240,000</td>
<td>36,870,323</td>
<td>207,873</td>
<td>27,148,949</td>
<td>5,302,376</td>
<td>2,509,760</td>
<td>9,194,328</td>
<td>16,196,568</td>
<td>802,259,000</td>
<td>1,119,722,910</td>
</tr>
</tbody>
</table>

*Source: CONAGUA (2009).*
allow detecting cases of undue accumulation and speculation.

To some extent, the amendments to the LAN that went into effect in 2004 rather than improve the functioning of the water markets actually led to a dispersion of provisions and more complications in the administration of the concessions regime. However, the amendments also offer an opportunity to boost the regulated water market and strengthen the Water Banks through the legal route. Beyond the legal aspects, the proper functioning of the markets requires a suitable database, fed by the REPDA and other computer systems operated by CONAGUA.

### 6.2 Water Bonds

In several countries, different ideas have emerged for the generation of Water Bonds, based on water savings achieved either voluntarily or as a result of public policies. These bonds are different from those normally issued for the financing of specific programs or projects (see the experiences in OECD 2010 and 2012). For example, in Chile, the Ministry of Planning has proposed the creation of a “Community Market of Water Bonds,” in which the fines charged for illegal withdrawals and other revenues associated with excessive consumption would be transformed into Water Bonds for financing community projects (not necessarily related to water).

In Mexico, a similar initiative was launched through the Water Use Rights Adjustment Program (Programa de Adecuación de Derechos de Uso de Agua or PADUA). PADUA has the objective to preserve the productivity and competitiveness of irrigation districts through the permanent buyback of water rights. PADUA tries to match the demand with the availability of water under different hydrologic conditions. From 2004 to 2006 the program bought back 130 million of m³ water. Additionally, it validated the related water rights. The program was a success because it increased the mean supply and reliability of delivery of water, making the system overall less vulnerable. When implemented in agricultural production areas supplied by underground water, PADUA is relatively effective in enhancing the sustainability of the country’s overexploited aquifers primarily because the Program withdraws concession titles from the market, effectively lowering the total amount of water extracted. Monitoring though makes such programs very complex to fully implement, particularly in areas with a large number of underground wells that are owned by private agents.

While significant amount of resources have been invested in the Program, the evaluation of its effectiveness has been hindered by the lack of adequate indicators, lack of monitoring, and slow registration process which impose high transaction costs. The existence of illegal wells further limits the overall success of such Programs. Even so, an assessment carried out by the UN Food and Agriculture Organization (FAO) in 2004 (FAO-SAGARPA, 2005) concluded that “… the implementation of PADUA in the irrigation districts which rely on surface water contributes to reducing the degree of oversizing; guaranteeing the water supply for agricultural users; and saving water to achieve the resource’s sustainability.” More recently, other initiatives have been

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61 For example, the Water Banks could become some sort of water rights “corridor.” Either through a voluntary waiver or through a bailout, the Water Banks could temporarily collect these water rights and reassign them in conformity with the regulatory rules. The Water Banks would not be buying rights—in breach of the Constitutional rules—but rather, these Banks would be managing the rights and reassign them in accordance with efficiency, equity, and sustainability objectives. In this way, the Water Banks could play a valuable role in bringing closer together and coordinating the demand and supply of water rights. The revenues derived from these transactions could be channeled to a Water Fund set up to finance projects aimed at, for instance, reducing the overexploitation of aquifers or promoting the efficient use and conservation of water.
proposed within CONAGUA. One of those seeks to incorporate a mechanism similar to the clean development mechanism but in the water sector (Freig, 2011).

CONAGUA has recently started a new initiative to promote water bonds (H20 Bonds). This instrument could be implemented once the necessary conditions for institutionalizing a formal water market in Mexico have been created. The Bonds would promote water conservation and encourage users to invest in the modernization and technological upgrading of their parcels, so that optimum levels of exploitation may be reached.

The proposed scheme works is similar to instruments being used in the United States which involve tradable coupons entitling their owner to discharge effluents into water bodies under regulation of quantity and quality of the discharge. A secondary market has developed around these coupons.

