OECD Studies on Water

Making Water Reform Happen in Mexico

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Foreword

Water is not only the source of life for human beings but it has also always played a central role in the economic, social and environmental development of countries. With the looming challenge of climate change, governments are increasingly recognising the urgency of ensuring the sustainable management of water resources. Successful water policies can set a strong basis for improving the life of all citizens, and the 2030 Water Agenda provides a solid start to this process in Mexico. There is now an opportunity for the new administration to make Mexico a leading example of successful water reform in OECD and Latin American countries.

The report *Making Water Reform Happen in Mexico* is the first OECD Country Review on water. It provides evidence-based policy advice on how to move forward water reform in Mexico and defines the priority areas on which the government needs to focus to translate ambitious policy objectives into action. Building on a one-year multi-stakeholder policy dialogue carried out in 2012, the report provides key insights drawing upon OECD expertise on governance, economics and financing of the water sector, as well as the experience of four countries heavily engaged in water reforms (Australia, Brazil, Italy and United Kingdom).

Several Mexican basins are under severe water stress. The quality of rivers, lakes and aquifers is at stake. Safe drinking water and adequate sanitation need to be provided to an additional 40 million inhabitants by 2030, while the country is increasingly exposed to damages from floods, droughts and hurricanes. To address these challenges, Mexico needs to invent its own model for water governance and bring more flexibility into its water policies to cope with future challenges. It also needs to pay more attention to the cost-effectiveness of water-related public spending, and address regulatory gaps in service provision.

The OECD has been a strong advocate for getting the basics right to meet the water reform challenge. Effective governance, sustainable financing, sound regulatory frameworks, integrated river basin management and policy coherence lie at the heart of this challenge. OECD has long emphasized that one size doesn't fit all situations and that countries need to develop home-grown solutions. But as was highlighted at the 6th World Water Forum in Marseille in 2012, effective policy solutions to the water crisis do exist and are relatively well-known. The real challenge lies in making reform happen, and implementing those solutions known to be the best fit, the most appropriate, not merely those possible today.

Lessons from previous OECD work on *Making Reform Happen* show the importance of a whole-of-government approach that sets the correct incentives to change behaviours. It is essential to manage risks and trade-offs and to define clear and time-bound targets backed up by financial plans. Sequencing and prioritising is critical for success, as is monitoring of implementation progress. Finally, unravelling historical legacies and

sharing information are key requirements for breaking down barriers and making water reform happen.

The OECD report *Making Water Reform Happen in Mexico* highlights a number of policy levers that the new administration may wish to consider for setting up a cohesive and cost-effective water policy framework. Lessons from Mexico will undoubtedly enrich the wealth of experience across both OECD and non-OECD countries. OECD looks forward to contributing to the important task of designing, promoting and implementing better water policies for better life in Mexico.

Angel Gurría
OECD Secretary-General

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This report is the outcome of a one-year policy dialogue between OECD and CONAGUA officials, as well as a wide range of Mexican stakeholders. It builds on the results of a previous policy dialogue on framework conditions for private sector participation in Mexico's water infrastructure, led by the Investment Division of the Directorate for Financial and Entreprise Affairs. Key findings of the report were discussed at a public seminar "Making Water Reform Happen in Mexico" held in Mexico City, Mexico on 11-13 September 2012, and the Secretariat is grateful to all participants for their valuable comments and inputs. The policy dialogue engaged four high-profile peer-reviewers to share experiences from their countries, whom the Secretariat would like to thank warmly: Philip Fletcher (Office for Water Services, England and Wales), Antonio Massarrutto (Advisor to the National Authority on Energy and Gas, Italy), Ney Maranhão (National Water Agency, Brazil) and Kerry Olsson (National Water Commission, Australia).

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Acronyms and abbreviations

ACT	Australian Capital Territory - Australia
ACU	Association of Irrigations Users (*Asociación Civiles de Usuarios*)
AFD	French Development Agency (*Agence française de développement*)
AGBAR	Barcelona water company (*Aguas de Barcelona*) - Spain
ANA	National Water Agency (*Agencia Nacional de Aguas*) – Brazil
ANA	National Water Authority (*Autoridad Nacional del Agua*) – Peru
ANEAS	National Association of Water and Sanitation Utilities (*Asociación Nacional de Entes de Agua y Saneamiento*)
ANUR	National Association of Irrigation Users (*Asociación Nacional de Usuarios de Riego*)
APAZU	Urban Potable Water and Sewerage Program (*Programa de Agua Potable, Alcantarillado y Saneamiento en Zonas Urbanas*)
ARD	Agriculture and rural development
ASF	Superior Auditor of Mexico (*Auditoría Superior de la Federación*)
BANDAS	National Bank on Surface Water Data (*Banco Nacional de Datos de Aguas Superficiales*)
BANOBRAS	National Works and Public Services Bank (*Banco Nacional de Obras y Servicios Públicos*)
CAALCA	Water Center for Latin America and the Caribbean
CAASIM	Commission on Water, Sewerage and Inter-municipal Services (*Comisión de Agua y Alcantarillado de Sistemas Intermunicipales*) – state of Hidalgo
CABSA	CArbon, Biodiversity and Agro-forest systems Capture (*Captura de Carbono, Biodiversidad y Sistemas Agroforestales*)
CAP	Common agricultural policy
CBA	Cost-benefit analysis
CENAPRED	National Centre for Disaster Prevention (*Centro Nacional de Prevención de Desastres*)
CFE	Federal Electricity Commission (*Comisión Federal de Electricidad*)
CIAPACOV	Inter-municipal Commission for the Provision of Water and Sanitation Services (*Comision Intermunicipal de Agua Potable y Alcantarillado de los Municipios de Colima y Villa de Alvarez*)
CICC	Inter-ministerial Commission on Climate Change (*Comisión Intersecretarial de Cambio Climático*)
CICM	College of Civil Engineers of Mexico (*Colegio de Ingenieros Civiles de México*)

CIDECALLI	Centre for Demonstration and Training in Rainwater Harvesting (*Centro Internacional de Demonstración y Capacitación en Aprovechamiento del Agua de Lluvia*)
CLG	Department for Communities and Local Government – United Kingdom
CLICOM	Computerised Climate System (*Sistema Clima Computarizado*)
COAG	Council of Australian Governments – Australia
COD	Chemical oxygen demand
CODIA	Conference of Ibero-American Water Directors (*Conferencia de Directores Iberoamericanos del Agua*)
COFEMER	Federal Commission for Regulatory Improvement (*Comisión Federal de Mejora Regulatoria*)
COFEPRIS	Federal Commission for the Protection against Sanitary Risks (*Comisión Federal para la Protección contra Riesgos Sanitarios*)
COLMEX	College of Mexico (*Colegio de México*)
CONABIO	National Commission for Biodiversity, Knowledge and Use (*Comisión Nacional para el Conocimiento y Uso de la Biodiversidad*)
CONACyT	National Council of Science and Technology (*Consejo Nacional de Ciencia y Tecnología*)
CONAFOR	National Forestry Commission (*Comisión Nacional Forestal*)
CONAGO	National Governor's Commission (*Conferencia Nacional de Gobernadores*)
CONAGUA	National Commission of Water (*Comisión Nacional del Agua*)
CONANP	National Commission of Natural Protected Areas (*Comisión Nacional de Áreas Naturales Protegidas*)
CONEVAL	National Evaluation Council of Social Development Policy (*Consejo Nacional de Evaluación de la Política de Desarrollo Social*)
COPLADE	State Committee for Planning and Development
CORESE	Commission of Regulation and Follow-up (*Comisión de Regulación y Seguimiento*)
COTAS	Technical groundwater committees (*Comités Técnicos de Agua Subterráneas*)
DECLARAGUA	System for Declaration and Online Payment (*Sistema de Declaraciones y Pago Electrónico*)
DEFRA	Department for Environment, Food and Rural Affairs – United Kingdom
DPSABDR	Reimbursement of Payments for Bulk Water Supply in Irrigation Districts
DUIS	Sustainable and Integrated Urban Development Program (*Desarrollos Urbanos Integrales Sustenable*)
ERIC	Quick finder on climate information (*Extractor Rápido de Información Climatológica*)
EU	European Union

EVALUA	Evaluation Council for Social Development (*Consejo de Evaluación del Desarrollo Social*) – Federal District of Mexico
FIEF	State Infrastructure Fund (*Fondo de Infraestructura para las Entidades Federativas*)
FONADIN	National Infrastructure Fund (*Fondo Nacional de Infraestructura*)
FONDEN	Natural Disaster Fund (*Fondo de Desastres Naturales*)
FONREGION	Regional fund (*Fondo Regional*)
FOPREDEN	Fund for Natural Disaster Prevention (*Fondo para la Prevención de Desastres Naturales*)
GAW	Government Agreement on Water – The Netherlands
GWP	Global Water Partnership
HC	Hydraulic Confederation
IBWC	International Boundary and Water Commission (*Comisión Internacional de Límites y Aguas*)
IDB	Inter-American Development Bank
IIUNAM	Engineering Institute of the National University of Mexico (*Instituto de Ingeniería de la Universidad Nacional Autónoma de México*)
IMCAS-X	Initiative for Citizens Monitoring of Water and Sanitation in the Metropolitan Area of Xalapa (*Iniciative de Monitoreo Ciudadano de Agua y Saneamiento de la Zona Metropolitana de Xalapa*)
IMTA	Mexican Institute of Water Technology (*Instituto Mexicano de Tecnología del Agua*)
INE	National Institute of Ecology (*Instituto Nacional de Ecología*)
INEGI	National Institute of Statistics and Geography (*Instituto Nacional de Estadística, Geografía e Informática*)
IPTARI	Inventory of Wastewater Treatment Plant (*Inventario de Plantas de Tratamiento de Aguas Residuales Industriales*)
IUA	Irrigation users associations
IWRM	Integrated Water Resource Management
JIRA	Inter-municipal Board for Integrated Management of the Ayuquila River Basin (*Junta Inter-municipal del Medio Ambiente para la Gestión Integral de la Cuenca del Rio Ayuquila*)
KPI	Key performance indicators
MXN	Mexican peso
NARUC	National Association of Regulatory Utility Commissioners – United States
NGO	Non-governmental organisation
NWC	National Water Commission – Australia
NWI	National Water Initiative – Australia
NWL	National Water Law (*Ley de Aguas Nacionales*)
OECD	Organisation for Economic Co-operation and Development
OFWAT	Water and Regulation Authority – United Kingdom
O&M	Operation & maintenance

PAL	Clean Water Program (*Programa de Agua Limpia*)
PEMEX	Mexican Petroleum (*Petróleos Mexicanos*)
PES	Payment for Ecosystem Services
PHIT	Integrated Hydraulic Plan of Tabasco (*Plan Hidrico Integral de Tabasco*)
PIBAPI	Program of Basic Infrastructure for the Care of Indigenous People (*Programa de Infraestructura Básica para la Atención de los Pueblos Indígenas*)
PIDA	Programme of Infrastructure for Environmental Development (*Programa de Infraestructura para el Desarrollo Ambiental*)
PPP	Public-private partnership
PRODDER	Water Rights Tax Rebate Program (*Programa de Devolución de Derechos*)
PROFECO	Federal Consumers' Attorney (*Procuraduría Federal del Consumidor*)
PROFEPA	Federal Attorney for Environmental Protection (*Procuraduría Federal de Protección al Ambiente*)
PROMAGUA	Program for Water Supply, Sewerage and Sanitation in Urban Areas (*Programa para la Modernización de los Organismos Operadores de Agua*)
PROME	Water Utilities Efficiency Improvement Project (*Programa de Mejoramiento de Eficiencia de Organismos Operadores*)
PROSANEAR	Program for Wastewater Treatment (*Programa Federal de Saneamiento de Aguas Residuales*)
PROSSAPYS	Rural Waterworks Development Program (*Programa para la Sostenibilidad de los Servicios de Agua Potable y Saneamiento en Comunidades Rurales*)
PROTAR	Wastewater Treatment Program (*Programa de Tratamiento de Aguas Residuales*)
PUC	Public Utility Commission – United States
PSAH	Programme for the Protection of Hydrological Ecosystems (*Programa de Servicios Ambientales Hidrológicos*)
RBC	River basin council
RBO	River basin organisation
REPDA	Public Registry of Water Rights (*Registro Público de Derechos de Agua*)
RWP	Regional Water Program
SACMEX	System of Waters of Mexico City (*Sistema de Aguas de la Ciudad de México*)
SAGARPA	Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (*Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación*)
SAGE	Sub-basin Management Plan (*Schéma d'aménagement et de gestion des eaux*) – France

SALUD	Ministry of Health (*Secretaría de Salud*)
SDAGE	River Basin Management Plan (*Schéma directeur d'aménagement et de gestion des eaux*) – France
SE	Ministry of Economy (*Secretaría de Economía*)
SECTUR	Ministry of Tourism (*Secretaría de Turismo*)
SEDESOL	Ministry of Social Development (*Secretaría de Desarrollo Social*)
SEGOB	Ministry of the Interior (*Secretaría de Gobernación*)
SEMAR	Ministry of Marine (*Secretaría de Marina*)
SEMARNAT	Ministry of Environment and Natural Resources (*Secretaría del Medio Ambiente y Recursos Naturales*)
SENER	Ministry of Energy (*Secretaría de Energía*)
SFP	Ministry of Public Function (*Secretaría de la Función Pública*)
SHCP	Ministry of Finance (*Secretaría de Hacienda y Crédito Público*)
SIAPS	Information System on Drinking Water and Sanitation (*Sistema de Información del Agua Potable y Saneamiento*)
SIARCO	Water Information System for the Central-West Region (*Sistema de Información de la Región Centro Occidente*)
SIATL	Water-flows Stimulator (*Simulador de Flujos de Agua de Cuencas Hidrográficas*)
SICA	Water Quality Information System (*Sistema de Información de Calidad del Agua*)
SIG	Managerial Information System (*Sistema de Información Gerencial*)
SIGA	Water Geographic Information System (*Sistema de Información Geográfica del Agua*)
SIGMAS	Geographical Information System for Groundwater Management (*Sistema de Información Geográfico para el Manejo de Agua Subterránea*)
SIH	Hydrological Information System (*Sistema de Información Hidrológica*)
SIMAS	Saltillo water utility (*Sistema Municipal de Aguas y Saneamiento de Saltillo*)
SINA	National Water Information System (*Sistema Nacional de Información del Agua*)
SIRA	Regional Information System on Water (*Sistemas Regionales de Información sobre el Agua*)
SIPROIH	Information System on Water Infrastructure Projects (*Sistema de Información de Proyectos de Infraestructura Hidráulica*)
SIRNM	National Monitoring Network System (*Sistema de la Red Nacional de Monitoreo*)
SISAPS	Monitoring of Water and Sanitation Service Utilities Information (*Seguimiento de la Información de los Prestadores de Servicios de Agua Potable y Saneamiento*)
SISBA	Information System on Water Basin Services (*Sistema de Información de Servicios Básicos del Agua*)

SISP	Dam Security System (*Sistema de Seguridad de Presas*)
SIT	National Information System on Tariffs (*Sistema Nacional de Información de Tarifas*)
TSS	Total suspended solids
UNAM	National University of Mexico (*Universidad Nacional Autónoma de México*)
UNDP	United Nations Development Programme
WFD	European Water Framework Directive
WFS	Water Financing System
WIN	Water Integrity Network
WRM	Water resources management
WSS	Water and Sanitation Services
WUA	Water user association

Executive summary

In 2011, Mexico launched an ambitious 2030 Water Agenda to achieve, within the next 20 years, clean water bodies, balanced supply and demand for water, universal coverage and settlements safe from catastrophic floods. This strategic planning exercise shows clear political leadership on behalf of the Mexican government to design a long-term vision for the water sector. On the ground, though, making water reform happen is challenging, especially in Mexico where past experience has shown how difficult it can be to translate policy objectives into action. Although Mexico has a well-developed policy framework for water resource management in place, with a number of policy instruments and institutions, policy implementation is still uneven: 20 years after their creation, river basin councils are not fully operational, the regulatory framework for drinking water and sanitation is scattered across multiple actors, and harmful subsidies in other sectors (energy, agriculture) work against water policy objectives. To round out Mexico's policy framework, action is imperative to increase water productivity and the cost-efficiency of water policies, address multi-level and river basin governance challenges (in particular to bridge inconsistencies between federal and basin priorities), sequence and prioritise reform needs, and support greater policy coherence with agriculture and energy.

Mexico's reform challenge must address numerous areas, from access and quality, to water management institutions

Mexico is under severe water stress. Over the past 60 years, the amount of water available for each person has declined drastically due to population growth; furthermore, water is unevenly spread in Mexico, with more than three-quarters of the population living in regions with little water. And the situation is unlikely to improve if current water policy does not change. Indeed, it is estimated that during the next 20 years, Mexico will need to provide an additional 36 million inhabitants with drinking water services and 40 million inhabitants with sanitation services. The states facing the greatest challenges are Baja California, Chiapas, Mexico, Jalisco, Puebla and Veracruz. In this context, Mexico's challenge is to use the growing water reform momentum to create inclusive, integrated and coherent water policy. Moving forward under a business-as-usual scenario is not an option.

Water users in Mexico are vulnerable, and their vulnerability will increase in the coming decades, especially in the Lerma and Grande river basins. Addressing this means, in part, improving the quality of rivers, lakes and aquifers in Mexico. This task has been a major challenge throughout the country because surface and groundwater quality is threatened by pollution loads from point and diffuse sources, and insufficient attention to wastewater discharges. Currently, 91.3% of the population has access to drinking water services, and 89.9% has sanitation coverage. According to the 2030 Water Agenda, between 1980 and 2007, floods, hurricanes and droughts affected more than 8 million

people and caused MXN 130 billion of damages. In 2010 alone, hurricanes affected 118 municipalities in Coahuila, Nuevo León, and Tamaulipas; 138 municipalities in the states of Campeche, Puebla, Veracruz; and 56 in the states of Chiapas and Oaxaca. Approximately 200 cities with a population of more than 10 000 inhabitants are located in river basins with high flood risks. Despite such challenges, Mexico does have an existing and well-developed policy framework for water resource management. The implementation of the policy framework, however, is uneven. This is seen in river basin councils, which are not fully operational, in the failure of some chosen policy instruments to contribute to policy objectives, and in the fragmentation of the regulatory framework for drinking water and sanitation. To surmount these obstacles, Mexico must make a particular effort to increase water productivity and to render water policies cost efficient. This will require cohesive multi-level governance, better sequencing and prioritising of the reforms, and support for greater water policy coherence with agriculture and energy.

The 2030 Water Agenda sets a clear path for water reform, but it must overcome critical implementation obstacles

The 2030 Water Agenda is the result of a one-year, nationwide consultation process including key stakeholders at the local, state and national levels. This ambitious agenda aims to achieve 4 policy goals within the next 20 years: balanced supply and demand for water, clean water bodies, universal access to water services, and settlements safe from catastrophic floods. Implementation of the agenda will be monitored yearly, with a provision to revise and adjust its scope every six years.

The OECD has been working with Mexico to provide evidence-based assessment, analytical guidance and customised policy recommendations in support of the country's water policy reform. This collaborative process supported by OECD tools, methodologies and frameworks in the field of water policy as well as key lessons from the OECD work on "Making Reform Happen". As part of the process, the policy dialogue involved high-level peer reviewers and experts from Australia, Brazil, Italy and the United Kingdom. It focused on four key areas identified as essential drivers for change: multi-level governance, river basin governance, economic efficiency and financial sustainability of water policies, and regulatory frameworks for service provision. The key findings and policy recommendations from the dialogue are presented in four corresponding chapters of this report, together with a tentative "implementation plan" defining practical steps, potential indicators to monitor implementation and impact, and cross-references to the 2030 Water Agenda initiatives. The plan is offered up to help make water reform happen.

Synthesis of key messages from the report

Mexico has the opportunity to invent its own model for water governance. As a federal state, with huge regional variations between water availability and water demand, Mexico would benefit from place-based and tailored responses to water challenges. For instance, the responsibilities devolved to one particular state or basin organisation should match the particular water challenge in that territory, and the capacities in terms of funding, know-how and desire for reform. When the actions taken meet the needs, Mexico can make the best of initiatives flourishing at state, basin or local levels.

Mexico needs to bring more flexibility into its water policies to ensure that the policies can meet future challenges. The country will face a range of future challenges, including climate change and huge uncertainties about future water availability and demand. The policies that address Mexico's needs today, in terms of water allocation or infrastructure, may not respond to the country's future challenges. However, there are certain steps Mexico can take to address its current challenges while avoiding being locked-in forever to suboptimal options, which include adopting economic instruments and putting in place green and smart infrastructures.

Mexico needs to set incentives to manage trade-offs across water-related sectors (agriculture, energy, land use, etc.) and remove harmful subsidies that clearly work against water policy objectives, increase costs and put water security at risk in several basins. For instance, the inconsistency of energy subsidies to farmers for irrigation leads to detrimental impacts on water demand and groundwater management. The inconsistencies could be avoided if accompanying measures were adopted to gradually remove subsidies and build on incentives that work well on the ground. Many pilot programmes and experimentations at local and state levels (e.g. voluntary schemes for farmers to give up subsidies) could be shared and replicated.

Mexico needs to pay more attention to the cost-effectiveness of water-related public spending and investment decisions. Mexico has significantly increased water-related public expenditures and the level of water-related investment. To ensure that future expenditures are well-targeted and cost-effective, it is necessary to ensure that initiatives are well co-ordinated between departments and levels of government; that other potential sources of financing are being accessed (including revenues from water-related services); and that incentives are correctly set for efficient water uses.

Mexico needs to address key regulatory gaps in order to improve the population's access to safe efficient and sustainable water and sanitation services. The OECD has identified a number of regulatory functions that need to be properly designed and allocated to increase social inclusion and boost local development in Mexico. While there are several ways of discharging these functions across actors and places, improving the regulatory framework will be essential for the sustainable provision of water services to the population.

OECD overarching recommendations to help make water reform happen

Meeting the water reform challenge in Mexico requires action on many fronts. This report highlights a number of levers that a new administration may wish to consider when setting up a cohesive and cost-effective water policy framework in Mexico.

- ***Develop a whole-of-government implementation action plan building on the 2030 Water Agenda policy goals.*** This plan should seek to enhance policy coherence with agriculture, energy and territorial development and bridge identified governance gap, with a high level of political commitment.
- ***Set up mechanisms and incentives for enhancing water policy outcomes in the country's current decentralisation framework.*** The mechanisms should leave sufficient flexibility to adjust to the features of each state and basin's institutional structure and will require capacity building at all levels to match responsibilities with capabilities.

- ***Fully exploit the benefits of existing economic instruments in line with the Polluter-Pays, Beneficiary-Pays, Equity and Policy Coherence principles,*** which the OECD has identified as necessary to underpin the effective financing of water resources management.
- ***Clarify the regulatory framework for water services*** to address overlaps and gaps in regulatory functions, clearly assign responsibilities at each level of government, strengthen enforcement and compliance, and increase the focus on the quality and efficiency of service provision.
- ***Strengthen the role, capacity, prerogatives and autonomy of river basin councils.*** That way, they can design place-based policies, develop integrated basin plans, identify and prioritise projects, and generate the required resources to carry out their duties. A tailored approach may be required in this context as well, as basins are faced with specific challenges and are endowed with distinct capacities.
- ***Establish platforms to share good practices at basin, state and municipal levels, and engage the different stakeholders in a common water framework for Mexico.*** These platforms could build on institutions such as the National Conference of Governors (CONAGO), the Mexican Institute of Water Technologies (IMTA) and the National Association of Water and Sanitation Utilities (ANEAS) to collect, review and benchmark success stories in support of effective decision making.
- ***Foster transparency, information sharing and public participation for more inclusive decision-making processes.*** This will also benefit better evaluation, monitoring, integrity and accountability in the water sector.
- ***Evaluate the effectiveness of federal programmes at achieving water policy objectives***. Given the heavy reliance of the water sector on subsidies, federal programmes constitute an important lever for policy makers to incentivise better performance and harmonise rules of operations. A systematic evaluation of the impact of federal programmes would provide feedback on the effectiveness of the rules of operation, and would help to better capitalise on the synergies between federal programmes.

Assessment and recommendations

In 2011, Mexico launched an ambitious 2030 Water Agenda to achieve, within the next 20 years, clean water bodies, balanced supply and demand for water, universal coverage and settlements safe from catastrophic floods. This strategic planning exercise shows clear political leadership on behalf of the Mexican government to design a long-term vision for the water sector. On the ground, though, making water reform happen is challenging, especially in Mexico where past experience has shown how difficult it can be to translate policy objectives into action. Although Mexico has a well-developed policy framework for water resource management in place, with a number of policy instruments and institutions, policy implementation is still uneven: 20 years after their creation, river basin councils are not fully operational, the regulatory framework for drinking water and sanitation is scattered across multiple actors and harmful subsidies in other sectors (energy, agriculture) work against water policy objectives. To round out Mexico's policy framework, it is imperative to take action to increase water productivity and the cost-efficiency of water policies, address multi-level and river basin governance challenges (in particular to bridge inconsistencies between federal and basin priorities), sequence and prioritise reform needs, and support greater policy coherence with agriculture and energy.

Mexico's water reform challenge

Mexico's water sector presents several pressing challenges. First, the country is under severe water stress and water users will be exposed to greater vulnerability during the coming decades. Another challenge is the quality of rivers, lakes and aquifers in Mexico. In their current state, these water bodies have adverse environmental (water quantity, water quality and ecosystems), health and economic (additional costs for water services, sustainability of farming) consequences, and improving their quality is critical. Universal access to water supply and sanitation is yet another challenge, which can be addressed by ensuring efficient, reliable and quality service provision. In addition, Mexico is increasingly exposed to hydro-meteorological events (hurricanes, floods and droughts). These events are affecting more than half of the Mexican states and their impacts are generating important socio-economic costs. The question of how the country should address these challenges is linked to priorities across states and river basins and will therefore require place-based solutions implemented at the local level, but some common themes will also emerge; these will need to be addressed at the federal level. In particular, Mexico needs an overarching framework for water supply and sanitation at federal level, and cost-effective water policies.

In March 2011, Mexico adopted the 2030 Water Agenda to reform the water sector. The agenda aims to achieve 4 policy goals within the next 20 years: balanced supply and demand for water, clean water bodies, universal access to water services and settlements safe from catastrophic floods. It establishes 38 initiatives covering a

wide range of issues and requiring an annual investment of EUR 3 billion. The agenda is grounded in a technical prospective analysis and benefitted from a one-year, nation-wide consultation with key stakeholders at the local, state and national levels. While the agenda proposes a strategic vision for the water sector in Mexico, it requires a clear implementation plan to get started on critical reforms. For instance, further guidance is needed on how to bridge the financing gap, especially with regard to climate change, or on how to address the virtual water imbalance caused by highly water-consuming products or by activities leading to over-exploitation of groundwater resources. Therefore, addressing obstacles to water reform calls for a clear diagnosis of the factors that will foster or hinder the implementation of needed reforms in the short, medium and longer run. The following sections shed light on four sets of issues that need to be addressed and inform on the key messages and recommendations of the report.

Improve multi-level governance to address territorial and institutional fragmentation

Manage interdependencies across multiple actors and stakeholders

Mexico's fragmented institutional setting raises important capacity and co-ordination challenges for integrated, coherent and inclusive implementation of water reform. Several institutions, agencies and bodies are involved in water management at federal, state, municipal and basin levels. While some progress has been achieved in better managing interdependencies across stakeholders and creating an overarching framework for water resources management, much remains to be done to overcome the scattered regulatory framework for water services.

Understanding *who* does *what* and at *which* level is critical to overcome multi-level governance gaps. At the federal level, CONAGUA (*Comisión Nacional del Agua*) is the main body in charge of water planning, financing and strategic setting in the water sector. However, decisions taken in other sectors (agriculture, energy, land use) can work against water policy objectives, increasing costs and putting water security at risk in several basins. For instance, energy subsidies to farmers have detrimental impacts on water demand and groundwater management. Policy coherence between the sectors is essential, but some level flexibility needs to be allowed to manage risks and trade-offs at different levels and adjust to institutional features. Under the framework of co-ordination and differentiated responsibilities among government´s institutions and levels, as mandated by the new General Law of Climate Change, there is an opportunity to set a joint scheme for action considering water as a cross-cutting issue for different sectors.

Setting multi-stakeholder platforms is crucial for multi-level co-ordination and for sharing and replicating actions that are successful at local and state levels (e.g. voluntary schemes with accompanying measures to remove harmful subsidies). Further, international best practices provide valuable references, and economic instruments can play a role aligning incentives and signalling the value of the resource.

Address grey areas in the legal framework, including the informal sector

A wide range of informal actors and community-based water management systems operate outside of any legal water framework. Irrigation units typically operate without a legal identity and are not organised in a way that allows them to voice their concerns. In small communities, where resources and capacities are limited, water supply and sanitation services are often provided through community solutions. Many of these solutions have been successful in terms of improving coverage and generating health benefits (e.g. in the state of Oaxaca), but uncertainty about their status complicates oversight and monitoring.

Bridge co-ordination and capacity gaps building upon good practices at local, state and federal levels

Many water governance gaps faced by Mexico are not specific to the sector but relate to the country's broader governance challenges. They concern issues of enforcement and compliance, accountability, uneven nature of decentralisation, informality, institutional quality, capacity of public administration and limited transparency in policy making. Further effort is needed to bridge accountability, information and capacity gaps across levels of government. In this respect, the Mexican government's high-level commitment to reform the water sector is a good signal, and should positive results be forthcoming, one that is likely to spill over other sectors and benefit wider institutional and economic reforms.

There has been some progress in addressing institutional fragmentation of water policy at the federal level. Some of these efforts were undertaken through CONAGUA's Technical Council and others through the development of cross-sectoral planning at national level. However, despite CONAGUA's participation in several high-level bodies, co-ordination efforts are often led in a bilateral way between CONAGUA and water-related public agencies. The potential for policy coherence at the watershed level is not fully exploited, as the emphasis is put on the federal level. There are many good practices on the ground for policy coherence that could be further replicated while letting enough flexibility for the governance system adjust to local features. A potential solution could be to align the 2030 Water Agenda policy goals with the multi-level planning apparatus, made up of interlocking plans, programmes and systems at different levels that include, amongst others, the National Development Plan, the National Water Programme, the National Water Information System, the regional and state water programmes and the multi-annual investment plan.

Encouraging co-ordination and building capacity are critical steps towards bridging multi-level governance gaps in water policy. In the case of Mexico, four main areas need to be considered to achieve horizontal and vertical co-ordination in support of the water reform: *i)* foster policy coherence across water-related areas, especially agriculture, energy, environment and territorial development; *ii)* strengthen capacity at basin, municipal and state levels for effective decentralisation and place-based policies; *iii)* improve access, quality and disclosure of information at all levels to guide decision-making processes; and *iv)* encourage public participation for more open, responsive, sustainable and inclusive water policy.

Recommendations

- **Develop a whole-of-government implementation Action Plan, building on the 2030 Water Agenda policy goals and initiatives.** The Action Plan should seek to foster coherence across policy areas (especially energy and agriculture); bridge multi-level governance gaps; sequence priorities; and foster co-ordination of targets and indicators across federal, regional and state water instruments and actors.
- **Set up mechanisms and incentives to enhance water policy outcomes in Mexico's existing decentralisation framework, leaving sufficient flexibility to adjust to the needs of each state and basin institutional structure.** Capacity-building, inter-municipal arrangements, multi-annual budgeting and investment plans; a professional career system for water staff; and contracts across levels of government are examples of pragmatic tools that can bring consistency to water governance so that responsibilities can be carried out at the level where they can best be managed.
- **Foster information sharing, integrity and public participation across all levels of government for more transparent, accountable and inclusive policy making.** Improved access, quality and disclosure of information across levels of government and wider engagement of key stakeholders in the decision-making process are prerequisites for better evaluation, monitoring, integrity and accountability in Mexico's water sector.

Strengthen river basin governance for effective integrated water resources management

Strengthen river basin councils' prerogatives and capacities

Since 1992, a comprehensive system of river basin organisations, councils and auxiliary bodies has been under development; however, it is not yet fully operational. Decision-making power is still centralised within the hands of CONAGUA and its regional/local offices. As a result, river basin councils lack the necessary planning, capacity, regulatory and financing powers to carry out their functions. Regional water programmes designed as a follow-up to the 2030 Water Agenda are a step in the right direction, but they are closer to a list of infrastructure-driven projects than properly developed river basin plans. There are many benefits to strengthening river basin councils that range from an improved ability to foster more coherent and effective decision making and information sharing to the capacity to minimise transaction costs and overlaps. These types of benefits could be achieved by better equipping river basin councils to co-ordinate and articulate river basin plans within the context of state and national priorities and programmes.

Ensure that all relevant stakeholders are represented

Progress has been achieved towards decentralisation of water resources management but further efforts are needed to ensure that all stakeholders are engaged. Originally, the majority of river basin council representatives were government representatives. Today, most of river basin council members are citizens, which allows for civil society representatives on the councils and gives this group a voice at the table. There are some

groups, however, that are still under-represented, such as small farmers and indigenous communities, and there is also scope to increase the participation of irrigation districts and units, which would significantly contribute to the sustainability of catchments and the balance of aquifers. During the design of the 2030 Water Agenda, river basin councils served as intermediaries between local stakeholders (irrigation associations, environmental organisations, academics and citizens) and government agencies, but the incentives to attend council meetings remains limited because decisions taken there are not binding.

Share lessons and align objectives and strategies across river basin institutions

Even though river basin institutions face common challenges, there are limited opportunities for them to share lessons and experiences. River basin organisations and river basin councils report to different constituencies, therefore they have limited platforms through which to share concerns and experiences and to take consistent and mutually beneficial decisions. Co-ordination between river basin councils and organisations is currently undertaken on an *ad hoc* basis. In order to change this relationship between the groups, there must be clearly defined, high-level political objectives and more systematic communication, which would help to build the technical and managerial capacities of river basin institutions, in particular for the formulation of policies and the design of instruments such as water pricing to manage water demand.

An objective and independent assessment of river basin organisations, councils and auxiliary bodies' performance would help them learn from good experiences and improve the overall institutional structure for river basin management. Regular communication, design of action plans and information sharing should also be fostered. Several actions may be considered including:

- organisation of periodical meetings between executive boards of river basin councils and their respective auxiliary bodies to exchange on local issues and specific matters. Improved co-ordination among river basin authorities would allow for a real inter-fitting;
- consideration of the establishment of operative management offices in river basin councils and COTAS, and viable websites to widely disseminate information amongst river basin councils;
- development of exchanges of practices among river basin authorities at the national level, or by groups of authorities sharing similar concerns which would allow to enhance capacities through peer-learning mechanisms;
- participation of irrigation districts and units to save water and contribute to aquifer sustainability;
- evaluation of the outcomes of river basin projects, programmes and experimentations, sharing the results and building on better assessments and monitoring.

Good governance practices in various river basin councils could be further replicated throughout Mexico. Initiatives in Jalisco, Guanajuato, Colima and Hidalgo have helped overcome key water challenges such as aquifer over-exploitation, and have explored innovative approaches water tariff setting to put a price on ecosystem services. Replication has been slow because of the lack of a robust assessment of the prevailing river basin governance scheme and local experiments.

Recommendations

- **Strengthen the role, functions and autonomy of river basin councils and their auxiliary bodies** with the objective to develop effective basin plans that go beyond infrastructure project portfolios; identify and prioritise projects; and foster co-ordination across local, basin, state actors. The measures implemented to achieve these goals need to meet the specific challenges and distinct capacities of each river basin council and auxiliary bodies.
- **Establish a platform to share good practices across river basin organisations, councils and auxiliary bodies to enhance capacities through peer learning.** Several actions could be considered, including the organisation of periodical meetings between river basin council executive boards and their respective auxiliary bodies to exchange on local issues and specific matters, websites, training and operative offices.
- **Consider giving river basin organisations a gradual degree of autonomy to raise and allocate funds locally for priority investment.** This could be considered when policy objectives are well defined and recurrently reviewed, and it would allow river basin organisations to generate the resources needed to carry out their duties in closer proximity to local stakeholders.
- **Engage stakeholders in river basin councils within a framework of joint responsibility, transparency and accountability.** Participation should not be restricted to consultation and approval of programmes, but extended to have an active role in the decision making.

Enhance economic efficiency and financial sustainability of water policy

Three main issues hamper the economic efficiency and financial sustainability of the water sector in Mexico. First, decisions taken in other areas such as agriculture and energy, which have consequences on water use and availability, clearly work against water policies and increase the cost of water resources management. Second, financial capabilities are not aligned with responsibilities, which can generate high costs and hinder the cost-effectiveness of public expenditures. Similarly, financial resources should be aligned with the 67 territorial units identified as priorities in the 2030 Water Agenda. Third, the sector is heavily subsidised and lacks strategic financial plans at both federal and basin level. In addition, the reliance on public funding (55%) puts the financial sustainability of water policies in Mexico at risk, as competition to access scarce public budgetary resources gets fiercer.

Improve the institutional organisation of water policies

To improve the institutional organisation of water policies, several institutional measures could be considered including:

- clarifying the respective roles of federal, state and basin councils;
- complementing plans for water-related infrastructures or services with financial plans in order to clarify *who* pays for *what* and *when*;
- using economic instruments to enhance intergovernmental co-ordination; and

- better aligning national expenditures and basin priorities by strengthening the role of basin authorities in spending decisions and/or by making a more systematic use of rules of operation to improve the performance of sub-sectors.

Enhance the cost effectiveness of water policies

CONAGUA is the single biggest spender in the water sector, with a budget of MXN 38.8 billion in 2012, i.e. close to 55% of the estimated total sector expenditures. Its budget has almost tripled in real terms in the last two presidential administrations, and has resulted in a high rate of water infrastructure development. Still, this significant increase in public spending for the water sector has not solved all the challenges.

Without discarding the benefits of many of the infrastructures built in the previous decade, some costly policy options have been implemented because of a failure to consider or implement cost-effective alternatives. For instance, properly operating and maintaining water infrastructures is less costly than rebuilding them, due to decay, once the community can no longer access the service. Furthermore, closing unlicensed wells is usually more effective than mitigating the consequences of illegal water use, and technification of irrigation systems is also costly, but fails to contribute to water policy objectives if the water saved is used to irrigate additional surfaces. In addition, buy-back programmes are more cost effective when based on the volume of water saved rather than on the cost of the action taken, which allows farmers to choose the most resource-efficient appropriate technique. As a result, while levels of investment into water infrastructures have been high, water services, and above all sanitation services, remain poor in large parts of the country, in particular in rural areas where institutional and financial risks are higher.

Make a better use of economic instruments for water management

Mexico has a number of economic instruments in place, but the instruments do not always succeed in supporting water policy objectives. For instance, low rates and lax enforcement (e.g. illegal abstractions, under-reporting of consumption) prevent abstraction charges from being effective instruments for water policies, while low pollution charges do not significantly change the behaviour of polluters. Poorly designed water markets and payment for ecosystem services (PES) schemes, although a step in the right direction, have failed in a number of instances to contribute to conservation. There is room to improve the design of economic instruments in place in Mexico so that they better contribute to cost-effective water policies and make the best use of public funds.

Reforming subsidies is also a major area of potential reform. The subsidies to electricity for irrigation pumping amounted to MXN 6.8 billion in 2010 – which is over nine times more than the financing provided for efficient water infrastructure (MXN 773 million). Around 80% of electricity subsidies to irrigation water pumping accrue to only the richest 10% of farmers, making this a particularly regressive subsidy. The effects on the environment are catastrophic – over 100 major water aquifers in Mexico are now over-exploited. And this has an impact on the farmers and local communities – they are the ones who suffer first when the water runs out. Since July 2011, there has been a pilot programme in 13 aquifers to replace these subsidies with the equivalent in cash transfers. This type of effort should be scaled-up.