In a second stage, the basic principle is to reward the users who save water through a non-monetary instrument that could be exchanged for cash at a later stage. Through its River Basin Organizations, CONAGUA would act as the referee for similar Water Bond market transactions. Users would have the right to transfer their water savings to other users, provided their total consumption is below a specific water user efficiency parameter; the latter would vary according to crop grown and the type of irrigation system used. The standards to be developed would have to be recognized by all participants in the scheme.

In the final implementation stage, legal amendments would be required to set deadlines to be met by each category of users for reaching the maximum level of water consumption.

**Figure 9: Water Bonds According to Freig (2011)**

Replicating the CDM global system for a national water system, the roles and functions could be:

<table>
<thead>
<tr>
<th>Use (Developer)</th>
<th>Authorized Third-Party (DOE)</th>
<th>CONAGUA (JEMDL)</th>
<th>CONAGUA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
<td><strong>Validation</strong></td>
<td><strong>Report</strong></td>
<td><strong>Verification</strong></td>
</tr>
<tr>
<td>• Water-Saving Project Design Document</td>
<td>• Preliminary review by an authorized who is certified and previously accredited</td>
<td>• Focus on the broader aspects of the project</td>
<td>• Periodic monitoring and verification (i.e., each fiscal year) to verify the continuity of the assumption that gave rise (investment) to the increasing efficiency of water volume.</td>
</tr>
<tr>
<td>• In standard format</td>
<td>• Thorough review to ensure that the project adheres to the operating rules and methodology</td>
<td>• Resolution by CONAGUA for.</td>
<td></td>
</tr>
<tr>
<td>• In compliance with pre-approved methodologies</td>
<td>• Estimation of water volume reduction</td>
<td>• The granting of the interruption for the expiration of untapped volumes</td>
<td></td>
</tr>
<tr>
<td>Rationale for:</td>
<td></td>
<td>• The authorization to exchange water bonds</td>
<td></td>
</tr>
<tr>
<td>• Baseline</td>
<td>• Strict review of supporting documentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Additionality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Estimation of water volume reduction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Monitoring plan</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The real and effective collaboration between users, experts and CONAGUA will be determinant to design a system and streamlined approval process that is adequate, equitable, meets the needs of both parties and provides effective solutions both in costs and approval times.

Source: From Freig (2011).
allowed. Failure to meet the deadline or exceeding the consumption cap, would require the user to purchase H2O Bonds at a price dictated by CONAGUA. Private players could be encouraged to invest in these special bonds if the latter could be used to pay for certain taxes and for buying water-saving equipment.

The aforementioned initiatives have similar characteristics. It is clear that the water rights market needs to be strengthened as well as CONAGUA’s authority to establish a proper certification system. Implementing these initiatives will require modifications to existing legal frameworks and improvements in the monitoring systems used to estimate water consumption. The ideas for strengthening the water market and creating Water Bonds are promising, and should be promoted as a medium-term initiative for the SFA.

### 6.3 Directing the Income Generated by Water Use Rights

During CONAGUA’s first five institutional years (1989–94), its fiscal revenues from the payment of water use rights and other related levies increased to 90 percent of its budget. Resources derived from the collection of levies have supported contracting of external credits for a total amount of more than US$2 billion.

The bulk of the levies collected for the use or usufruct of national waters comes from industrial, commercial, and water service users (between 70 and 80 percent). The collection of levies associated with hydro-power generation, which has decreased from 8 to 6 percent, strongly depends on annual precipitation conditions. The collection associated with urban-public use has gradually increased, due to a series of incentives to ensure that water utilities meet their fiscal obligations. Almost 58 percent of total collection comes from users in three water-administrative regions: Río Bravo, Lerma-Santiago Pacifico, and Valley of Mexico. Effectively, there are significant cross-subsidies to the irrigation and water supply and sanitation subsectors. Cross-subsidies also exist between different regions of the country.

Even though the collection of these water use fees has represented a large percentage of the budgets allocated to CONAGUA, the current concept has strayed from its original concept in several ways:

62 The smaller the rainfall, the smaller the volumes used to generate hydro-power.

### Figure 10: Composition of Levies

The budgetary allocation required to ensure proper water resources management (monitoring networks, management of the concession regime, programs to restore the balance in aquifers and watersheds) is currently way below the needs.

The existing budgetary allocations are destined for investment programs in support of irrigation and water supply and sanitation development programs and projects rather than on management of the national waters.