There is action needed in several directions: first, to improve collection rates of water-related taxes and charges, and second, to adjust the rates and the structure of

charges and tariffs to reflect water policy objectives. Other objectives, such as social or economic ones, are better addressed by other means, e.g. targeted social support to address affordability issues. A third action is to identify and assess water harmful subsidies, with a view to phasing them out, and fourth is to strengthen the knowledge and database on which economic instruments rely. For instance, tariffs operate best where water is metered, which is seldom the case for irrigation in Mexico. Lastly, there is a need to allocate more resources to monitoring of water uses; at present, they account for less than 1% of CONAGUA's budget.

Raise revenues from the beneficiaries of water services

Though tariffs are in place for bulk water, irrigation water, and water supply and sanitation services in Mexico, the contribution of users to total water sector expenditures remains low (about 45%). This puts the financial sustainability of water policies in Mexico at risk, as it increasingly relies on public finance, and as competition to access scarce budgetary resources gets fiercer. Prices for water services need to reflect at least the operation and maintenance cost of providing those services, and they need to be aligned with policy priorities (regarding investment, reliance on commercial finance or demand management), etc. Although politically difficult, such reforms are facilitated by a robust analysis of the social impacts of water tariffs because targeted social measures are more effective and less costly than low-cost water to address affordability issues.

The 1992 Mexican National Water Law includes the Water Financing System concept, however, the creation of this type of system has been pending since 2004. Should this initiative be revived, it would provide an opportunity to ensure that the framework conditions are set to enhance the cost-effectiveness of water policies in Mexico, and it would make sure that decisions in other sectors do not work against and add costs to water policy. The system would aim to make the best use of public budgets and to enhance the financial contribution of water users. Well-designed and targeted accompanying measures would be needed to facilitate transition.

Recommendations

- **Enhance the cost effectiveness of water policies through better institutional architecture**. Investment plans should reflect basin priorities (and not merely compile a list of projects) and should be backed by strategic financial plans to ensure: *i)* long-term financial sustainability; *ii)* diverse investments (public and private funds); and *iii*) proper consideration of low-cost options (e.g. green infrastructures or community management).
- **Fully exploit the benefits of existing economic instruments in line with four principles: Polluter-Pays, Beneficiary-Pays, Equity and Policy Coherence.** The level and structure of abstraction and pollution charges, and of water tariffs, should reflect water policy objectives, and collection rates should be increased for justice and efficiency reasons. PES schemes, buy-back programmes and water markets should be designed and implemented so that they cost-effectively contribute to water policy objectives.

Recommendations (*cont.*)

- **Raise revenues from the beneficiaries of water services.** Prices for water services need to reflect at least the operation and maintenance cost of providing such services. They need to be aligned with policy priorities (e.g. investment, reliance on commercial finance or demand management) and backed by strong regulation (e.g. the quality of the service). Although politically difficult, such reforms are facilitated by a robust analysis of the social impacts of water tariffs because targeted social measures are more effective and less costly than cheap water to address affordability issues.

Improve service provision regulatory frameworks

The regulatory framework for water supply and sanitation is scattered

In the absence of an overarching regulatory framework for water and sanitation services at the federal level, regulatory responsibilities are scattered across different levels of government and various legal instruments. Under the Constitution, water supply and sanitation management is the primary responsibility of municipalities, which have varying levels of capacity and resources. Municipalities change government every 3 years, and water service providers change General Directors every 18 months on average. This high turnover rate of local officials and managers has significant consequences, including discouraging long-term planning and impeding the building of capacity. Important local political interferences affect the performance of service providers, for example, water tariffs are rarely set according to technical criteria and with a view to contributing to covering costs.

There is an opportunity to clarify and improve regulatory responsibilities

The recent adoption of the Human Right to Water and Sanitation in Mexico creates a momentum for change. The constitutional amendment to Article 4 provides an opportunity to revise the legal framework and revive the debate around a federal law that would provide an overarching framework for service provision. Such a law would help clarify regulatory responsibilities. Crucially, regulation of services needs to be separated from service provision and policy making through the clear allocation of regulatory functions to specialised entities and strengthened autonomy of service providers. Regulation of water supply and sanitation is not only about tariff setting, it involves other functions, such as the setting and monitoring of standards for access to and quality of services, of efficiency incentives, social regulation, collection of information and monitoring of performance, and the organisation of users' participation. These functions remain underdeveloped in Mexico and would benefit from greater clarification about *who* does *what* to discharge them.

Accompanying measures are needed to support autonomous, efficient and financially sustainable water providers

The trend towards the corporatisation of providers should be strengthened and supported by capacity building and staff professionalisation. This would involve a recruitment process based on competences and terms of appointment that do not coincide with political cycles. The flip side of increased autonomy of water operators is the establishment of appropriate accountability

mechanisms, such as a consolidated monitoring framework for water and sanitation services (involving performance indicators agreed by all) and strengthened user participation in the consultative bodies of water utilities and in water decision making.

Financial capacity of providers to carry out their activities needs strengthening. While not the only one, tariff regulation is an important determinant of the financial sustainability of water operators. Consensus building and awareness-raising on the role of tariff regulation in supporting the financial sustainability of providers, while providing incentives for efficient service delivery remain much needed.

Recommendations

- **Clarify the regulatory framework for water services to address overlaps and gaps in regulatory functions, assign responsibilities at each level of government with a full separation between regulatory functions, service provision and policy making.** A federal law could help more clearly delineate the regulatory responsibilities, but would not be enough to ensure operational separation in all states and municipalities. The latter may be achieved through different models taking into account the specificity of state situations, such as setting up of separate regulators, as recently done in the state of Mexico.
- **Foster transparency on service performance and regulatory processes by pursuing the development of performance indicators and establishing mechanisms for increased public scrutiny of regulatory processes.** Transparency is a strong lever for improved performance and re-establishment of trust between water users and water authorities (including providers). Consolidating the information base and monitoring framework for service providers needs to be pursued. Credible regulatory authorities also require transparent regulatory processes such as clear tariff regulation, systematic publication of decisions and public consultation on regulatory proposals.
- **Establish a platform to share the good regulatory practices that are developing at state and municipal levels.** A number of states and municipalities have put in place innovative mechanisms or institutional organisations to support better regulatory processes and service provision. These practices could be collected and reviewed systematically to form a base upon which other sub-national governments could build. In addition, institutions such as the National Conference of Governors (CONAGO) and the National Association of Water and Sanitation Companies (ANEAS) could be better exploited.
- **Evaluate the effectiveness of federal programmes at achieving the policy objectives for water and sanitation services.** Given the heavy reliance of the water and sanitation services sector on subsidies, the federal programmes constitute an important lever in the hand of policy makers to incentivise better performance in water and sanitation services, and in particular the corporatisation and professionalisation of providers and more efficient use of water. Several programmes exist in Mexico with various Rules of Operation. While they are acknowledged as having contributed to improving water and sanitation services, their respective real impact has not been measured. A systematic evaluation would provide feedback on the effectiveness of the rules of operation, and would help to better capitalise on the synergies between federal programmes.

Introduction: Setting the scene

There is momentum in Mexico towards more inclusive, integrated and coherent water policy that goes beyond business as usual. The 2030 Water Agenda adopted in 2011 proposes a strategic vision for Mexico's water sector, with challenging reforms that require a thorough analysis and diagnosis of both the factors that will foster or hinder implementation and the measures that will likely help to overcome them. The agenda also points out what benefits the factors could bring to the water sector.

Mexico's water reform challenge

Mexico is under severe water stress

Water users in Mexico are vulnerable and will be even more so in the coming decades, especially in the Lerma and Grande river basins. Since 1950, the country has seen water availability decline by 75% because of population growth. In addition to the decline in water levels, the uneven distribution of water around the country is also a challenge, causing several basins severe current and future water stress. Further, 101 of Mexico's 653 aquifers are overdrawn, in particular in Lerma, Valley of Mexico and Balsas. And more than three-quarters of Mexico's population live in water-scare regions, thus requiring a greater focus on water demand management.

Figure 0.1. **Water stress by river basin: Baseline (2050)**

Sources: OECD Environmental Outlook Baseline; output from IMAGE; OECD (2012), *OECD Environmental Outlook to 2050*: *The Consequences of Inaction*, OECD Publishing, Paris.

The quality of Mexican water bodies is at stake

Improving the quality of rivers, lakes and aquifers is a major challenge in Mexico because it impairs end users, business activity, environmental protection and property values. At present, the country's surface and groundwater quality is threatened by pollution loads from point and diffuse sources and insufficient attention to wastewater

discharges; this results in adverse environmental consequences (poor water quality, reduced stream flows, drying up of wetlands), adds costs to the provision of water services (as water has to be treated before it can be used) and threatens the economic viability of farming.

Providing safe drinking water and adequate sanitation to all requires further action

Mexico has arguably met the water and sanitation Millennium Development Goals, but further progress is needed to ensure that the water supplied is safe to drink. Currently, 91.3% of the population has access to drinking water services, and 89.9% of the population has access to sanitation coverage. Considering the country's existing coverage, and the future population growth in the next 20 years, Mexico will need to provide an additional 36 million inhabitants with drinking water services and 40 million inhabitants with sanitation services. The states facing the greatest challenges in this regard are Baja California, Chiapas, Mexico, Jalisco, Puebla and Veracruz. Beyond water access, the efficiency and reliability of service provision and the financial sustainability of service providers are also major concerns.

Exposure to floods and droughts is increasing

According to CONAGUA, between 1980 and 2007, hurricanes and droughts affected more than 8 million people and caused MXN 130 billion worth of damages. In the past, floods and investments in flood protection were mainly concentrated in the Valley of Mexico and the Southern Border, but the Central Gulf and Yucatan Peninsula are now also at risk. The hurricanes in 2010 affected 118 municipalities in Coahuila, Nuevo León, and Tamaulipas; 138 municipalities in the states of Campeche, Puebla, Veracruz; and 56 in the states of Chiapas and Oaxaca. Approximately 200 cities with a population of more than 10 000 inhabitants are located in river basins with high flood risks.

The policy framework for water management has evolved, but institutional reforms are still needed

Mexico has a well-developed policy framework for water resource management; a number of institutions are in place, at federal and state level, and Mexico has developed an array of policy instruments (from abstraction charges to water markets). However, policy implementation is uneven, river basin councils are not yet fully operational and the regulatory framework for drinking water and sanitation is fragmented. There is a particular need for efforts to increase the water productivity and the cost-efficiency of water policies. Addressing multi-level governance challenges (in particular to bridge inconsistencies between federal and basin priorities), sequencing and prioritising reform needs, and supporting greater policy coherence with agriculture and energy will be necessary to steps to make water reform happen.

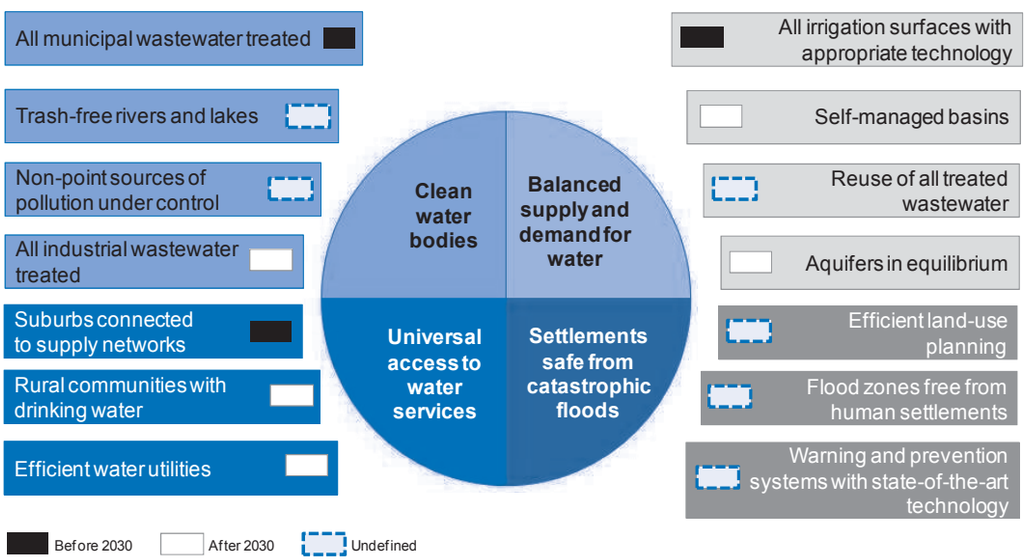
The 2030 Water Agenda: A long-term strategic vision for the sector

To address these concerns, in 2011, Mexico developed the ambitious 2030 Water Agenda, which was conceived as a forward-looking exercise as part of the national planning system. The Agenda benefitted from a one-year consultation process with key stakeholders at local, state and national levels organised into thematic discussions, a web

forum and 13 regional roundtables. Outcomes of the debates were synthesised in different reports and fed the design of the 2030 Water Agenda. The Agenda's strategic vision:

- seeks to achieve 4 policy goals within the next 20 years: balanced supply and demand for water, clean water bodies, universal access to water services and settlements safe from catastrophic floods;
- lays out five principles (sustainability, integral long-term vision, catchment vision, local control, subsidiarity), two strategic lines related to governance structures and capacity of water managers as well as distribution of competences at the three tiers of government;
- sets up 38 initiatives covering a range of issues including river basin institutions, polluting behaviours, soil conservation, land use, state governments' role, capacity building, tariff setting, legal frameworks, and information and monitoring systems;
- requires an overall annual investment estimated at EUR 3 billion over the next two decades; and
- is grounded in a technical prospective analysis.

Figure 0.2. **The 2030 Water Agenda: Goals and timeline**



Source: Elaborated based on CONAGUA (*Comisión Nacional del Agua*) (2011), *2030 Water Agenda*, CONAGUA, Mexico.

Annual monitoring of the 2030 Water Agenda's implementation will take place, with a provision to revise and adjust its scope every six years. Since 2011, focal points for each of the agenda's initiatives have been appointed within the National Water Commission (*Comision Nacional del Agua*, CONAGUA) and four working groups created on public participation, institutional strengthening, reform for the legal frameworks and financing. The first evaluation of the 2030 Water Agenda's implementation was carried out by CONAGUA to assess progress, and the evaluation results were published in a report available online.[1] In parallel to launching the evaluation

report, 13 regional water programme documents were published in March 2012, featuring project portfolios to reflect the agenda's goals and initiatives in each hydrographic region. Additional water programme-related documents were published in October 2012 based on the 2030 Water Agenda initiatives, including 32 state level programme documents for sustainable water management.

OECD-Mexico policy dialogue to make water reform happen

Globally, making water reforms happen is challenging, but it is particularly arduous in Mexico where past experience has shown how difficult it can be to translate policy objectives into action. It is easier to diagnose challenges – many are common knowledge – in particular for service provision (as was identified by CONAGUA as early as 1989), but it is difficult to align incentives across multiple stakeholders, which stalls the implementation process. There is need for guidance on how to implement the reform roadmap set out in the 2030 Water Agenda. For example, bridging the financing gap requires strategic financial planning that goes beyond expenditure plans. In order to assist authorities with the implementation process and address critical implementation bottlenecks, the factors that will foster or hinder the implementation of needed reforms in the short, medium and long term need to be diagnosed.

Box 0.1. **OECD-Mexico policy dialogue on water**

The OECD-Mexico policy dialogue aimed to provide analytical support to Mexico. The dialogue drew on OECD work on water governance, financing and policy reform, lessons from the OECD 2010 project on *Making Reform Happen* and good practices from OECD member and non-member countries. It had the following objectives and relied on the process and tools summarised below.

Objectives

- Identify key **co-ordination and capacity challenges** across multiple stakeholders involved in water policy design, regulation and implementation; and suggest good practices in response to the institutional and territorial fragmentation.
- Identify challenges hindering **effective river basin governance**, and shed light on good practices within Mexico (at river basin, aquifer level) and internationally for truly integrated water resources management.
- Identify challenges hindering the **economic efficiency and financial sustainability** of water policies, and suggest good practices to make the most of economic instruments.
- Identify challenges related to **key regulatory functions for service provision**, and suggest options for improvement and potential trade-offs based on the experience of countries with similar issues.

Box 0.1. **OECD-Mexico policy dialogue on water** (*cont.*)

Process

- The OECD formed a **task force of experts** comprised of OECD analysts to oversee the project and to prepare the required case and comparative studies, analysis and exchange of experiences.
- **Three peer reviewers** from Australia, Brazil and Italy, and **one high-profile expert** from the United Kingdom were involved throughout the process and participated in the policy mission.
- The OECD prepared a **questionnaire** on the different components of the project, which was answered by CONAGUA focal points.
- The OECD and CONAGUA organised a **fact-finding mission** (7-11 May 2012) to meet with key stakeholders at different levels of government, as well as experts and representatives from civil society, academia and the private sector.
- A **policy seminar** was held in Mexico City (10-15 September 2012) to discuss the draft assessment and recommendations of the report, with representation from a wide range of stakeholders: OECD analysts, peer reviewers and, to reflect sub-national experiences, distinguished state and municipal representatives.

OECD tools and concepts

- OECD Framework for Financing Water Resources Management (OECD, 2012a)
- OECD Recommendation on Regulatory Policy and Governance (OECD, 2012b)
- OECD Preliminary Guidelines for Effective Multi-Level Governance (OECD, 2011)
- OECD Preliminary Checklist on Making Reform Happen (OECD, 2010)
- OECD Checklist for Public Action: Principles for Private Sector Participation in Water Infrastructure (OECD, 2009a)
- OECD Tool on Strategic Financial Planning (OECD, 2009b)

The analysis presented in this report is based on official data collected through an OECD questionnaire; available documents from the Mexican government, academia and donors; and discussions held with Mexican officials and stakeholders throughout the process. OECD assessment and recommendations were discussed at an OECD Policy Seminar held in Mexico City on 11-13 September 2012 involving independent experts and representatives from the National Water Commission, academia, non-governmental organisations (NGOs), public and private operators, states, donor agencies, inter-municipal bodies, the Ministry of Environment and Natural Resources (SEMARNAT), the National Association of Water and Sanitation Companies (ANEAS) and the Mexican Institute of Water Technologies (IMTA). The report also benefited from review by several OECD policy committees and working parties including the Territorial Development Policy Committee; the Working Party on Biodiversity, Water and Ecosystems; the Regulatory Policy Committee; and the Joint Working Party on Agriculture and the Environment.

The report assesses four issues, which are considered requisites to water policy reforms in Mexico: *i)* co-ordination of multi-level institutions and programmes; *ii)* water governance at basin level; *iii)* economic efficiency and financial sustainability of water policies; and *iv)* regulation of the water supply and sanitation sector.

Chapter 1 assesses key multi-level governance gaps identified in Mexico's water sector and good practices for better managing interdependencies across multiple actors to make the water reform happen on the ground. It draws an institutional mapping of *who* does *what* in water policy design, regulation and financing, provides particular emphasis on challenges related to institutional and territorial fragmentation, and suggests areas for improvement based on good practices taking place at different levels.

Chapter 2 focuses on the role of river basin organisations, councils and auxiliary bodies as vehicles for water reform implementation. It provides insight on the current state of integrated water resources management in Mexico, achievements witnessed since the decentralisation of water resources management in 1992, and remaining institutional and capacity challenges of the different river basin authorities.

Chapter 3 discusses economic efficiency and financial sustainability of water policies in Mexico. It provides an inventory of existing economic instruments in place to manage water resources. It discusses shortcomings in the design of the instruments that limit their contribution to water policy objectives, and it suggests ways forward by putting forth measures that can ease reform.

Chapter 4 explores how key regulatory functions for service provision are currently discharged, and by which authority, including tariff setting, performance monitoring, enforcement of quality standards and customer engagement. It provides guidance on how such functions can be better institutionalised to support effective, efficient and sustainable service provision.

Each chapter offers recommendations to policy makers, and the report concludes with an "implementation plan" to assist in making water reform happen. The plan identifies concrete practical steps (in the short, medium and long term) and potential indicators to monitor progress and implementation, as well as relevant examples from OECD and non OECD countries; and cross-references to the 2030 Water Agenda initiatives.

Note

1. Available at *www.cmic.org/comisiones/sectoriales/infraestructurahidraulica/publicaciones_conagua/Pdf/publicaciones/2012%20PDF/SGP-10-12baja2012.pdf*.

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Chapter 1

Addressing multi-level governance challenges

This chapter assesses key multi-level governance gaps identified in Mexico's water sector and good practices for better managing interdependencies across multiple actors to make water reform happen on the ground. It draws an institutional mapping of who does what in water policy design, regulation and financing, provides particular emphasis on challenges related to institutional and territorial fragmentation, and suggests areas for improvement based on good practices across levels of government as well as in other OECD and non-OECD countries.

Introduction

OECD water governance expertise informs and is a springboard for water sector reforms in Mexico. The key message from OECD work in this area has been that securing water for all requires a combined strategy that addresses hydrology, infrastructure building, financing and good governance. Therefore, making water reform happen in Mexico requires resilient institutions, place-based policies, collaborative efforts and sound capacity at all levels to engage key stakeholders in joining forces and sharing the risks and tasks. As there is no one-size-fits-all water governance model, national reforms need to be tailored to local contexts to take into account territorial disparities. In this regard, the OECD multi-level governance framework has been used as a tool for policy makers to diagnose governance challenges *ex ante* and to define relevant policy responses accordingly.

The discussion on multi-level governance is presented in four sections. The first section overviews key features of Mexico's water policy. The second section provides an institutional mapping of key players in water resources management and service provision, including both official and non-official actors. The following section discusses the major governance gaps in terms of information asymmetry, divergent objectives, limited capacity at the sub-national level, poor accountability, lack of policy coherence across water-related areas, insufficient funding to carry out duties at different levels, and appropriate scale for water resources management and service provision. The fourth section identifies options for reforming water governance in Mexico based on national and other OECD member countries' good practices. The last section summarises the main conclusions and provides policy recommendations.

Water policy framework

The overarching framework for managing water emanates from the Mexican Constitution and two Mexican federal laws. The 1917 Constitution establishes the national government as owner of all water resources in Mexico, and gives local governments responsibility for service provision (Article 115). The 1981 Federal Duties Law[1] and the 2004 National Water Law[2] regulate these constitutional provisions and establish the principles and mechanisms for managing water resources (see Annex 1A.1). In most cases these are replicated through state water laws. In Mexico, water policy is enforced through **regulatory instruments** (e.g. titles for concession, allocation of water use rights, prohibitions), **order and control mechanisms** (e.g. inspection and measurement, sanctions), **economic instruments** (e.g. fees, charges, taxes) and **participative tools**.

Throughout the 20th century, there has been an evolution of water policy reforms towards planning and decentralisation. In the 1920s, the creation of the **National Irrigation Commission** helped to spur the development of a vast network of dams, aqueducts, wells; and supply and sanitation systems throughout the country. As a result of these developments, 80% of Mexican households obtained access to drinking water, an extensive surface area was developed under agricultural irrigation, and the country was able to support the water needs of the nation's industrial expansion. The 1992 National Water Law, amended in 2004, was a major turning point towards integrated water management. It decentralised some key functions to municipalities, river basin organisations and irrigation districts, and in parallel, significant investments were made to improve wastewater treatment plants, replace supply sources and modernise agricultural

irrigation system technology. It also included the definition of optimal dam operation policies, dimensioning of irrigation districts, development of standards on environmental flows and studies on the impacts of climate change and mitigation measures.

Box 1.1. **Mexico's 1992 and 2004 National Water Laws: Objectives and scopes**

The **National Water Law** was adopted on 1 December 1992 (prior to that date, water in Mexico was regulated under the 1972 Federal Law on Water) and redefined the regulatory framework of water resources and water services in terms of management, co-ordination, co-operation, financing, and control with the:

- establishment of formal markets for trading water surpluses;
- initiation of full-cost recovery water pricing;
- elimination of subsidies in selected areas;
- transfer of irrigation district management to water user associations;
- confirmation of municipal and state management of urban water and sanitation services;
- allowance of private sector management of water services via government concessions; and
- institutionalisation of local participation through the consolidation of a network of river basin councils.

The law also **consolidated the role of the CONAGUA (National Water Commission)** as the executive authority for all water-related matters, giving the body primary responsibilities to: *i)* design water policy; *ii)* formulate the national water programme; *iii)* develop potable and sewage water systems and treatment; *iv)* construct, operate and maintain dams and irrigation systems; and v) expedite titles of concession.

The law created the **Public Registry of Water Rights** (REPDA) as an effort to eliminate bureaucratic practices and promote links between the management of water rights and water uses, changes in financing practices, contracts and concessions, construction permits and infrastructures.

The **law was amended in 2004** and took the decentralisation paradigm further by expanding the role of state and local authorities in water management with representation functions within river basin institutions and in water quality regulation. The reform also consolidated social participation in river basins (Articles 5, 7bis, 9, 10 and 14bis) with, for example, the obligation for river basin organisations to establish consultative councils that participate in decision-making processes (Article 12). But to date, the secondary legislation or "reglamento" of the 2004 Law is still pending, making it difficult to enforce.

Sources: Ortiz Rendon, G. (1993), "Conceptos Originales Relevantes de la Ley de Aguas Nacionales", Instituto Mexicano de Tecnología del Agua, Mexico; Dominguez, J. (2011), "Agua y Territorio: Políticas y Normatividad", Tercer coloquio "Ciudades en cuencas sustentables", El Colegio de México, 4-6 October 2011, Mexico City; Wilder, M. (2010), "Water Governance in Mexico: Political and Economic Apertures and a Shifting State-citizen Relationship", *Ecology and Society*, No. 15.

While there have been significant water reforms initiated over the past three decades, there is still a need to institute clear overarching policy objectives for the water sector. This common gap often leads to policy instruments attempting to achieve multiple objectives that are not compatible. Failing to set clear policy objectives also makes it difficult to support long-term political commitment, which is essential in a country like Mexico, where political mandates are short. Therefore, the definition of clear water policy objectives can help to move further from engineering and infrastructure-led water policies

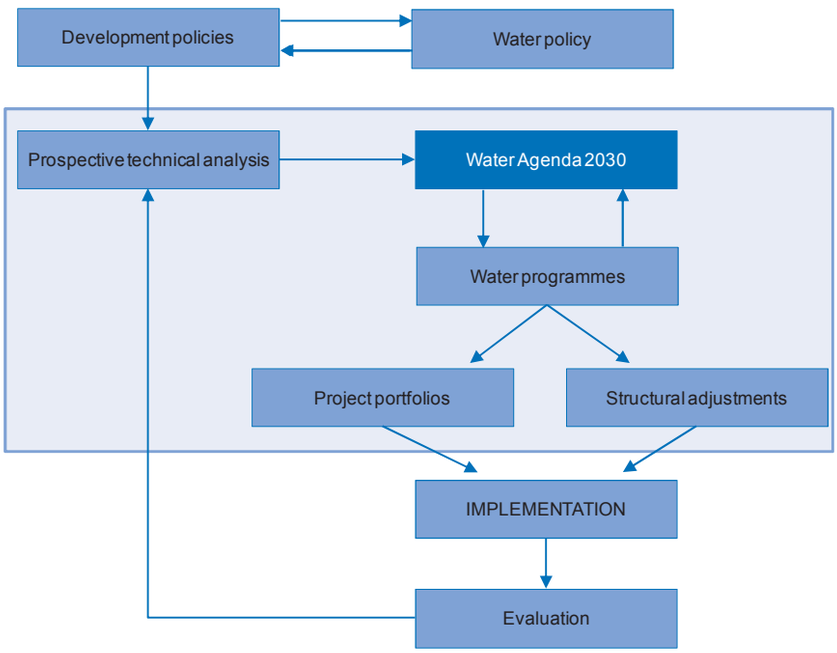
to institutional strengthening based demand management (search for efficiencies) and effective decentralisation. In addition to clarifying policy objectives, the distribution of responsibilities among different decision-making bodies needs to be addressed. When municipalities and river basin organisations were transferred responsibilities for service provision and resources management, the federal government retained significant power in terms of financing, planning and environmental regulation. As such, the devolution of prerogatives to lower levels of government came with limited institutional strengthening, transfer of human resources and capacity building, which hindered self-organisation, efficiency and sustainability.

Mexico has a multi-level planning structure comprised of interlocking strategic plans, programmes and systems (see Figures 1.1 and 1.2). The 2030 Water Agenda is part of this structure within the National Water Management System (*Sistema Nacional de Gestion del Agua*), which also includes:

- The **National Development Plan**, which sets the general orientation of public policies in Mexico and establishes the five priority areas *i)* respect of right and safety; *ii)* competitive economy and employment; *iii)* equal opportunities; *iv)* environmental sustainability; and *v)* effective democracy.
- The **National Water Program**, which is a six-year guiding document for water policies that established national objectives and strategies in terms of water resources management.
- The **National Water Information System**, which was established to provide public access to data and interactive maps on water quality, quantity, uses and conservation.
- **Regional water programmes**, which were designed for each of the 13 hydro-administrative regions and include project portfolios to align national objectives with regional and local strategies on water management.
- **State water programmes**, meant to be aligned with state planning laws and state water laws. They were jointly designed by river basin organisations, CONAGUA, IMTA (Mexican Institute of Water Technology) and their respective constituencies. They focus on integrated water resources management and sustainable social development towards 2030 and place water management at the centre of overall state development and planning.
- **A multi-annual investment plan**, enshrined in the 2004 National Water Law, was designed by the Ministry of Finance to ensure financial sustainability of the sector.

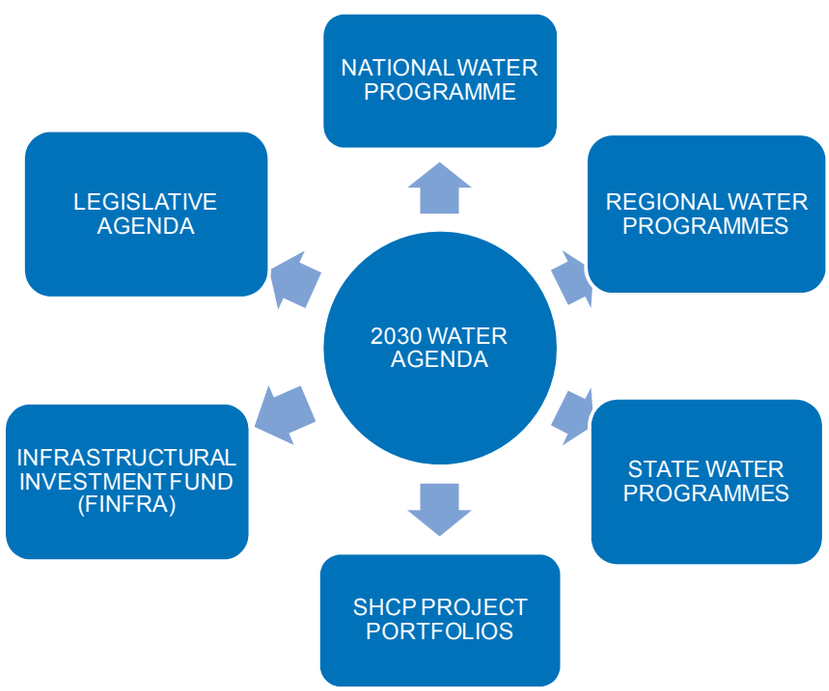
Figures 1.1 and 1.2 illustrate the complex system in Mexico to devise, implement and evaluate water policies. A "process flow" approach that shows *who* does *what*, *why*, *when*, *how* and that checks and controls this allocation of roles is needed to navigate the system and identify deficiencies, conflicts and overlaps under the current institutional structure for what regards consultation of key stakeholders, information sharing, as well as planning, regulatory and financing responsibilities. Such an institutional mapping is provided later in the report (Figures 1.3 and 1.4).

Figure 1.1. **A systemic approach to the 2030 Water Agenda**



Source: Elaborated based on data provided by CONAGUA (*Comisión Nacional del Agua*), November 2012.

Figure 1.2. **The 2030 Water Agenda in the national water policy framework**



Source: Elaborated based on data provided by CONAGUA (*Comisión Nacional del Agua*), in November 2012.

In 2011, the 2030 Water Agenda was designed as a masterpiece in the national water governance system, with the objective to hand over a country with "clean water bodies", "balanced water supply and demand", "universal access to water services" and "settlement safe from catastrophic floods" to the next generation. Several of the Agenda's initiatives relate to the reassignment of legal functions, regulation, capacity development, institutional organisation, enforcement, compliance and the adoption of incentives to build a resilient water management system at the national and regional levels. Particular emphasis in the Agenda is put on strengthening the role of river basin organisations and their auxiliary bodies (see Chapter 2 on river basin governance) and involving civil society and water users' associations.

Box 1.2. **The contribution of better governance to the 2030 Water Agenda's goals**

- Better governance can help to achieve **balanced water supply and demand** through, for instance, a more prominent role of the technical groundwater committees (COTAS) in aquifer management, regulations for the distribution of surface water by catchment and aquifer, reinforced systems to measure and ensure compliance with the volumes allocated and authorised in an agricultural year.
- Better governance can help to achieve **clean water bodies** through institutional mechanisms to discourage polluting behaviours or norms for assessing, controlling and monitoring pollution sources. Also, co-ordinated action with water-related policy areas can, for example, enhance reforestation programmes associated with soil conservation in priority catchment areas.
- Better governance can help to achieve **water and sanitation for all** through a number of channels. For example, greater prerogatives to state governments for water supply and sanitation, certification management and capacity building for water utility technical staff. Universal access to water could also be improved through tariffs set-up based on technical criteria rather than political considerations, and strengthened capacity of CONAGUA and state water commissions to promote, supervise and regulate service provision.
- Better governance can also contribute to **settlements safe from catastrophic floods**, while, for example, strengthening municipalities' capacities to improve information systems and organise civil defence in the face of floods.

Institutional mapping of key actors in water policy

Mexico's current water governance is multi-layered and multi-faceted to accommodate the different water users and water uses in the country that operate at very different scales and spatial dimensions: drinking water, irrigation, hydropower and environmental needs. The number of institutions, agencies and other bodies involved in water management at federal, state, municipal and basin levels attests to the wide range of authorities governing the sector. This fragmented institutional setting raises important capacity and co-ordination challenges for integrated, coherent and inclusive implementation of Mexico's water reform. A first step in addressing these challenges is to understand ***who*** **does** ***what*** at ***which level*** in water policy.

Water policy design, financing and regulatory roles at federal level

This section provides a picture of the allocation of roles and responsibilities for water policy design, financing, regulation and implementation at the federal level.

CONAGUA has primary responsibility over the water sector, looking to several ministries and agencies to contribute to policy design, regulation, financing and implementation.

- The **National Water Commission** (CONAGUA – *Comisión Nacional del Agua*) is the main actor in water policy. It administers the rights for water use and wastewater discharge as well as for planning, irrigation and developing drainage systems. It also defines water availability at basin and aquifer level, and finances and maintains most of the hydraulic infrastructure across the country. CONAGUA has additional responsibilities to manage emergency and natural disasters and to provide essential sector funding through a range of federal programmes. Further, it administers economic instruments and collects water resources charges; delivers bulk water supply services (for urban centres, industry and irrigation districts) and collects related charges; operates some irrigation districts and collects irrigation charges for those services; directly executes and maintains investments in water infrastructure (dams, etc.); and transfers federal budget resources to support municipalities, water utilities and agricultural water users. This deconcentrated body under the mandate of the Ministry of Environment, receives direct budgetary transfers from the federal government and collects fees for water use and wastewater discharge duties.
- The **Ministry of Environment** (SEMARNAT – *Secretaría de Medio Ambiente y Recursos Naturales*) formulates and conducts national policy related to natural resources when the policies do not fall explicitly under the responsibility of other institutions. It also has responsibility, in co-operation with other institutions, for policy related to ecology, environmental sanitation, water, environmental regulation of urban development and fisheries. Furthermore, SEMARNAT, along with other institutions (mainly CONAGUA), establishes the official Mexican norms in relation to wastewater discharges, and supervises their enforcement in co-ordination with other institutions, state and municipal authorities. The ministry also works with the Ministry of Finance to define criteria to allocate resources and incentives for a sustainable exploitation of natural resources, and it can establish contracts and concessions, and issue licenses, permits, authorisations, etc. related to water issues.
- The **Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food** (SAGARPA – *Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación*) is responsible for achieving more efficient and productive water use in agriculture. The ministry funds programmes in support of sustainable use of soil and water resources in agriculture that also ensure that the country's food needs are met.
- The **Ministry of Health** (SALUD – *Secretaría de Salud*) is responsible for domestic water supply quality standards. It maintains domestic water services provision records in relation to water quality information, monitoring and evaluation.
- The **Ministry of Finance** (SHCP – *Secretaría de Hacienda y Crédito Público*) defines the budget that is allocated to the water sector. It co-ordinates with institutions in the water sector on the corresponding scheduling, authorises multi-year investment programmes, and funds water programmes intended to improve water supply and sanitation services.

- The **Ministry of Social Development** (SEDESOL – *Secretaría de Desarrollo Social*) provides financial support to rural communities in developing water supply, sewerage and sanitation infrastructure.
- The **Federal Congress** (*Congreso Federal*) sets policies, and assesses and approves budgets for the water sector as well as amendments to the National Water Law, the National Duties Law and regulations to these laws. The National Water and National Duties Laws set the rates of water abstraction and pollution charges.
- The **Mexican Institute of Water Technology** (IMTA – *Instituto Mexicano de Tecnología del Agua*) – a decentralised agency from SEMARNAT – promotes knowledge, technology and innovation for sustainable water management.
- The **Federal Attorney for Environmental Protection** (PROFEPA – *Procuradoría Federal de Protección al Ambiente*) conducts environmental studies and monitors the quality of rivers, lakes and groundwater. The agency applies sanctions where violations of environmental regulations are discovered.
- The **Federal Electricity Commission** (CFE – *Comisión Federal de Electricidad*) finances, builds and operates multi-purpose dams used for electricity generation, water supply to cities, and irrigation and flood protection. It also administers the federal electricity subsidy for rural users (*Tarifa 9*).
- The **National Forestry Commission** (CONAFOR – *Comisión Nacional Forestal*) promotes the adequate management of forests to harmonise their social, economic and environmental benefits. This role includes funding and undertaking efforts to reduce soil erosion in upstream areas of river basins.
- The **National Infrastructure Fund** (FONADIN – *Fondo Nacional de Infraestructura*) is the co-ordination vehicle for funding and developing infrastructure in various sectors, including the water sector. It provides financing for planning, design and construction of water and sanitation projects that demonstrate positive social impact, reasonable profitability, and include compulsory private sector participation.
- The **National Commission for the Development of Indigenous Peoples** (CDI – *Comisión Nacional para el Desarrollo de los Pueblos Indígenas*) funds programmes to provide basic services (water and sanitation, as well as electricity and roads) to localities with an indigenous population above 40% and that are classified as high or very highly marginalised, with a total population of between 15 000 and 50 000 inhabitants.

Policy, financing and regulatory roles at the sub-national level

At the sub-national level, the federal government still retains significant power over water resources management, while there is no overarching federal framework for water services. The Constitution gives municipalities primary responsibility for water supply and sanitation along with various levels of capacity and resources. This division of responsibility results in heterogeneity across the territory.

- **State governments** have responsibilities for planning, regulating and developing infrastructure for water resources. Under the subsidiarity principle, they also directly provide services if requested by municipalities, and they can formulate their own state-level planning for water.
- **Municipalities** are responsible for providing water and sanitation, either directly (e.g. service providers that are part of the municipal government) or indirectly (e.g. providers that are legally separate entities wholly-owned by the municipality). They can also delegate responsibility to private operators or utilities owned and operated by the state government.
- **Water utilities** (*Organismos Operadores*) are in charge of service delivery. These public, decentralised organisms are diverse in nature with varying technical, commercial, financial and administrative competencies. They enjoy, in theory, a certain level of autonomy, but not complete independence, from municipal authorities. In a limited number of cases, the private sector is involved.
- **State water commissions** foster co-ordination between municipalities and the federal government. Their prerogatives differ across states but often include irrigation, water supply and sanitation, technical assistance to municipalities and service provider performance supervision.
- **State congresses**, in most cases, approve tariffs and play a key role in approving state water plans and in allocating financial resources for water infrastructure.

The 1992 National Water Law gradually transferred water resources responsibilities to a wide range river basin organisations, councils and auxiliary bodies at the sub-national level.