The LFD earmarks part of the water levies collected for CONAFOR (Mex$300 million) and water supply and sanitation utilities but it should also earmark resources for the water management. A back of the envelope analysis suggests that earmarking 30 percent of the revenues stemming from water use rights would enable to strengthen and modernize the water management systems.

### 6.4 Legal Reform

It is acknowledged that the level of investments required for the development of new infrastructure, rehabilitation of existing one, and operation and maintenance, are much higher than the current federal resources allocated to CONAGUA. But it is important to ensure that the national waters are managed to ensure the long terms sustainability and to provide all the necessary services. The PEF does not consider the financial needs to manage and conserve the national waters. It is highly recommended that discussions be initiated with SHCP as well as Congress to highlight the consequences and long term impact of failing to cover those financial needs associated with the management of national waters (in terms of quality and quantity, surface and groundwater). CONAGUA could propose the financial needs required to ensure long term water management that would ensure that the main objectives, as established by its National Water

### Table 8: Collection by Type of Use (in 2007 Millions of Pesos)

<table>
<thead>
<tr>
<th>Use</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Use*</td>
<td>5,565.0</td>
<td>5,547.8</td>
<td>5,261.8</td>
<td>5,362.5</td>
<td>4,952.4</td>
<td>4,847.5</td>
<td>4,609.0</td>
<td>4,948.9</td>
</tr>
<tr>
<td>Urban-public</td>
<td>486.3</td>
<td>459.4</td>
<td>1,205.9</td>
<td>1,722.1</td>
<td>1,683.8</td>
<td>1,802.6</td>
<td>1,589.8</td>
<td>1,710.2</td>
</tr>
<tr>
<td>Power plants</td>
<td>558.3</td>
<td>451.1</td>
<td>415.0</td>
<td>349.6</td>
<td>386.7</td>
<td>388.4</td>
<td>453.6</td>
<td>435.2</td>
</tr>
<tr>
<td>Spas and recreation centers</td>
<td>24.6</td>
<td>25.5</td>
<td>24.1</td>
<td>11.1</td>
<td>19.8</td>
<td>20.4</td>
<td>20.3</td>
<td>19.5</td>
</tr>
<tr>
<td>Aquaculture</td>
<td>0.2</td>
<td>0.5</td>
<td>0.4</td>
<td>0.9</td>
<td>0.6</td>
<td>0.5</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>6,634.4</td>
<td>6,434.3</td>
<td>6,907.2</td>
<td>7,436.2</td>
<td>7,043.3</td>
<td>7,059.4</td>
<td>6,673.0</td>
<td>7,114.3</td>
</tr>
</tbody>
</table>


*Note:* Total may differ from the sum of the individual figures as a result of rounding.

*Refers to any use other than those specified.*
Program (Programa Nacional Hídrico or PNH) are met.

An amendment to the LFD, as part of the medium-term initiatives of the SFA, would allow turning the revenues collected by CONAGUA into financial support for the introduction of the financing mechanisms that would allow to: (i) secure support of the activities related to water management, and (ii) serve as an effective counterpart for the implementation of schemes that favor the mixing of public and private resources, directly or through their securitization.
There are multiple challenges in the financing of water supply and sanitation services:

- **Lack of financial viability of most water utilities.** State laws proclaim the obligation to set tariffs that allow for full cost recovery. In practice, the tariffs, which must be approved by the local congresses, with some exceptions, do not fully cover real costs. Federal support, based on the current Operating Rules of federal supported programs, is lax when it comes to ensuring a proper tariff structure. The low efficiency of the water utilities substantially contribute to the financial deficit.

- **Budget Cycle of Federal Support.** The existing one-year budgetary cycle imposes severe constraints in the design and implementation of infrastructure projects.

- **Competing Operating Rules of Federal Programs.** The existing rules for the different federal programs in water supply and sanitation are not sufficiently linked to broader strategic objectives or results regarding financial efficiency and sustainability and the rules across programs are often with different types of requirements, some of them lax.

- **Lack of Solvency of the Majority of Water Utilities.** The vast majority of the water utilities and municipalities in Mexico do not have a sufficiently high credit rating that will allow them to access non-public sources of funding.