- Thirteen **river basin organisations** (RBOs – *Organismos de Cuencas*) serve as technical, administrative and legal deconcentrated bodies of CONAGUA and formulate regional water policy. They programme, build, operate, preserve and maintain the federal water works in the hydrographic regions, either directly or through concessions to third parties. River basin organisations also support concessions and contracts, and regulate the water infrastructure works supported federal funds. In addition, they can propose and set-up irrigation or technified rainfed districts and oversee the quality of water and water river basins.
- Twenty-six **river basin councils** (RBCs – *Consejos de Cuencas*) were established in a subordinated hierarchy at the sub-basin, micro-basin and aquifer levels as consultative bodies and discussion fora to promote social welfare, economic development and environmental preservation.
- Auxiliary bodies provide platforms for technical work and discussions, and include 41 **river basin committees**, 32 **river basin commissions**, 82 **technical groundwater committees**, 38 **local clean beach committees**, 85 **irrigation districts** and 23 **technified rainfed districts** (see Chapter 2 on strengthening river basin governance).

Figure 1.3. **Institutional mapping for water resources management**

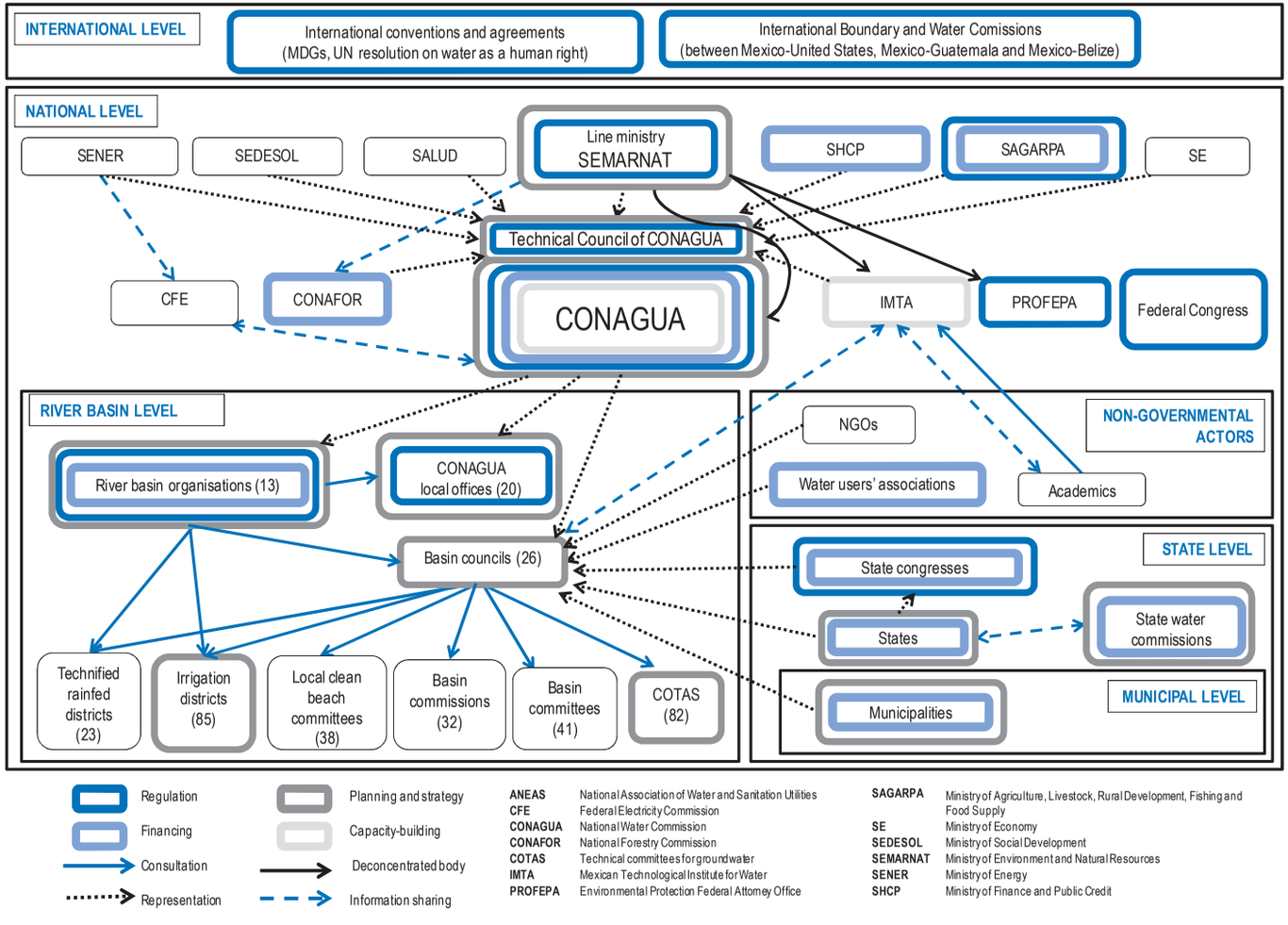
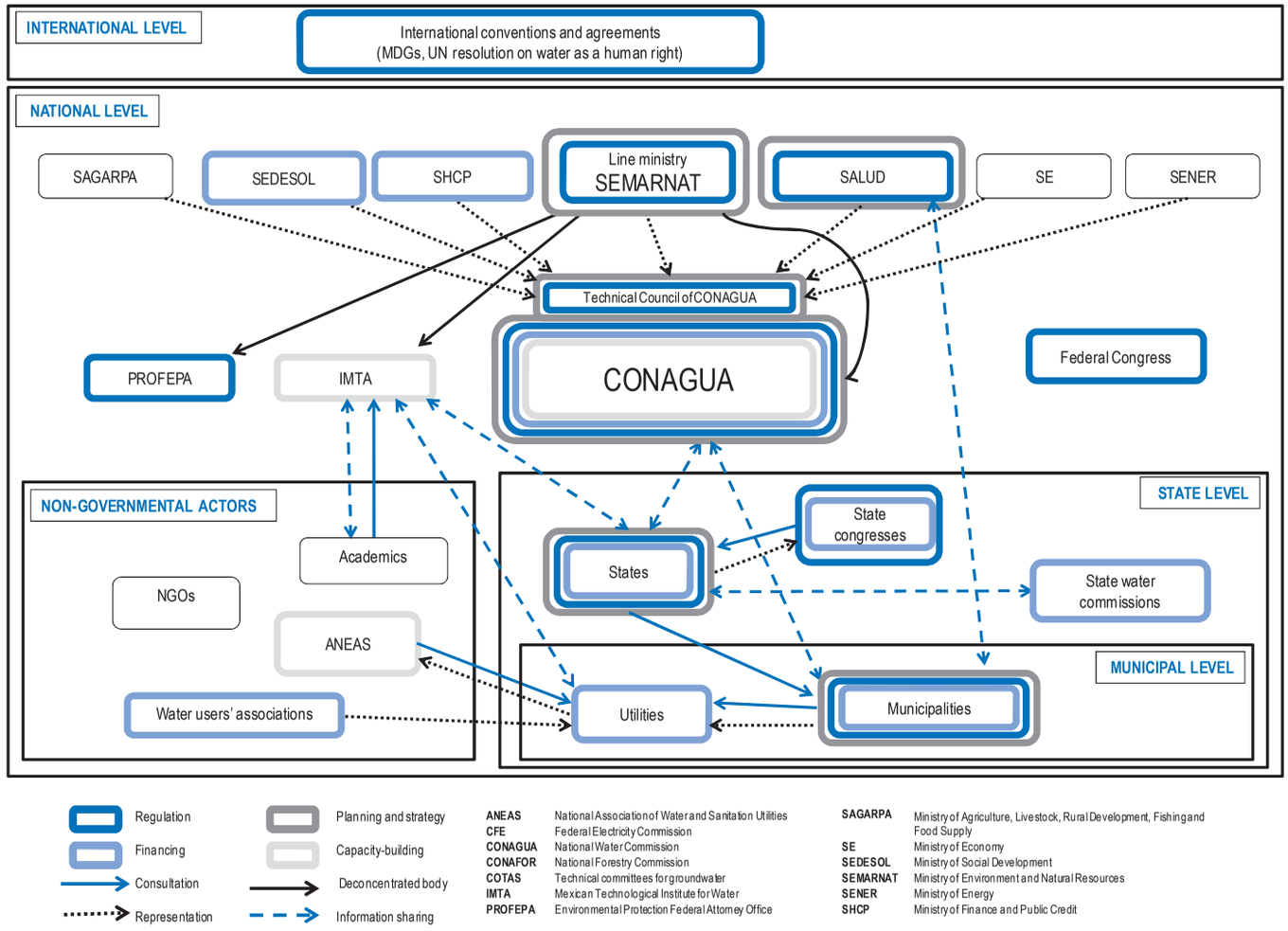


Figure 1.4. **Institutional mapping for water and sanitation services**



A variety of local water governance systems

Territorial disparities

Mexico faces important disparities across its territory in terms of water *quality*, *quantity* and *access*. Over the last century, the population density increased with many households in urban and peri-urban areas suffering from extreme poverty.[3] This density increase has resulted in increased pollution and other stresses on water resources and infrastructure. Cities with more than 50 000 inhabitants now have 95% drinking water coverage while the share remains at 79% in rural areas.[4]

The rural-urban dichotomy entails different types of stakeholders for water management. Approximately 30 million Mexicans currently live in settlements with less than 2 500 inhabitants. Rural communities are often excluded and have limited financial or human resources to meet the water requirements of rural Mexicans. In rural zones, alternative ways for service provision are required as the imbalance of wealth presents problems for the economic sustainability of water projects. However, the decentralisation experience in the agricultural sector has resulted in gains for water users who now have more local control and authority over how to manage water. Historical over-exploitation of agricultural water has been a factor in uniting water users in irrigating communities to design strategies that allow them to continue production.

The 2030 Water Agenda refers to the need to address rural-urban disparities, in particular regarding irregular supply and inadequate water quality. For example, the strategic goal of the Agenda related to "universal access to water services" makes a distinction between urban and rural regions for what regards wastewater treatment in medium-sized and rural localities, the construction of wells, and rainwater harvesting.

An important informal sector

In addition to formal actors officially established by laws and regulations, Mexico has an important component of informal actors in the water sector. It is estimated that only half of Mexico's 5 000 water operators are official utilities. In small communities, where resources and capacities are limited, service provision is ensured through community solutions, thus complicating the assessment of the total number of operating wells in the country. Mexico also has more water concessions than water availability, which has contributed to water imbalances. Historically, the federal government granted water users a variety of often irregular or provisional extraction authorisations (Amilpa, 2010). In the early 1990s, only 2 000 formal entitlements co-existed with multiple irregular permits whose authenticity could not be verified. This resulted in far too many farmers exercising a legal right to water, which caused unsustainable water use, i.e. more water extracted than could be naturally sustained.

The importance of informality is particularly high in the field of irrigation. Mexico has a total of 40 000 irrigation units, both formal and informal, and 85 irrigation districts.[5] These units are usually small, generally with one well controlled by one person or by a limited group of people. In contrast to irrigation districts, whose members are organised in formal water user associations fully recognised by the government, irrigation units typically operate on the basis of informal arrangements without legal identity and have been historically neglected by the government. They are neither monitored nor organised to voice their needs and concerns. This lack of institutionalisation restricts their participation in water management institutions such as COTAS (technical groundwater

committees) that contribute to solving, for example, the challenge of aquifer over-exploitation. The informality of irrigation units also limits their application for government funding, and complicates the oversight and monitoring role of CONAGUA and other institutions. The National Water Programme (2007-12) established a target to strengthen the organisational capacities of 10% of the 40 000 irrigation units formalising their legal status. This rather low (but already challenging) target reveals the complexity of addressing the issue.

Community-based water management options

Community-based options for water management exist both in urban and rural areas. Many states and municipalities cannot reach all social groups, in particular those living in poor, marginalised (*colonias*) or remote (*rancherías*) areas, therefore alternative solutions are needed. For example, it is estimated that in indigenous regions, 17% of municipalities (mainly concentrated in the state of Oaxaca) resort to traditional uses and customs to govern water, a political process that is fully recognised by the Constitution. Such areas have low population density, high poverty rates and a low capacity to finance water infrastructure.[6] It can be challenging to link these indigenous regions with official mechanisms, such as river basin organisations and councils. Additional examples of community-based management can also be found in the irrigation sector. The **Yaqui River Basin Irrigation District** (220 000 hectares, mostly wheat) includes 20 000 producers ranging from indigenous production societies, collective *ejidos* and small private-holders, to large-scale agribusiness conglomerates. Such forms of self-organisation have been very effective in dealing with drought (Scott and Banister, 2008). They have also responded to record low reservoir levels by instituting district-wide fixed volumetric limits (per hectare), and by cancelling the secondary (spring-summer) growing season. Another example of community-based organisation is rainwater harvesting. In 2004, a team of academics and engineers initiated a community-level harvesting project to promote rainwater harvesting,[7] including for human consumption, as a sustainable alternative to overdrawn groundwater resources and declining surface supply. The rural village of **San Felipe del Progreso**, located in the poverty-stricken, remote **Mazahua** region (northeastern part of the state of Mexico) and far off the municipal water grid, was a pilot for this experiment.

Water rights

While water trading is developing in Mexico and desirable from an economic efficiency and environmental point of view (see Chapter 3 on economic efficiency and financial sustainability), a strong prerequisite for an efficient and fair water trading system is related to property rights. At present, these rights are not ensured, and many challenges concerning water rights relate to informal water actors and community-based options.

The National Water Law establishes that water belongs to the nation and the use of the nation's waters will be allocated through concession deeds by the federal government through CONAGUA, by means of the river basin councils, or directly. The allocation of water concessions is demand-driven and the National Water Law establishes that in the case of competition among users, public water supply has the priority. Concessions are recorded in the Public Registry of Water Duties (REPDA). Up to December 2008, 360 301 concession deeds were registered in the REPDA. It is important to note that 30% of total concessions are in the Lerma-Santiago-Pacific region.

Table 1.1. **Small-scale water supply and sanitation arrangements in Latin American countries**

Type of small-scale water and sanitation services (WSS) arrangements	Observations	Country where they are dominant
Community organisations	Association providing WSS to various communities through a public co-operative model	Bolivia
	Drinking water committees in charge of providing services in suburban and rural areas	Chile (in rural areas), Nicaragua
	Rural drinking water co-operatives	Colombia (in rural areas), Ecuador (in rural areas)
	Community utilities	Honduras (in suburban and rural areas), Peru (in suburban and rural areas)
	Administrative boards for drinking water or local committees for drinking water and sanitation	El Salvador
	Community associations providing WSS to small urban and rural communities	Guatemala
Small private utilities	In some cases, they manage WSS systems and in others are in charge of water services as part of a larger operator	Colombia, Ecuador
Public co-operative utilities	Members of the utility are representatives from municipalities, NGOs and users' associations	Colombia
Cisterns or tanker	Exist mostly in suburban and rural areas	Bolivia, Colombia, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Peru

Source: Based on Amilpa, E.A. (2011), *Gestión Comunitaria de los Servicios de Agua y Saneamiento – Su Posible Aplicación en México* (Water and Sanitation Community Management Services: Possible Application in Mexico), ECLAC (CEPAL), United Nations, Mexico City.

Concessions are only used in regulated zones where no strict extraction limits (*vedas*) are set. In free extraction zones users are free to extract water given they keep a record of extractions, and in zones with strict extraction zones no concessions can be given. A concession specifies the maximum amount of water a user can extract, the use that will be given to it (domestic, industrial or agricultural), the location of the watershed and the duration of the concession.

An important problem in the use of concessions is that the time between the moment a user submits a request to CONAGUA and the moment he has the water deed concession can last for years (even though the law states it should be in 60 days). This delay affects not only users but the functioning of the whole system and opens the door to corruption. For instance, SAGARPA used to have as a requisite for certain irrigation programmes that users had a valid concession. However, it has decided to drop the requisite since it could not hold off resources until the concession process was done. Instead, only the proof that a concession request has been submitted is now requested. Indeed, delays can be explained by the fact that all registers in REPDA are managed at the central level though by law the assignment of deeds is supposed to be decentralised through river basin councils.

Another problem is that while water rights are defined in the law and in each concession, the authorities lack capacity to enforce the law. For example, the River Basin Council of Balsas only has the capacity to carry out 120 inspections visits in a year, for a total of 5 000 users within the jurisdiction. For this reason, Balsas' authorities mostly inspect industrial users and some strategic areas. This is also the case in other areas of the country. As a result, according to INE's research on water consumption, 80% of agricultural users exceed their concession volumes, and only 30% have working meters.

According to the National Water Law, concessions are valid for 5 to 30 years; 6 months before the end date of the concession, users can ask for an extension. If not, they lose the concessioned volume of water, which can then be allocated. If the allocated volume in a concession is partially or not used for more than two years, the concession can be cancelled. Users have the option of paying a guarantee fee to keep the concession even if it is not used (*cuota de garantia*).

In the face of climate change and in the pursuit of sustainable development, the allocation of water rights and the creation of water rights systems must take into consideration the natural environment. Although Mexico's National Water Law calls for the creation of water rights systems that consider an upfront allocation of water or restricted use of water to protect and sustain the country's ecosystems, the current water rights systems do not factor in sustainability – water allocation is calculated solely on the average annual availability. For instance, prior to 2012, Mexico had no instrument to calculate the amount of water required to sustain the natural environment, i.e. environmental flows ("eflow"). In 2012, however, a Mexican eflow standard was approved, and CONAGUA initiated a programme to apply the eflow standard to river basins that have a positive water balance. The programme is being implemented with the support of the Inter American Development Bank, WWF and the Fundación Gonzalo Río Arronte, and is also focusing on establishing and protecting eflow reserves for the environment and reducing the vulnerability of river basins to climate change.

Box 1.3. **Allocation, management and reform of water rights in OECD countries**

In **Australia**, the initial Water Rights Implementation occurred between 1885 and 1985. During that time, up until the 1970s, water rights allocation was essentially done on a "first come, first served basis" and it was shaped around strong social concepts of equity. The water licenses granted by the country were allocated based on the pre-20th century economy, and did not foresee the huge demands the new economy would stake. The latter generated a relatively ordered water resource management, the development of a significant irrigation industry that makes a substantial contribution to the rural economy and sustains a number of rural towns and cities, and limited legal conflicts. In more recent years, key water reform actions have been implemented that have improved the overall management of water, including the 1994 Council of Australian Governments (COAG) Water Reform Framework, the 2004 National Water Initiative and the Commonwealth Water Act (2007).

Outcomes associated with these initiatives include the

- establishment of a cap on surface water diversions in the Murray-Darling Basin (in 1995);
- establishment of water markets that allow water users to trade on a local, regional and interstate basis;
- unbundling by the state government of water assets from land assets, allowing water users to trade water independently, as required under the COAG water reform agreements;

Box 1.3. **Allocation, management and reform of water rights in OECD countries** (*cont.*)

- establishment of a river restoration programme called "The Living Murray" which responded to evidence of declining health within the Murray River system. The programme was a joint government programme which sought to return water to the environment through water purchasing and enhancing infrastructure initiatives;
- introduction of Commonwealth water legislation and commitments to establish a basin plan to manage the basin as a whole, which includes the setting of environmentally sustainable limits on the amount of water that can be taken from the basin's water resources; and
- establishment of an independent statutory body, the National Water Commission, to audit, assess and monitor progress in water reform.

In **Chile**, water management was centralised and driven by water legislation that highly regulated water rights until 1981 when the National Water Code created a water market seeking higher economic efficiency and conservation of water. The water market was established independently from land markets and auctioned water sources that had been declared exhausted, therefore creating opportunities to acquire water rights. Once private parties were in possession of their water rights, they would be responsible for the management and distribution of their water. However, government authorities would retain legal power over the water to allow them to reallocate water and to ensure water supply to urban areas if water shortages were a problem.

In the western states of the **United States**, most administrations apply a water rights allocation regime based on permits (only Colorado uses a system based on judicial decrees). In each system, legal protection is offered to water rights acquired through "appropriation", for which a water user must: *i)* identify unclaimed (i.e. unappropriated) water in a stream; *ii)* develop a structure or system to physically divert the claimed water; and *iii)* use the claimed water in a beneficial way. Water rights that are privately owned in that area can be bought and sold in water markets, and in some of the western states, water rights can be sold separately from the land or property on or under which the water flows. These rights have the potential to pose challenges to national efforts to protect the environment and manage water quality, which prompted the US Supreme Court to introduce the concept of "federal reserved water rights". The concept was seen as a way to avoid the overexploitation of resources and the exhaustion of ecosystems. As part of the Supreme Court's ruling, the federal government acquired reserved water rights for the national forests, national grasslands, national parks, wilderness areas, wildlife refuges, American Indian reservations, military installations, and a variety of other public lands. Since the concept was adopted, additional environmental legislation has been passed and enforced at the federal level. At the state level, however, incremental refinements have been made to prior appropriation that broaden the definition of beneficial use, commit to considering the "public interest" as part of water transfers, and set up modest programmes to establish water rights for instream flow protection.

Sources: Kenney, D. (2002), "Water Allocation Compacts in the West: An Overview", Gonzaga University School of Law, Spokane, United States; Leon *et al.* (2008), "Adaptive Water Management in Brazil and Chile", presentation slides, available at *www.gecafs.org/documents/PP05Leon.pdf*; Bruns, B.R. *et al.* (eds.) (2005), *Water Rights Reform: Lessons from Institutional Design*, International Food Policy Research Institute, Washington, D.C.

Governance challenges in Mexico's water sector

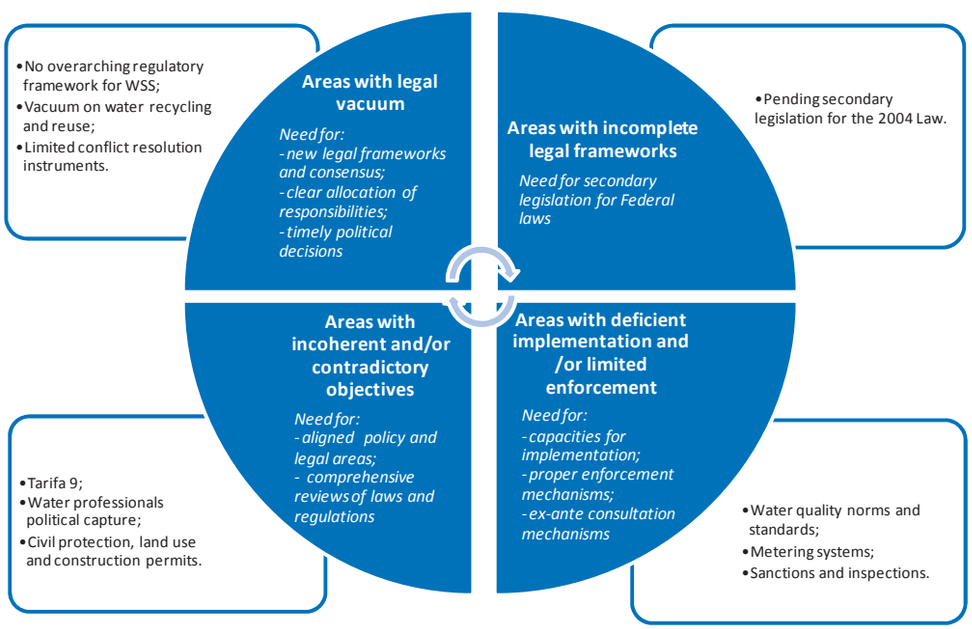
Many water governance challenges experienced by Mexico are not specific to the sector, but relate to a wide range of institutional challenges and raise the critical issue of

enforcement. These challenges concern issues of compliance, accountability, uneven nature of decentralisation and informality, as well as quality and capacity of the public administration. In Mexico, the water sector is faced with a combination of these challenges due to its intrinsic characteristics: it is both a local and global issue, it has many spillovers on related policy areas (agriculture, energy, spatial planning, education, tourism, etc.), it involves large sunk investments, and it is a cornerstone for development. The following sections aim to identify the grey areas in Mexico's water governance framework and the main multi-level governance gaps that need to be bridged for effective implementation of the 2030 Water Agenda.

Grey areas in water policy framework

Several of the 2030 Water Agenda's initiatives point to the need to update, abrogate and renew legal frameworks or to the need to design new frameworks that improve the sector's governance. Amongst these initiatives are those related to the 1981 Federal Duties Law, the regulation of the 2004 National Water Law, the Law on Water Supply and Sanitation under discussion, which is now under preparation, as well as the Law on Improvement Contributions of Federal Public Works in Water Infrastructure.[8]

Figure 1.5. **Tentative classification of grey areas in Mexico's legal frameworks**



Missing or incomplete legal frameworks

Missing legal frameworks have different origins and hinder the development, sustainability and efficiency of the water sector. They often occur in complex, technical and sensitive fields characterised by the absence of political consensus and fragmented decision making. One example is the lack of a **comprehensive legal framework for water supply and sanitation** at the federal level. This sub-sector has been operating under self-regulatory arrangements with no overarching principles at federal level beyond the allocation of responsibilities to states and municipalities. In February 2012, access to water as a human right was incorporated into the Constitution, re-opening debate on the

allocation of roles and responsibilities for service provision at different government levels: the federal level is responsible for the human right to water, but service provision is in the hands of municipalities.[9] A draft law proposal regarding water supply and sanitation is under discussion with stakeholders, and is expected to be passed in 2013. Another example is related to **hazardous substances**. The introduction of the Law of Wastewater Treatment and More Stringent Controls by SEMARNAT, which charges large industrial users effluent fees based on the quality of their water discharges, has not prevented the use of hazardous chemicals in industry, agriculture or mining. As a result, poisonous substances continue to seep into aquifers through lixiviation or sedimentation (Barkin, 2005), having a major impact on drinking water quality.

Mexico has no regulatory standards for **rainwater harvesting** or the use of **grey water**. While the Mexican Constitution explicitly identifies certain thresholds for state water ownership (i.e. state property), harvested rooftop rainwater is mostly excluded, and is only partly covered by technical norms on drinking water and wastewater treatment. In the absence of regulatory standards that clearly define who is in charge of what, a myriad of informal institutions are active in this area, offering guidance and informal standards (Meehan, 2010).

The country also has no overarching framework to deal with **social conflicts** in the water sector.[10] Social conflicts are particularly acute in three areas (Castro *et al.*, 2006): *access* to drinking water and sanitation; *quality* of service provision (interruption, administration, informal water sellers); and *disputes* around water allocation (control of water systems, extraction from aquifers, etc.). In informal settings, communities sometimes provide *ad hoc* mechanisms for conflict resolution (Meehan, 2010). In cases where the federal or state level is responsible for delivering services and/or managing resources, communities often act as both the jury and the judge in solving complaints. Most conflicts end up in court where judgements can take several years. Mechanisms such as "water courts" in Spain can provide interesting lessons for Mexico. These historical bodies, based on customary law as well as popular and oral practices, arbitrate over irrigation management issues across user communities. Several countries, including France, have also empowered river basin authorities with functions to mediate water use conflicts.

The **subordinate regulation** for the 2004 National Water Law is still pending, which hinders effective decentralisation of water resources management. While several federal laws have been amended in the last decade, there has been no coherent approach to legal reviews by sector.[11] The 1992 National Water Law, which was amended in 2004, represented a major breakthrough in the decentralisation of water resources management, but no subordinate regulation has been issued. This has affected the water sector in several ways. First, river basin councils were created by the 1992 law as co-ordination and consensual bodies, but they were not given the necessary powers and regulatory functions to carry out their duties. In the absence of subordinate regulation, these institutions were left with no updated roles and attributions, and very limited technical, capacity and financial resources. Second, though the 2004 law foresees climate change mitigation measures, there is no secondary legislation to provide an updated framework regarding water volumes and/or recovery. Third, the 2004 law created various legal and administrative concepts (*cuota de garantia*, water banks and public participation), which still require subordinate legislation for proper use and enforcement.

Incoherent legal frameworks

Responsibilities for providing water services to **illegal settlements** following the recent adoption of water as a human right are unclear. Irregular settlements are not uncommon, particularly in big cities.[12] The 2012 constitutional amendment to Article 4 of the Constitution implies providing universal access to drinking water regardless of geographical conditions and urban configurations. However, it does not provide guidance on who should be responsible for: *i)* connecting illegal settlements to service provision and *ii)* bearing the risk and high costs of infrastructure.

Contradictory **water pollution regulations** can also hinder integrated water policy. The Ministry of Agriculture (SAGARPA) is in charge of regulating and inspecting the use of fertilisers in irrigation areas, while CONAGUA is responsible for overseeing the water quality norms and standards issued by the Ministry of Health. The 2030 Water Agenda foresees taxes for environmentally damaging products, such as agrochemicals and pesticides, as an alternative for non-point pollution problems, which require co-ordinated efforts with agriculture. These taxes are contemplated where the options for direct control of discharges or prior treatment are not possible. For example, a decrease in pollution could be achieved by reducing the amount of agrochemicals applied in agricultural production processes; however, the implementation of this type of measure would require that SAGARPA review and promote internationally proven practices and principles, such as the Polluter-Pays principle, and avoid non-point pollution by herbicides and agrochemicals without damaging productivity.

Weak implementation of existing legal frameworks

In many cases, improving water governance does not necessarily require the adoption of new laws, regulations and subordinate legislations, but rather the enforcement and compliance of already existing legal frameworks. For example, **wastewater** discharge-related sanctions established in the 1981 Federal Duties Law are rarely enforced, and inspections to ensure their compliance are conducted infrequently because the Law does not clearly specify which institution is responsible for this task – a task that could come under PROFEPA. The 1981 law also foresees metering systems for concession titles holders and agricultural pump level reporting. In practice, however, the volumes allocated through concession titles are largely exceeded because this provision is not enforced on the ground, and there is no consolidated metering network that could provide accurate information. Initiative 6 of the 2030 Water Agenda aims to "reinforce systems to measure and ensure the compliance with the volumes" but in practice CONAGUA does not have the human, technical or financial capacity to undertake this task. In the April 2012 regulatory impact analysis presented to the Federal Commission for Regulatory Improvement (COFEMER), CONAGUA stated that countrywide, 190 inspectors conduct an average of 570 **inspections** a week. Although this number has increased over time, it is still insufficient to control the use of metering and volumes extracted (SEMARNAT, 2011b). Furthermore, additional skilled staff is needed to guarantee the oversight of national waters. Similarly, several Mexican **norms** setting compulsory **standards** for technical and operational aspects are not enforced (on average, 1 or 2 out of 46 quality standards are measured, depending on local capacities and information from utilities). Here again, inspections by the Ministry of Environment or the Ministry of Health are insufficient to address the magnitude of the challenge.

Multi-level governance challenges for implementing water reform

Institutional and territorial fragmentation in Mexico's water sector generates multi-level governance "gaps" that need to be diagnosed and bridged to make water reform happen. As in most OECD countries that have largely decentralised their water policy, the multiplicity of stakeholders intervening at basin, municipal, state, national and international levels raises significant challenges for managing interdependencies across policy areas and between levels of government. The *OECD Multi-level Governance Framework* (OECD, 2011) classifies into seven categories key co-ordination and capacity gaps that countries frequently face, regardless of their institutional setting (unitary, federal), hydrographic characteristics (water-rich or water scarce) and organisation of water policy (centralised, decentralised). These gaps vary in degree by country, but they can be mutually reinforcing and should be considered in a systemic way.

Table 1.2. **Multi-level governance gaps hindering Mexico's water reform**

Type	Description and examples
Administrative gap	Mismatch between administrative and functional units (water bodies, municipalities, metropolitan areas, regions, states) and hydrological boundaries and imperatives.
Information gap	Asymmetry of information across stakeholders, limited standardisation, incomplete REPDA and metering system => public disclosure and harmonisation are key concerns
Policy gap	Misaligned policies and silo approaches across water, energy, agricultural, territorial development and financing policies
Capacity gap	High turnover among water professionals, limited training programs for technical, administrative and management staff;
Funding gap	Very limited own-source revenues at sub-national level; Huge reliance on federal programmes and CONAGUA resources.
Objective gap	Lack of continuity of public policy at local level because of limited political mandates (3-year term of Mayors); Contradictory motivations of RBO and RBC leadership
Accountability gap	Limited stakeholder engagement in WRM (farmers and indigenous communities) and WSS (users and consumers); Limited official mechanisms to channel' demands

Sources: Adapted from OECD (2011), *Water Governance in OECD Countries: A Multi-level Approach*, OECD Publishing, Paris, doi: 10.1787/9789264119284-en; Charbit, C. (2011), "Governance of Public Policies in Decentralised Contexts: The Multi-level Approach", *OECD Regional Development Working Papers*, 2011/04, OECD Publishing, Paris, doi: 10.1787/5kg883pkxkhc-en; and Charbit, C. and M. Michalun (2009), "Mind the Gaps: Managing Mutual Dependence in Relations among Levels of Government", *OECD Working Papers on Public Governance*, No. 14, OECD Publishing, Paris, doi: 10.1787/221253707200.

Administrative gap

The administrative gap refers to the mismatch between administrative and functional units on the one hand, and hydrological boundaries on the other hand. In the water sector, a major challenge lies in the fact that the administrative boundaries of municipalities, regions and states rarely correspond to hydrological imperatives (rivers and aquifers' boundaries). This results in a mismatch at the sub-national level that often obstructs water policies and complicates the relationships between elected representatives, local authorities, water agencies, resource managers and end users. Historically, water bodies have been organised along administrative boundaries, although river catchments rarely obey administrative logic. Management failures, such as a lack of co-operation, participation and transparency, are often rooted in the hydro-administrative mismatch. For example, regarding water resources management, it is difficult to enforce water quality regulations and water abstraction rules where two or more water management

bodies are in charge of different sections of one river. In water services, the administrative gap raises the question of the "appropriate" scale for investments and service delivery to pool resources and capacity and reap the economies of scale. In addition, metropolitan areas, with their overlapping jurisdictions and political fragmentation, can lead to incoherent and, at worst, mutually contradictory water management practices.

Box 1.4. **Water supply and sanitation management in rural areas and isolated communities**

In Mexico, state legislation has established several mechanisms to manage water and sanitation services (WSS) in isolated areas. The range of options includes **rural boards** to manage drinking water services (e.g. Chihuahua), **rural water committees** (e.g. Guanajuato, San Luis Potosi), management units for water sustainable development (e.g. Tabasco) and **community organisation programmes** (e.g. Guanajuato and Tabasco).

In the state of Oaxaca, where 53% of the population live in rural areas, the government has developed an extensive programme called "A Culture of Water" to extend WSS, build capacities and foster rational use in rural areas based on exchanges and dialogues with the communities. Several actions were carried out in rural regions to: *i)* raise awareness on hygiene measures and required equipment; *ii)* equip communities with drinking water and wastewater treatment facilities; *iii)* conduct bacteriology analysis and capacity building on disinfection practices; *iv)* carry out state-wide information campaigns; and *vi)* open cultural centres on water with learning material and organised activities. As part of these efforts, municipalities and villages were engaged to provide equipment, design work plans and to publish monthly newsletters. Impacts have been very positive in terms of WSS coverage extensions and drop in water-related diseases cases. Lessons learnt from the state of Oaxaca's experience include the **key role of women** on health and the acquisition of better hygiene measures, the influence of **informed children** on adult behaviours, the need for support from government authorities and the overall benefits of such actions on community social well-being.

Sources: Galindo, E. and J. Palerm (2012), "Toma de Decisiones y Situación Financiera en Pequeños Sistemas de Agua Potable: Dos Casos de Estudio en El Cardonal, Hidalgo, México", *Región y sociedad*, año xxiv, No. 54. pp. 261-298; Amilpa, E.A. (2011), "Gestión Comunitaria de los Servicios de Agua y Saneamiento: Su Posible Aplicación en México", United Nations, México.

Mexico has undertaken important steps to bridge the administrative gap: for example, the creation of 13 hydro-administrative organisations as CONAGUA regional offices and the design of regional water programmes, which reflect the main initiatives of the 2030 Water Agenda at the territorial level. But the gap between administrative and hydrological logics is still acute for aspects related to organisation, regulation and information exchange. For water supply and sanitation, finding the appropriate service delivery level (local, inter-municipal, state) to reap the economies of scale is still a significant challenge.[13] With some exceptions, many municipalities count multiple and fragmented water utilities, without the appropriate autonomy, technical or financial resources to properly carry out their duties.

Better co-ordination between river basin councils and river basin organisations' jurisdiction is needed to bridge the administrative gap. As part of the technical study carried out prior to the design of the 2030 Water Agenda, Mexico was divided into 168 cells at the intersection between hydrological regions and administrative

boundaries within a given state. This can help to align hydrological and administrative boundaries while creating sub-regions for better planning at the "unit" level. The unit levels are then encompassed into larger hydro-administrative units, allowing for a certain level of co-ordination. However, this strategy does not entirely solve the challenge because river basin organisations report to different constituencies than river basin councils (see Chapter 2 on strengthening river basin governance), which can make co-ordination difficult at times.[14] River basin councils' auxiliary bodies work mainly at sub-river basin levels, and therefore tend to be closer to users and communities, but they are not institutionally linked to the hydro-administrative regions. There is also scope for increasing the participation of irrigation districts and units to save water, and to develop water pricing (see Chapter 3 on economic efficiency and financial sustainability), which would significantly contribute to the sustainability of catchments and the balance of aquifers and should be linked to efforts related to water trading .

Transboundary water challenges also contribute to the administrative gap. Mexico shares eight catchments with its neighbouring countries: three with the United States (Grande, Colorado and Tijuana), four with Guatemala (Grijalva-Usumacinta, Suchiate, Coatán and Candelaria) and one with both Belize and Guatemala (River Hondo). Discords subsist between Mexico and the United States despite the signature of bi-national agreements.[15] With population growth on both sides of the border, water needs within a context of recurrent droughts and serious concern about water supply for agriculture and other economic activities have increased over the last few decades (Castro Ruiz *et al.*, 2011). Issues such as boundary demarcation, national ownership of water, sanitation, water quality management and flood control are part of the solutions sought by the International Boundary and Water Commission (IBWC).

Information gap

Despite significant achievements in recent years, the asymmetry of information across public agencies, local authorities and levels of government remains an important challenge for Mexico's water policy. In particular, CONAGUA has made important efforts to build and consolidate databases (see Annex 1.A2) such as the **National Water Information System** (SINA) and produce the annual **Mexico Water Atlas**, which discloses key geographical and statistical data in the sector. Still, the downscaling of such information at local, state and basin levels has not entirely been achieved, and data collection remains somewhat fragmented across multiple institutions, with limited standardisation. Several Mexican institutions (e.g. the National Institute of Statistics and Geography [INEGI], IMTA, the National Association of Water and Sanitation Utilities [ANEAS], universities, research centres and government agencies) and NGOs (e.g. *Consejo Consultivo del Agua*) have also contributed to better access and quality of information in the water sector. For example, the **Water and Sanitation Information System** (SIAPS – *Sistema de Información de Agua Potable y Saneamiento*) was developed by a pool of institutions led by the College of Mexico (COLMEX) as a geographical database disaggregating water supply and sanitation information to the lowest local level possible (colonies and blocks) while better taking into account the local situation. Another example is the **Water-flows Stimulator** (SIATL – *Simulador de Flujos de Agua de Cuencas Hidrográficas*), which was developed by the INEGI in 2010 as a

tool to support planning projects, infrastructure building and water resources management, as well as the prevention of flood and natural disaster.