The last challenge is the result of a complex set of institutional interactions summarized in Table 9. For each challenge, the Table depicts, using Harvey Balls, the respective weight and responsibilities of the main players. On a scale from 0 (white or empty Harvey Ball) to 100 percent (grey or full Harvey Ball) the circles illustrate the relative influence that each player and framework has in making adjustments to address a particular problem. The table depicts that CONAGUA has enough space to act and improve in different areas, but other factors and players also come into play. A lack of willpower from utilities, the existing regulatory framework, and several political factors are additional external challenges that are not necessarily under the control of CONAGUA.

The first salient point of this analysis is that the excessively low tariff levels are at the heart of the financial problems faced by utilities. This has made it necessary to increase the subsector’s revenues through taxation: either in the form of fiscal resources channeled directly through the PEF or the States’ expenditure budgets, or through other mixed financial programs such as PRODDER, APAZU, PROTAR, PROSANEAR, and PROMAGUA (PROME), or special funds like the 1928 Trust Fund (Valley of Mexico).

The proliferation of financial mechanisms creates a perverse incentive for the water utilities (or the municipalities) not to raise because some of these programs provide capital and operation and
maintenance subsidies that are not contingent upon having a good financial standing nor on ensuring that tariffs cover costs. The existence of numerous federal programs with different overlapping and competing Operating Rules undermines the efficiency in the allocation of public funds.

Most State laws stipulate that tariffs should be set to ensure the recovery of capital costs and operation and maintenance. However, it is the same State Congress that enacts the law that breaches it by not enforcing municipalities’ proper tariffs. In other cases, as in the State of Mexico, Congress does set the tariffs, but each municipality can adjust them and they usually do so but downwards. The main challenge on this issue is on how to create an incentive that is politically and socially feasible and that can be properly enforced.

7.1 Program for Reimbursing Water Levies (PRODDER)

PRODDER was a program established to address the low levels of payment of levies from the water utilities and municipalities, and the lack of regulatory and enforcement capacity from CONAGUA. Adhering to PRODDER implied the cancellation of the debt and the implementation of an incentive mechanism known as “peso sobre peso” under which the levies recovered by CONAGUA could be returned to the utility on the condition that these resources were invested in activities that would improve efficiency. A similar incentive currently exists related to the effluent discharge fees that could be reimbursed if used by utilities to promote wastewater treatment.

The success of PRODDER is mixed; it has promoted the increase in revenues but its impact on improving the efficiency of water utilities is less evident. The following factors come into play:

- Most of the projects implemented under PRODDER have been formulated with the objective to cover the operational and rehabilitation needs of water systems and, sometimes, the expansion of secondary networks. As such, these projects were not designed to improve efficiencies.
- Investments are still designed under a yearly budget cycle. Efficiency improvement programs can only be effective if they are designed as long-term programs.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Main players</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient rates</td>
<td>Water utilities</td>
</tr>
<tr>
<td>Insufficient subsidies</td>
<td></td>
</tr>
<tr>
<td>Limited private participation</td>
<td></td>
</tr>
<tr>
<td>Poor control over results</td>
<td></td>
</tr>
</tbody>
</table>

Table 9: Financial Challenges in Water and Sanitation

Source: Self compilation.
Note: The relative weight each player and factor has in addressing a specific issue is depicted graphically by the surface area of the circle that is filled in blue.
The Program does not contain indicators that can monitor improvements in efficiencies.

The reimbursement of the fees from CONAGUA to the utilities is a very lengthy process with high administrative costs. The administrative procedures are not adequate.

An aspect to consider is whether PRODDER is the proper mechanism to promote improvement in efficiencies of the water utilities. Lack of payment from the utilities reflects the unsustainable financial conditions that exist in the sector, primarily caused by very low tariff levels. Under these circumstances, CONAGUA could condition the reimbursement of the fees to the formulation, by utilities, of a financial and institutional improvement long-term plan with activities and investments to ensure financial sustainability. A series of indicators would be monitored and will define the amount of the support based on improvements.

Two additional important considerations: (i) Redesigning PRODDER with a medium-term vision based on the capacity to allocate a multi-annual flow of resources that will be disbursed against a series of performance indicators; and (ii) the legal and political feasibility of presenting a draft amendment to the LFD.