The **Public Registry of Water Rights** (REPDA) is incomplete, and the establishment of an accurate metering system is only in its initial stages of development.[16] In 2010, for instance, the measurement of concessioned water attained 9.5% of the total volume of national water, i.e. slightly more than the 9% that had been established as a target in the National Water Programme (2007-12). The measurement concentrated on ten priority aquifers from Chihuahua, Zacatecas, Guanajuato and Puebla that are overexploited and require particular attention (SEMARNAT, 2011b). The National Water Law conditions the allocation of concession titles to the information on average annual availability of water in the river basin or aquifer concerned. In 2010, CONAGUA had published information on 282 aquifers (out of a total of 653 in the country), from which 84% of the groundwater is extracted, as well as information on 722 watersheds (SEMARNAT, 2011a). Some initiatives in the 2030 Water Agenda are a good step towards bridging the information gap.[17]

Information gathering at the federal level needs further systematisation and consensus to provide a common frame of reference across levels of government. Water quality and quantity data gathered as part of the **Water Geographic Information System** (SIGA – *Sistema de Información Geográfica del Agua*)[18] and the **National Bank on Surface Water Data** (BANDAS – *Banco Nacional de Datos de Aguas Superficiales*)[19] provide support to local-level water planning and management tasks. Basic information on social, economic and environmental trends can be accessed in CONAGUA's annual statistical book, but further efforts are needed on consumption levels, user surveys, tariffs, financing and capacities at the sub-national level. Quality and reliability of such data may be strengthened through greater consensus on methodology and rely on third-party verification mechanisms beyond CONAGUA in order to agree on a common framework to be used by water managers. There have been some attempts from NGOs and academia to provide a national information portal or a clearing house in support of decision making. In 2004, for example, the *www.agua.org.mx* online portal was created as an easy-to-use virtual platform to offer a one-stop entry point for selected water information. The platform also holds a thematic library and has developed virtual workplaces for innovative solutions to water challenges. In addition to receiving data from all over the world, the platform has developed several specific tools including a guide on water and sustainable building and guides for service providers and for teachers. Since 2004, the portal has received an average of 4 000 visitors per day and it has 3 500 members.

There are also good practices at the regional level for better information sharing that deserve attention. Documents published at the federal level rarely contain detailed information on the local situation, and local official publications are often inexistent. To address this, in 2004, representatives from nine states agreed to develop an information system on water quantity (availability and coverage) and quality for the various river basins and sub-basins in their region. The **Water Information System for the Central-West Region** (SIARCO) was created and financed with state funds. A technical body was established to oversee data collection and monitor public disclosure. Since then, SIARCO has promoted inter-institutional participation (with state water commissions, universities, etc.) to exchange good practices and share transparent mechanisms for data gathering and the production of information on water. It serves as a database for all water management bodies in the region, and it supports the design of a regional water programme. In addition, SIARCO uses indicators to evaluate the state of the region's water sector, and promotes knowledge sharing with civil society to foster social participation.

Further progress is needed towards better information harmonisation and public disclosure across federal, state, basin and local actors. For example, a common methodology on key performance indicators related to utilities would help. At present, in addition to utilities' own performance indicators, CONAGUA, IMTA and the Water Consultative Council have developed three different sets of indicators. Current co-ordination efforts between CONAGUA and INEGI, as part of the technical committee specialised on water, are a valuable step to improve the reliability of federal information and facilitate its wider dissemination to constituencies and end users.[20]

Information currently used for internal purposes could be useful to the wider community, for example, information regarding the amount of funds allocated and spent by the various federal programmes is only available through the **Information System of Basic Water Services** (SISBA – *Sistema de Información de Servicios Básicos del Agua*), which tracks the physical-financial execution of infrastructure development. According to evaluations of the Rural Waterworks Development Program (PROSSAPYS – *Agua Potable y Saneamiento en Comunidades Rurales*) (CONEVAL and SEMARNAT, 2012), SISBA information is not always up to date because the system relies on states to send their information to CONAGUA prior to insertion into the system. For some federal programmes (Urban Potable Water and Sewerage Program [APAZU – *Programa de Agua Potable, Alcantarillado y Saneamineto en Zonas Urbanas*], Clean Water Program), performance evaluations pointed out missing data related to the specificities of beneficiaries, the geographical distribution of investments, the link between target population and served population and specific performance indicators to monitor their impacts.

Policy gap

Fragmentation of water-related tasks across line ministries and public agencies hinder water reform implementation in Mexico. Despite CONAGUA's participation in **several high-level bodies** (see Annex 1A.4) at present, water, energy, agriculture and fishery policies are not aligned in Mexico, and decisions taken in other policy areas can have significant consequences for water use and availability. For instance, **energy subsidies** to farmers have detrimental impacts on groundwater management and water demand, which works against water policy effectiveness. Yet, there are some good practices that could serve as examples. Established by the General Law of Climate Change (issued on 6 June 2012), an **Inter-ministerial Commission on Climate Change** (CICC – *Comisión Intersecretarial de Cambio Climático*) was created to co-ordinate all actions of the federal administration in relation to the formulation of national policies to prevent and mitigate climate change impacts and to promote strategies and programmes to comply with international commitments. It is composed of 13 ministries (SEMARNAT, SAGARPA, Communication and Transports, Secretary of Social Development [SEDESOL – *Secretaría de Desarrollo Social*], Ministry of Economy, Ministry of Foreign Affairs, Ministry of Health, Ministry of Finance and Public Credit, Ministry of the Interior, Ministry of Tourism, Ministry of Navy, Ministry of Energy and Ministry of Public Education) which all contributed to the preparation of the National Strategy on Climate Change and developed criteria for a whole-of-government approach to public policies that the federal administration will apply when dealing with climate change.

There is a need to foster coherence between water and urban development policies at the local and municipal level. In some municipalities, permits are granted without the need for water operators' approval or consultation. This lack of co-ordination imposes excessive costs, which are borne, without proper retribution, by utilities.

Box 1.5. **Managing water-related risk in Mexico: A call for policy co-ordination**

CONAGUA has been leading efforts to mitigate the impacts of hydro-meteorological risks in Mexico, such as flooding and tropical cyclones, and has developed a **large hydraulic infrastructure network** of approximately 4 000 dams to store water that is expected to produce and regulate water flows for flood control, which is beyond the dam's primary functions (producing electricity for irrigation and supplying drinking water). Currently, CONAGUA is implementing two main projects in large flood prone areas: *i)* the **Integrated Hydraulic Plan of Tabasco** (PHIT – *Plan Hidrico Integral de Tabasco*) seeks to initiate the construction of embankments, dikes and protection walls, river drainage, flood control infrastructure to protect urban settlements from natural disaster; and *ii)* the **Hydraulic Sustainability Programme of the Valley of Mexico** (*Programa de Sustentabilidad Hídrica del Valle de México*) aims to increase the number of drainage branches to the Valley of Mexico's hydraulic system and reduce vulnerability in the valley through the construction of a 62 kilometre long wide tunnel.

Although some risk-related structural measures have been solely CONAGUA-led, the management of environmental risks related to water often calls for a co-ordinated and coherent approach across policy areas and institutions. For instance, over the last decade, CONAGUA and the National Centre for Disaster Prevention (CENAPRED – *Centro Nacional de Prevención de Desastres*) have worked together to develop **flood warning systems** to protect the most densely populated areas. The Fund for Natural Disaster Prevention (FOPREDEN – *Fondo para la Prevención de Desastres Naturales*) has been instrumental in this process, financing projects at the state and municipal levels. However, these co-ordinated efforts happen mainly on an *ad hoc* basis because Mexico's current institutional setting makes it difficult to achieve coherent territorial management policy, where the three levels of government could merge forces to reduce exposure of informal settlements. River beds and their surroundings are under the authority of CONAGUA, while land use and urban policies are the responsibility of the municipalities in 60% of the country's territory and are often designed with very little link to information about environmental risks.

Positive signs have been observed in 2012: information gathering is better co-ordinated with **consensus forecasts for tropical cyclones** elaborated jointly by the various meteorological organisations. The establishment of FOPREDEN also demonstrates the federal government's commitment to a **comprehensive risk management approach**. Prioritisation of investments in prevention and mitigation should be performed based on the **National Risk Atlas**, and with a wide consultation and co-ordination of the policies among key federal agencies, including CONAGUA, SEDESOL, SEGOB, CFE, SEMARNAT, the states and the municipalities to prioritise and channel prevention funding accordingly. In this respect, the development of the 2030 Water Agenda indicates a major shift in CONAGUA's approach to flood risk reduction. The agenda has a strategic line aiming to ensure that "settlements safe from catastrophic floods" (CONAGUA, 2011a) and several non-structural initiatives that have a strong focus on land use and territorial planning. Another positive sign observed is the recently adopted **2012 General Law for Civil Protection**, which states that risk atlases are binding instruments for the development of land-use plans at the municipal and state level. These atlases are developed at federal level as part of the Integrated Information System on Disaster-related Risks (*Sistema Integral de Información sobre el Riesgo de Desastres*) and provide simulation scenarios, security recommendations and prevention measures to help mitigate the impact of disasters. As the appropriate tools are in the process of development, territorial planning will remain on the front line of the policy agenda in coming years.

Source: OECD, (forthcoming), *OECD Reviews of Risk Management Policies, Review of the Mexican National System for Civil Protection*, OECD Publishing, Paris.

Important progress is underway to better co-ordinate water, land use and territorial development strategies at the federal level. Initiative 9 of the 2030 Water Agenda foresees co-ordination agreements between CONAGUA and CONAFOR for intensive reforestation programmes associated with soil conservation in priority catchment. The agenda also suggests the creation of a **National Observatory of Territorial Development** (Initiative 16). However, land-use planning attributions are spread out between the three branches of government and within the federal government, which has an impact on the 2030 Water Agenda policy goal related to "settlements safe from catastrophic floods". Numerous human settlements in Mexico are increasingly under water pressure and vulnerable to floods, particularly in known high-risk zones that are not always duly marked out on flood maps. Municipalities are responsible for land use, construction and zoning permits, land reserves for urban development, housing and ecological preservation, as well as the creation, evaluation and enforcement of urban development plans. Similarly, they have prerogatives over land planning programmes, which regulate ground uses outside of population centres. CONAGUA, however, is in charge of river beds and river banks, therefore, in the absence of a federal land-use planning strategy, capacities are fragmented and weakened, and municipalities' objectives often compete, causing the dispersion of institutional resources, a lack of co-ordination between authorities, and limited effectiveness of programmes and public policies.

Co-ordination is also needed across the multi-level planning system of Mexico, both within and outside the "water box". The 2030 Water Agenda addresses this in part by highlighting that "the formulation of national, sectoral and territorial programmes should be guided and co-ordinated with a long-term vision, not synchronised with changes in administration, and fully harmonised in their aims, contents and tools".

Capacity gap

Mexico's water sector is characterised by an important capacity gap, both for water services and water resources management that is generated by insufficient scientific and technical expertise and infrastructure for designing and implementing water policies. When there is a difference between the capacity needed to shoulder water responsibilities and the local authority's organisational, technical, procedural, networking and infrastructure capacity, consequences for the implementation of national water policies are unavoidable.

Most municipalities and states do not have the necessary staff, skills, expertise, know-how and infrastructure to ensure adequate water service delivery. Funds allocated by federal programmes to sub-national governments sometimes raise absorption capacity challenges (e.g. capacity to develop good projects at local level, capacity to implement them, etc.) and have to be returned (with penalties) in the absence of projects. In addition, the availability and quality of infrastructure (*hard* capacity) vary across the country. Mexico has 2 186 wastewater treatment plants in operation, processing 46.6% of the total of wastewater collected by formal sewage systems at the municipal level. Only 15 were rehabilitated between 2007 and 2010 (CONAGUA, 2011b). A recent study in the north of Mexico (Dominguez, 2012b) pointed out that "low efficiency in the distribution network is due to high losses, bad sectorisation […] and pipeline collapses in the sewage network […] due to lack of maintenance". Some infrastructure projects are underway with the objective to process 69% of the total wastewater collected by 2014.

The professionalisation of water staff is a key challenge for capacity building at the state and municipal level. Notably, it would involve a recruitment process based on competences and terms of appointment that do not coincide with political cycles. In the absence of a merit-based civil service, virtually all water managers and other municipal officials are politically appointed and likely to leave at the end of the mayor's three-year term. Most water professionals are therefore subject to high turnover rates, undermining the sector's efficiency and performance. Initiative 11 of the 2030 Water Agenda seeks to promote the systematic certification of management and technical staff of drinking water and sanitation utilities, and to create a National Civil Service Career System in the water sector. Therefore, staff with capacity and experience would be encouraged to seek certification and remain in their positions. At present, although with a few exceptions, water utilities do not have permanent training programmes for technical, administrative and management staff. The Management Committee of Competences created in 2010 foresees the development of training services and the transfer of technical resources from limited and small systems to modern and self-sufficient ones.

However, it is important to note that a Civil Service Career System faces several challenges, such as:

- diversity in size and economic capacity of utilities that could result in the monopolisation of better professionals by the larger utilities;
- municipal human resource management policies, which may impose a cap on salaries; and retribution, which may deter good professionals from entering the sector;
- lack of regulatory incentives for utilities to systematically improve performance;
- obstacles for mobility among utilities, which would be a negative incentive to acquire better technical skills.

Therefore, a market solution based on information sharing and disclosure and the obligation of utilities to post their vacancies would probably be more effective than a civil service solution, and it would be a good first step, especially if reinforced by improved regulation and publication of utility companies' performance.

Water resources management, river basin councils and their auxiliary bodies also lack specific training and knowledge. Many of their representatives, including some directors, are not water sector experts and carry out parallel responsibilities (e.g. farmers, etc.); therefore, they have little resources and time to devote to their tasks. Contrary to other sub-sectors, such as irrigation, direct federal funding in support of capacity building activities for river basin organisations is currently prohibited by the federal programmes' rules of operation. However, in recent years some progress has been made towards more capacity building for river basin councils and organisations.

Progress has been achieved in the past towards greater capacity of water managers. When CONAGUA was created in 1989, it inherited 35 000 employees, including 2 700 middle management positions. A large percentage of the middle management staff lacked planning and management knowledge, experience and training. In 1990, with IMTA support, CONAGUA started a postgraduate training programme to develop in-house expertise, and by June 1992, more than 100 professionals had graduated. At the time, the programme's focus was on technical supply-driven management rather than the consolidation of a system-wide, long-term capacity building programme that goes beyond *ad hoc* initiatives (Tortajada, 2001).

Funding gap

While public investment into the deployment of water infrastructures has been significant in recent years, major challenges remain to bridge the current funding gap. CONAGUA is the single biggest spender in the water sector with a budget reaching MXN 38.8 billion in 2012, i.e. close to 55% of the estimated total sector expenditures (see Chapter 3 on economic efficiency and financial sustainability). Mexico's water sector relies on earmarked transfers with very limited own-source revenues at the sub-national level. As a result, water policy is *de facto* dictated from the federal government through federal programmes that transfer resources to states, as water tariffs rarely cover the operation and maintenance costs. Initiative 12 of the 2030 Water Agenda, however, addresses the funding gap issue by promoting the definition of water tariffs that are set according to technical criteria rather than political considerations.[21] Most federal programmes are led by CONAGUA, except for the FONADIN and the Natural Disaster Fund (FONDEN – *Fondo de Desastres Naturales*), respectively carried out by the Ministry of Finance (SHCP – *Secretaría de Hacienda y Crédito Público*)/BANOBRAS, and SEGOB/SHCP/SFP. Their objectives range from the support to water services provision, technical and financial efficiency of operators and public entities, and capacity building, to the promotion of private sector participation; all of them support and finance the development of new infrastructures. They often target specific areas (e.g. municipalities of more than 50 000 inhabitants for the Program for Water Supply, Sewerage and Sanitation in Urban Areas [PROMAGUA – *Programa para la Modernización de los Organismos Operadores de Agua*]), rural areas for PROSSAPYS and actors (e.g. wastewater treatment operators for PROSANEAR [*Programa Federal de Saneamiento de Aguas Residules*] and Wastewater Treatment Program [PROTAR – *Programa de Tratamiento de Aguas Residuales*]).

Table 1.3. **Mexico's federal programmes in the water sector**

Federal programmes	Mission
APAZU – Urban Potable Water and Sewerage Program	Meet demands in drinking water and wastewater treatment
FONADIN – National Fund for Infrastructures	Support infrastructure development
FONDEN – Natural Disaster Fund	Support federal entities for the protection against natural disasters
FOPREDEN - Fund for Disaster Prevention	Supports federal level, state and municipality activities for risk assessment and reduction, including capacity building
Fund for Residual Water Treatment Programme	Improve the access and quality of sanitation services and strengthen utilities in charge of such services
PAL – Clean Water Program	Improve the quality of water to limit health risks
PRODDER – Water Rights Tax Rebate Program	Support improvement in efficiency and infrastructures for water and sanitation
PROMAGUA – Program for Water Supply, Sewerage and Sanitation in Urban Areas	Strengthen service utilities and promote environmental protection
PROME – Water Utilities Efficiency Improvement Program	Support and strengthen WSS operators
PROSANEAR – Federal Program for Wastewater Treatment	Promote Integrated water resources management principles and improve treatment of wastewater
PROSSAPYS – Rural Waterworks Development Program	Support local governments and WSS operators in rural areas
PROTAR – Wastewater Treatment Program	Maintain and improve wastewater treatment facilities

However, federal programmes cannot address all the pressing problems in each river basin, and funds are not necessarily allocated according to the newly developed local, state and regional water programmes. Mismatches between the transfer of financial resources and actual needs at subnational level are frequent, and cost-effective and sustainable projects are rare, despite improvements by Congress in the last few years to the budget approval process. The National Water Law identifies means to ensure financial sustainability of the sector; on the expenditure side, it requires the planning system to include multi-annual investment plans (as well as annual operative plans), and on the revenue side, it specifies that water charges aim at prioritising demand management and recovering the cost of federal investments. Financing the 2030 Water Agenda will require a mixture of resources coming from water users (duties, concessions and services) and from taxpayers (budgetary allocations assigned directly or indirectly to water). At present, this mixture is excessively and increasingly supported by federal resources, a combination that is not sustainable and that needs to be reviewed to significantly diversify the flow of financial resources.

Synergies are needed across federal programmes to align policy objectives and ensure cost-effectiveness. For instance, a recent evaluation of PROSSAPYS (*Programa para la Sostenibilidad de los Servicios de Agua Potable y Saneamineto en Communidades Rurales*) found that some rural and marginalised areas have not made full use of the resources they were provided because PROSSAPYS does not have a strategic planning mechanism in place to direct the efforts and allocation of resources to the areas in greater need, (Dominguez, 2012). The programme's reliance on INEGI's definition of rural area (less than 2 500 inhabitants), even though some of the localities targeted are above this threshold yet still have rural patterns, may also contribute to the lack of funds distributed to in-need areas. In addition, PROSSAPYS, Clean Water Programme (PAL) and APAZU could be better co-ordinated to support highly marginalised rural and urban zones in the first range, i.e. localities below 2 500 inhabitants and between 2 500 to 14 999 inhabitants. PROSSAPYS, PIBAPI (Program of Basic Infrastructure for the Care of Indigenous People) and the Program for the Care of Priority Zones are in the hands of the SEDESOL and could be co-ordinated by a revision of their rules of operation to streamline objectives and reduce overlaps and duplications.

Objective gap

Implementation of the water reform can be hindered by divergent objectives across the administration and among levels of government. An objective gap is often experienced in the areas of tariff setting, zoning and construction policies, electricity subsidies and irrigation. While CONAGUA and municipalities have different approaches for **at-risk settlements** in urban areas or the connection of new settlements to infrastructure networks (e.g. potential flooding), there is no mechanism compelling municipalities to follow CONAGUA's guidance and declare at-risk zones as dangerous for settlement. Construction permits are issued in an uncoordinated manner, and unsafe human settlements have proliferated increasingly in recent years. Some of the 2030 Water Agenda's initiatives aim to establish a mandatory **ecological land management programme** in all Mexican municipalities (Initiative 15), strengthen capacities of municipalities as regards **civil defence** (Initiative 19) and increase fines to civil servants who allow the non-compliance of **land-use plans** in urban development (Initiative 22). However, beyond the contemplated creation of a ministry of territorial development, the Agenda does not explicitly address the need to align objectives across multiple authorities with regard to zoning and construction policies. Regional water programmes

(CONAGUA, 2012b) and action programmes for sustainable water management at state level (CONAGUA, 2012c) produced after the 2030 Water Agenda can help to align objectives at sub-national level with respect to project portfolios.