Increasing the value of water use rights under the premise that the levies charged would still be reimbursed to the water utilities would not improve CONAGUA’s finances. Water use fees should be increased until they equal their opportunity cost.

7.2 Bulk Water

CONAGUA is responsible of providing bulk water only to the Metropolitan Area of the Valley of Mexico and to the industrial areas serviced by the Uspanapa-La Cangrejera aqueduct in Veracruz and the Lázaro Cárdenas aqueduct in Michoacán. These two aqueducts operate under relatively healthy conditions; there are issues with the operation, maintenance, and expansion, if necessary, of the Cutzamala System and the well systems that make up the Immediate Action Plan (PAI). However, most utilities are not paying for the required costs of these bulk water and for those who pay, the cost is below the real cost. Modifying this behavior and adjusting the costs is coupled with political difficulties.

In the case of the State of Mexico, there is a double payment scheme for bulk water: one collected by CONAGUA and one collected by the Water Commission of the State of Mexico (Comisión de Agua del Estado de México or CAEM) from the municipal water utilities, who are in a precarious financial situation. In the case of the State of Hidalgo, the lack of payment (or the non-collection) derives from sociopolitical considerations related to the fact that the state of Hidalgo has supply sources (wells) that serve the Metropolitan Area of Mexico City. The non-collection is perceived as compensation. Therefore, incentives will need to aim at improving the efficiency of the water utilities, as well as at programs for rationalizing the consumption of the final users.

For those utilities that produce their own water, the incentive of programs that compensate for efficiency improvement and water savings should be explored.

7.3 Water Supply and Sanitation Services

Several of CONAGUA’s programs focus on improving efficiency. Among these PROME, and some measures included in PROMAGUA and PRODDE. In this context, two additional types of incentives are highlighted and proposed: (i) compensation programs based on
efficiency-improvement results; and (ii) micro-metering and tariffs in line with consumption. It is also recommended to assess the APAZU and PROSSAPYS programs, given their importance for extending coverage of water supply and sanitation systems.

A first reflection would consider whether new incentives are needed in this area or whether the ones in place are just not working appropriately with regard to coverage (who has access to these programs) and effectiveness. PROMAGUA, and possibly PROME as well, only apply to a limited number of water utilities, leaving the rest unattended. It would be worth considering further upon the way these programs combine different funding sources; whether the private participation schemes that have been implemented or are being implemented are appropriate; and whether other schemes could lead to better results, in light of experiences in other countries.

An important aspect to be considered is that of the provision of services in rural areas. In this context, many valuable experiences (community management, local and regional companies) would be worth considering. PROSAPYS could be strengthened and consolidated.

**Wastewater Treatment**

This matter has been strongly supported by CONAGUA (PROTAR, PROSANEAR, FONADIN,) but it would still be important to evaluate these programs and assess their effectiveness. Given the lack of strong monitoring and evaluation programs, a challenge will be to assess their contribution towards reduction of pollution in surface and groundwater.

**Water Efficiency Public Policy**

As part of a new water efficiency policy drafted by CONAGUA with the support of the World Bank, a section on tariffs and subsidies was formulated. This policy defines the mechanisms and incentives to progressively fine-tune the degree of cost recovery through tariffs, and the subsidies that would allow reaching balanced revenue and expense flows. Subsidies would be established in a focused way based on efficiency and social criteria.

![Figure 11: Financing Policy in Water and Sanitation](image-url)

Source: Author’s production.
Chapter 5

[597x16]Chapter 5

Box 1. Tariffs and Subsidies

The tariff policy must take into account three basic aspects: (a) the efficient cost of the service provision; (b) the subsidy required for the low-income population; and (c) the financing mechanism of the subsidy.

The tariff policy is directly linked to the financial policy. Costs that are not recovered through tariffs must be covered by the government through taxes and/or through the resources it receives from CONAGUA stemming from water use and effluent discharge fees. The amount to be paid by the government and CONAGUA to water utilities must be defined in advance, based on a multiannual plan that specifies the service goals, total costs, and the cost recovery through tariffs as well as the resources to be provided by the Government, which derive from taxes, duties, products, and water use.

The tariff must reflect, as much as possible, the total cost of the provision of water and sanitation services. Sometimes this is not possible due to the socio-economic conditions of some users and the high cost of delivering these services, above all the result of obtaining new water supply and wastewater treatment sources. In these cases, the federal government must define a subsidy policy in order to help the low-income population, together with a financing mechanism that compensates for the subsidy payments, and a financing policy based on taxes, aimed at paying for the investments not covered by tariffs.

The policy of subsidies implicit in the tariffs must be targeted exclusively at the lowest-income users. The identification of users who should benefit from the subsidy should be based on a detailed study of the socioeconomic conditions of the population. This study should include clearly defined objective and transparent criteria for the classification of the population, as well as reliable updating mechanisms. The consumptive uses of water that should receive a subsidy should coincide with the minimum level for subsistence and the corresponding tariff charged should be enough to at least cover operational costs and service maintenance. Some practical examples of identifying users who should benefit from a subsidy are: (i) Chile, where selection criteria are based primarily on the level of income and consumption; (ii) Colombia classifies users according to their housing situation and location. In both countries, the subsidy compensation mechanism is clearly established. In Chile subsidies are compensated with federal government tax resources, while in Colombia they are compensated through cross-subsidies and/or municipal government tax resources.

The implementation of the tariff policy will not succeed if it does not go hand-in-hand with mechanisms that provide incentives for an efficient service provision and efficient commercial management together with high collection, invoicing, and measurement rates.

Since its establishment in 1989, CONAGUA has promoted different policies to meet the financial challenges faced by the water sector given the rising demands resulting from a growing population and a higher rate of economic growth. CONAGUA has gained much experience in the design and implementation of financial instruments that would comply with the long-term vision objective in water to achieve the sustainable and equitable management of water.

Based on the experience acquired and the current legal framework, a dialogue was started with a large number of interested parties to discuss how best to structure and implement the SFA. As a result of this dialogue, a conceptual framework was developed for the various components of the SFA and CONAGUA’s legal role in this context as derived from the LAN, which would allow formalizing and institutionalizing the SFA in the short term. It was argued that CONAGUA has the technical and administrative capacity to add value to the experience accumulated over more than 20 years by formalizing the SFA, through the joint efforts of its specialists and the financial and fiscal authorities. To this end, a series of steps and actions are suggested.

The second part of our work consisted in identifying a series of initiatives that could be incorporated into the SFA, alongside existing experiences. Two of these initiatives aim to provide additional mechanisms to promote additional activities for the modernization and technological upgrading of irrigation systems; two other initiatives aim to support programs in natural resources response and prevention. These initiatives undoubtedly require further analysis, in order to determine their feasibility and a roadmap for their implementation, as well as a methodology to monitor and evaluate their potential results and impacts.

One of the core issues that must be addressed is the provision of additional support for the modernization and technological upgrading of the irrigation districts and units, including the parcel level. Despite the efforts made to date, especially through the programs and mechanisms instituted by CONAGUA and SAGARPA, there are still inherent limitations associated with the lack and discontinuity of budget resources, and with access to financing and producers’ guarantees. The analysis has shown that FONAGA’s guarantee scheme, strengthened with additional resources provided by CONAGUA, makes financing more accessible and takes advantage of the management structure of the financial intermediaries (especially from outside the banking sector), thereby increasing the number of secured
loans. However, FIRA only operates as a second-tier bank and there are no limits to the net brokerage margin; as a result, the interest rates can be high, having a negative impact of the financial standing of farmers.

This study recommends the creation of the Water Fund, funded by a line item of the expenditure budget of CONAGUA and SAGARPA, which would direct its funds to long-term projects through private trust funds to be set up per project or per irrigation district or unit. The report outlines the Water Fund’s structure and functioning in order to conceptualize, plan, implement, finance, carry out, supervise, evaluate, and control the irrigation modernization and technological upgrading projects. It also analyzes the positive impact the Water Fund would have on the availability of budget resources and other financing instruments, and its possible limitations; the latter mainly suggest the need to promote the Fund’s establishment with the support of the Treasury and key actors of the legislative branch.

A second option that has been explored is the PPP, which, given its structure, can have present-value resources that may be used to pay for services provided by an investor; the latter receives a compensation during the service period. The report describes the general features of this type of scheme when applied to the modernization and technological upgrading of irrigation districts and units, as well as the actions required for its implementation. This option has been analyzed jointly with CONAGUA specialists and representatives from user associations, who agreed it was worthwhile promoting and broadening this type of scheme, given the positive experiences in other countries.

The combination of the two instruments proposed would enhance the effectiveness and efficiency of programs and projects funded through financing schemes in order to accelerate the modernization and technological upgrading of irrigation systems at the national level. It is important to mention that the recent promulgation of the LAPP has given the aforementioned schemes a stronger legal footing to facilitate their implementation. However, certain requirements cannot be met right away. It is recommended that CONAGUA selects some potential pilot projects in which different PPP schemes could be developed and tested in order to assess the feasibility of scaling up the approach.

Because of its geographical location, every year Mexico is affected by the impact of extreme hydro-meteorological events, which seem to be intensifying due to climate change. In order to organize the Federal government’s response to these events, and coordinate with States and Municipalities, the National Civil Protection System was established. For over a decade, the country has had the FONDEN which has channeled resources to disaster-stricken areas throughout the country. However, in view of the investments needed to duly address the effects of climate change, new financing instruments should be devised so that future events can be avoided as much as possible and their impact mitigated. To this end, it is critical that State and municipal governments participate more decisively in the financing of emergency works and response, taking into account their specific risk and vulnerability conditions.

This report proposes two instruments that would strengthen the coordination of federal and state-local authorities, through the permanent and institutional allocation of resources to address the effects of climate change. The first one is the creation of a Contingent Line for Priority Investments to cover short-term investments and expenses, especially to meet the financial needs of CONAGUA for emergency response. The second instrument is a Climate Change Investment Fund that would promote
medium- and long-term investments, necessary to offer better protection to the most vulnerable settlements in case of extreme events related to climate change.

The implementation of the above two financing schemes requires political will at all levels (local, state and federal). This will not be easily secured. However, immediate actions are necessary to duly address the challenges of our times. In addition to FONDEN’s natural vocation to focus on emergency response, the proposed financial instruments would be designed to fund larger-scope investments to rebuild the existing infrastructure to mitigate the impact of future events. They would also be used to fund larger and better infrastructure as well as preventive actions to address the effects of climate change. This is certainly possible: duly guaranteed financial instruments and institutional funding should help leverage investment funding and, consequently, multiply the volume of resources available to the water sector.

At the end of part two, the report looked at the revenue potential derived from the collection of water use and wastewater discharge fees, without proposing specific initiatives. This revenue source is considered one of the SFA’s strategic components, both to ensure continuity of the water infrastructure projects and programs and their associated services, and the sustainability of the actions.

Finally, the report also covered the financial challenges in water supply and sanitation and presented formulation and implementation of a public policy on subsidies and tariffs for the medium and long term in the framework of the SFA. This policy would define the mechanisms and incentives to gradually fine-tune the degree of cost recovery through tariffs, and the subsidies that will ensure revenue and expenditure flows are balanced. The subsidies would be clearly defined and be based on efficiency and social criteria.

The prospective efforts that were analyzed in the course of this study underline the existing financial challenge and the constraints in meeting the long-term objectives in water. It must be recognized that CONAGUA has developed various instruments to complement the federal government’s efforts, resulting in growing participation of citizens—as users of water and related services or as investors. The experience accumulated over more than 20 years together with the evolution of the legal frameworks offer a more optimistic view of what is attainable in terms of financing. The analyses also showed that as a result of the complexity and diversity of financing schemes for programs, projects, and actions in water, there has been a lack of coordination and a duplication of efforts. These, in turn, reduce the efficiency in the allocation and use of these scarce financial resources.

The current legislation lays out the foundation to organize the myriad of financial instruments currently available, and improve their effectiveness and efficiency; this can be accomplished by formalizing the SFA. This requires the development and implementation of a strategy for the SFA under the conceptual framework presented in this document.

The specific initiatives presented this report have been discussed with specialists from CONAGUA and with the users of irrigation districts and units. These discussions have led to the recommendation that these initiatives be put into practice, possibly with World Bank support, through pilot projects to confirm their feasibility and improve on their original design.

CONCLUSIONS


Castalia. 2008. “México. Estudio de Evaluación de los Instrumentos Financieros para el Sector de Agua y Saneamiento”. Informe Final preparado para el Banco Mundial. Washington, DC, USA.