The divergent objectives across policy areas and political calendars in Mexico hinder water reform implementation and coherence. There are multiple areas where conflicting goals and targets work against water policy objectives. For example, reducing overexploitation of aquifers requires consensus across sectors and water users (domestic, agriculture, industry, tourism) or accompanying measures to manage trade-offs. Without consensus, progress cannot be achieved. Agriculture is the biggest consumer of water and the largest beneficiary of subsidies, concessions and exemptions in Mexico's water sector. Similar to conflicting interests that may stem from **harmful subsidies** in water-related sectors, high **tariffs** can have a stagnating effect. For instance, tariffs charged to water-operating systems are usually higher than those charged to the industry. The optimal use of electricity tariffs by utilities depends greatly on the conversion and use of new, more energy efficient technologies. Currently, some large enterprises benefit from privileged access to aquifers, and they can obtain rights to drill wells or to exploit water surfaces without control. Most of these users pay inadequate tariffs to local utilities because the concessions for their water sources were federally issued concessions (Barkin, 2006). The **limited mandate of mayors** (three years, without possibility of re-election) is another factor that undermines the continuity of public policy at the local level, and requires strong incentives for long-term planning (e.g. through multi-annual budgeting and investment plans), contracts across levels of government and capacity building.

Box 1.6. **Brazil's National Water Management Pact: An example of long-term vision for multi-level water management**

In 2011, 25 out of 27 Brazilian states signed the Brasilia Declaration to formally create a **National Pact for Water Management**. The declaration's objective was to strengthen the National Water Resources Management System and the State Water Resources Management Systems within a structured governance framework.

The pact establishes a national vision for future water management in Brazil and aims to ensure water safety, measure regulatory impact on sectoral policies, and articulate water management initiatives with other policy domains. It also sets goals for institutional development and implementation of water management instruments; qualitative and quantitative objectives for water management; and goals for harmonising criteria, procedures and regulation.

In June 2012, a presidential decree was passed, along with the commitment of the Ministry of Environment, the National Water Agency (ANA – *Agência Nacional de Águas*) and state authorities to support the National Pact. The next step (2013-22) will be to develop various agreements and **contracts across levels of government** to foster technical co-operation, information sharing and capacity building with dedicated financial resources.

A **Water Management Consolidation Program** was also designed to frame the implementation of the pact at the state level and to institute a results-based payment system between the federal government and the state secretariat in charge. A review commission with representatives from ANA and the Ministry of Environment will be responsible for overseeing progress and allocating funding.

Source: Based on data received from the Brazilian National Water Agency in September 2012.

Accountability gap

There is room for improving public participation, transparency and institutional quality in Mexico's water sector. The 2030 Water Agenda recognises that the "effectiveness of policies is intrinsically related with the control of human actions, which alter the state of water resources and make them unsustainable over the long term". Several water-related problems in Mexico require local control and solutions: e.g. trash disposal in areas close to rivers, streams and other water bodies, and aquifer recharge areas; domestic and industrial discharges into gullies and rivers; inappropriate disposal of dangerous waste; industrial discharge connections without pre-treatment in public networks; occupation of rivers and federal zones; leakages in networks, overdrafting of aquifers and poor groundwater quality; limited monitoring and measurement systems; lack of protection plans for populations and productive areas in flood plains.

The design of the 2030 Water Agenda allowed for nation-wide social participation that needs to be further exploited. Improvements can be made to strengthen the participation of consumers and users, establish appropriate channels for their demands, and integrate stakeholders who are not part of official channels. River basin organisations can also open up opportunities to develop stronger interactions between users and government bodies by providing an avenue to find common solutions to water management.

In water supply and sanitation, participation of users and consumers is heterogeneous and non-systematic in Mexico because there are limited official mechanisms to channel user demands. CONAGUA has developed a norm to provide guidance for interested parties' involvement in service evaluation and improvement. At present, utilities are responsible for the implementation and use of the norm. The government institution officially in charge of consumers' welfare, the Federal Consumers' Attorney (PROFECO – *Procuraduría Federal del Consumidor*) should in principle provide an efficient channel for consumers' water and sanitation services complaints. While their website posts complaints about electricity and telecommunications, thus far there have not been any complaints posted related to water and sanitation services.

Box 1.7. **Fostering transparency in Mexico's water sector**

Corruption is one of the largest challenges to surmount to achieve good governance and guarantee a safe and reliable water supply to cities, industry and agriculture. Since 2001, the **NGO Transparencia Mexicana** has been monitoring and evaluating corruption in Mexican public services and has shed light on the critical issue it has become. Based on data provided by households on the extent of bribery practices, a **corruption index** was calculated for various sectors. In the case of water and sanitation services (connection or re-connection to water and sewerage network), results show that the corruption level has decreased since 2001, but remains in 12th position among the 35 services analysed.

Corruption entails a wide range of practices that take place both within and outside of legal frameworks. In the **irrigation sector** for example, corruption risks are related to capital-intensive investments, bid rigging in tender procedures, failed operation and maintenance by irrigation officials, regulation of groundwater overdraft and health. Falsified well and concession registration are also common practices. In the Valley of Mexico, for example, it is estimated that there is one unregistered concession title for each registered one. The water bottling industry is also subject to malpractices, with bottling plants in some cases pumping water from clandestine wells or private sources.

Box 1.7. **Fostering transparency in Mexico's water sector** (*cont.*)

In 2010, the **Superior Auditor of Mexico** (ASF – *Auditoría Superior de la Federación)* published a report ("Result of the Superior Auditing of public account 2010" ["*Informe del Resultado de la Revisión de la Cuenta Pública 2010*"]) that shed light on irregularities and **illegal practices** in the management of **public financial resources and investment** in the water sector. ASF's report exposed CONAGUA's inability to provide trustworthy documentation to monitor how states manage their resources and insufficient information to allow for a comprehensive audit. Illegal practices were also highlighted in relation to the use of federal programmes' funds such as the APAZU (misuse of programme funds, violation of the rules of operation, etc.). Different tools have been developed and used in Mexico to curb corruption; promote case-specific action; and foster transparency, accountability and participation at all levels. In 2006, for example, civil society and *Transparencia Mexicana* experts oversaw the La Yesca hydroelectric plant's (state of Nayarit) call for tender process, which prevented overpricing from occurring. And in 2010 an independent evaluation was carried out by the **Evaluation Council for Social Development** (EVALUA) in Mexico's Federal District to look at how water policies were designed and implemented. The country has also used opinion surveys (e.g. metropolitan areas of Queretaro) to raise awareness on corruption.

Sources: WIN (2011), "Corruption Risks and Governance Challenges in the Irrigation Sector – What are the Priorities for Water Integrity", Water Integrity Network, Berlin; UNDP (United Nations Development Programme) (2011), *Fighting Corruption in the Water Sector: Methods, Tools and Good Practices*, UNDP, New York; Reynoso, (2010), *Evaluación Externa del Diseño e Implementación de la Política de Acceso al Agua Potable del Gobierno del Distrito Federal*, Universidad Nacional Autonoma de Mexico, Mexico; Transparencia Mexicana (2010), *Índice Nacional de Corrupción y Buen Gobierno*, Transparencia Mexicana, Mexico; Auditoría Superior de la Federación official website: *www.asf.gob.mx* (last consultation on 12 November 2012); Contralinea (2012), "Desfalco y Desperdicio en Manejo de Aguas Nacionales", press article, 24 April 2012, *http://contralinea.info/archivo-revista/index.php/2012/04/24/desfalco-desperdicio-en-manejo-de-aguas-nacionales*.

In water resources management, some bodies were conceived as participatory instances, such as river basin councils, COTAS and clean beach committees, but small-scale farmers and indigenous communities continue to be overshadowed.

Identifying options for reform and good practices to improve water governance

Encouraging co-ordination and building capacity are critical steps toward bridging multi-level governance gaps in water policy. Five areas are particularly important for the implementation of the 2030 Water Agenda:

- *Fostering policy coherence across water-related areas*. This applies especially to agriculture and energy that figure less in the 2030 Water Agenda than territorial development.
- *Creating incentives for making reform happen at all levels and beyond political mandates*. This implies consistent, multi-annual and mutually supportive national, state and regional water programmes that incorporate the 2030 Water Agenda's objectives.
- *Strengthening capacity at basin, local and state levels* for effective decentralisation and development of place-based, integrated policies.
- *Improving access, quality and disclosure of information* across levels of government in support of effective and inclusive decision-making processes.

- *Encouraging public participation* for more open and inclusive water policy design and implementation.

Box 1.8. **Tentative guidelines for effective management of multi-level governance**

- Diagnose multi-level governance gaps in water policy making across ministries and public agencies, between levels of government and across sub-national actors to help clearly define public authorities' roles and responsibilities.
- Involve sub-national governments in designing water policy, beyond their roles as "implementers", and allocate human and financial resources in line with responsibilities of authorities.
- Adopt horizontal governance tools to foster coherence across water-related policy areas and enhance inter-institutional co-operation across ministries and public agencies.
- Create, update and harmonise water information systems and databases for sharing water policy needs at basin, country and international levels.
- Encourage performance measurement to evaluate and monitor the outcomes of water policies at all levels of government and provide incentives for capacity building.
- Respond to the fragmentation of water policy at the sub-national level by encouraging co-ordination across sub-national actors.
- Foster capacity building at all levels of government. This implies combining investments into physical water and sanitation or "hard" infrastructure and providing "soft" infrastructure, i.e. mainly the institutions upon which water outcomes rely and their ability to fulfil their duties in an effective and co-ordinated way.
- Encourage a more open and inclusive approach to water policy making through public participation in water policy design and implementation.
- Assess the adequacy of existing governance instruments for responding to challenges identified and fostering co-ordination of water policy at horizontal and vertical levels.

Source: OECD (2011), *Water Governance in OECD Countries: A Multi-level Approach,* OECD Publishing, Paris, doi: 10.1787/9789264119284-en.

Foster policy coherence across water-related policy areas

Progress has been made to better co-ordinate water across ministries and public agencies. The Technical Council of CONAGUA is an inter-ministerial body in charge of approving and evaluating the commission's programmes, projects, budget and operations, as well as co-ordinating water policies and defining common strategies across multiple ministries and agencies (SEMARNAT; SEDESOL; Secretary of Agriculture, Livestock, Rural Development, Fisheries and Food [SAGARPA – *Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación*]; Treasury; Energy; CONAFOR; IMTA; etc.). Its role is to include NGO representatives, such as water users' associations, to further strengthen civil society participation. The Water and Public Works Operation Technical Committee, integrated by CONAGUA, CFE, IMTA and UNAM research institutions is another example of co-operation. It meets weekly to deal with all dam operating issues, including hydroelectric power stations, and to optimise water management. Mexico has also engaged in efforts to co-ordinate water policy with spatial

planning and energy strategies. The DUIS programmes (*Desarrollos Urbanos Integrales Sustentables*) aim to endow cities with basic services that do not damage the environment or the quality of life. The Federal Electricity Commission and CONAGUA are involved in building and operating dams that to provide electricity and water supply to cities. Other inter-institutional agreements exist to co-ordinate human resources and financial, technical and material capacity when designing and implementing water projects in municipalities with a low development index.

There is still more to be done to foster coherence between water, energy and agriculture for effective policy implementation. CONAGUA participates in several high-level bodies (see Annex 1.A4), but these are mostly oriented towards day-to-day management and operational guidance rather than long-term strategy. As such, they are not adequate platforms to discuss critical issues such as harmful subsidies in water-related sectors or vulnerability to floods because of territorial development decisions. Technological fixes contemplated in the 2030 Water Agenda initiatives to improve coherence among the sectors are mainly engineer-driven and cannot solve the magnitude of the challenge related to irrigation (e.g. subsidies package, etc.). The lack of coherence is a critical challenge that must be addressed to find consensual paths for reform. The existence or creation of linkages between policy areas would provide a coherent institutional architecture and enhance water policy efficiency. It would also ensure that investment plans better reflect basin priorities and that public expenditures across sectors are better aligned with water policy objectives. The potential for policy coherence at the watershed level could be improved through the systematic involvement of river basin organisations and councils; this is an area that needs to be further exploited.

Some of the 2030 Water Agenda initiatives address policy coherence needs between water, land-use planning and territorial development, mainly through the creation of new institutions. In particular, the Agenda foresees the creation of a **Ministry of Land Use Planning** for a long-term land-use planning strategy; a **National Observatory of Sustainable Land Use Planning**; and a **National Development Planning Institute** to ensure the long-term harmonisation among different sectoral and territorial development policies in Mexico.

But, co-ordination across water-related policy areas can also be achieved through functional rather than architectural schemes, for example through inter-agency working groups, high-level ministerial taskforces (reporting to the presidential level), or truly inter-ministerial mechanisms that allow for regular and decisive consultation across federal entities. Such tools would help move from traditional *ad hoc* bilateral discussions between CONAGUA and other agencies (CONAFOR, SEDESOL, SAGARPA, etc.) to real multi-stakeholder platforms to define whole-of-government objectives and strategies while reducing transaction costs of multiple meetings. The current institutional set-up for dealing with climate change issues might serve as an example to mobilise key institutions of the federal public administration towards policy coherence (see Box 1.10). Efforts to include climate change considerations in every new programme, project or action promoted by sectors (not only the water sector) are underway. This is usually done by analysing the possible effects of a proposal on the environment through an *Environmental Impact Statement* presented to SEMARNAT.

Box 1.9. **Australia's National Water Initiative: A whole-of-government approach**

In 2004, the Council of Australian Governments (COAG), comprised of the Prime Minister, the premier and chief ministers of the states and territories, and the President of the Australian Local Government Association, agreed to a blueprint for Australia's continuing water reform. That blueprint is detailed in an inter-governmental agreement known as the National Water Initiative (NWI).

Through NWI, Australian governments committed to actions designed to achieve a nationally compatible market and a regulatory and planning-based system to manage water resources. The initiative is a shared commitment in recognition of the national imperative to increase the productivity and efficiency of Australia's water use, to service rural and urban communities, and to ensure the health of river and groundwater systems.

The NWI is a comprehensive reform agreement containing objectives, outcomes and agreed actions to be undertaken by governments across eight inter-related areas of water management:

- water access entitlements and planning;
- water markets and trading;
- best practice water pricing;
- integrated management of water for environmental and other public benefit outcomes;
- water resource accounting;
- urban water reform;
- knowledge and capacity building;
- community partnerships and adjustment.

The NWI established a schedule of deliverable outputs, approved by the initiative's signatories, which planned for most of the outputs to be completed by 2012. It also established the National Water Commission (NWC) to monitor the progress of jurisdictions against agreed national water reform milestones, assess the quality and direction of reform and impediments to its achievement, provide advice and guidance to governments, and audit the effectiveness of implementation of the Murray-Darling Basin Plan.

It provides regular reports on water management to COAG and the public because it places a high value on the public availability of information. In undertaking its monitoring and assessment roles, the NWC is independent of any jurisdiction, but responsible to the collective. Originally established with a sunset clause of 2012, the legislation enabling the NWC was recently renewed in recognition of the importance of its ongoing role.

In 2012, NWI remains an active reform agenda supported by most stakeholders. Many of its essential elements have been implemented, including substantial achievements in the implementation of water planning, water access entitlements and water markets. However, the full benefits of the initiative have not yet been realised. It is recognised that the timetable adopted for the completion of NWI's milestones was ambitious, and that several of the key reforms have proven to be technically and politically difficult, and demanding of scarce resources. COAG, with its supporting ministerial councils and senior officials groups, remains actively involved in the sustained, collaborative effort necessary to fully implement NWI, which continues to underpin necessary and important reforms to Australia's water management.

Box 1.10. **Positive efforts toward policy coherence in Mexico: The example of climate change**

In 2008, Mexico had the world's 13th highest greenhouse gas (GHG) emissions (excluding land use, land-use change and forestry) and it is among the most vulnerable countries to the impact of climate change: 15% of the territory, 68% of the population and 71% of GDP are highly exposed to direct adverse effects of climate change.

Significant impacts of climate change in Mexico

Sector	Impacts
Agriculture	– Lower productivity, particularly in a context of reduced water availability, though increases in carbon dioxide and temperatures can raise productivity of some crops in certain locations and types of soil.
Biodiversity	– Shift in location of ecosystems and species, with potential loss of species and habitats. – Increased wildfires, with negative impact on vegetation and animals.
Health	– Spread of contagious diseases and pests, along with the impact of heat waves, particularly in cities.
Vulnerable communities	– Economic impact on communities that are particularly vulnerable to climate variability – including small farmers and coastal communities – due to adaptation costs.
Water resources	– Increased demand for water for irrigation, livestock, industrial process cooling and human consumption. – Increased hurricane activity and intensity, affecting people's lives, economic activities and the natural environment around the Gulf of Mexico and on the Pacific coast.

However, Mexico has assigned a high political priority to tackling climate change and has shown international leadership. It has made great efforts in the last decade, taking a countrywide, mainstreaming approach rather than a narrow environment sector perspective.

Mexico's efforts include

- high-level political commitment (an inter-ministerial commission was created at presidential request in 2005);
- an aspirational target to reduce GHG emissions by 50% in 2050 compared to 2000 levels;
- a National Strategy on Climate Change in 2007;
- a dedicated federal Special Programme on Climate Change (PECC – *Programa Especial de Cambio Climatico*) in 2009;
- state-level plans, of which four are now in place.

PECC seeks to reduce GHG emissions by 51 Mt CO2 eq by 2012 compared to a baseline scenario. It includes 105 objectives and 294 targets for mitigation and adaptation measures in eight policy areas: integrated risk management; water resources; agriculture, forestry and fisheries; ecosystems; energy, industry and services; transport and communication infrastructure; land-use planning and urban development; and public health.

Mexico has also been a leader in identifying approaches for water-related adaptation in the international agenda (for instance, by organising the Dialogues for Water and Climate Change in the framework of the 16th Conference of the Parties to the United Nations Framework Convention on Climate Change [COP-16]) while introducing national measures such as standards for the artificial recharge of aquifers).

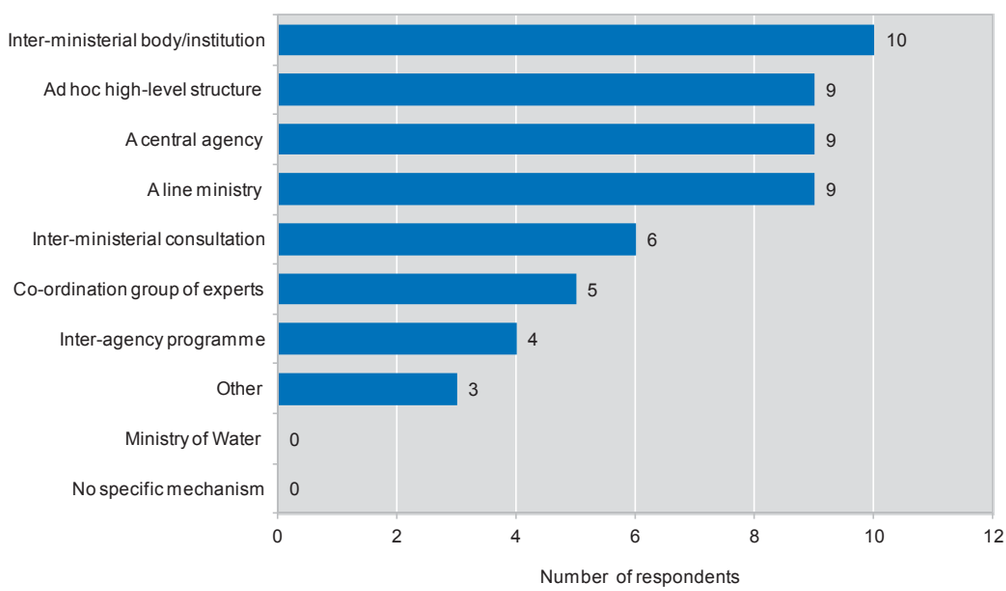
Some obstacles remain to further exploit synergies between federal environmental programmes and to foster more effective co-ordination between federal and state programmes, which is hampered by the lack of state environment plans and by the way the federal budget is formulated. While there are some state environment programmes in place they only reflect actions to be taken by state governments; they are not state environment plans that combine action by all government levels.

Sources: OECD (forthcoming 2013), *OECD Environmental Performance Review of Mexico*, OECD Publishing, Paris, forthcoming; and SEMARNAT (2009), "Programa Especial de Cambio Climático 2009-2012", SEMARNAT, Mexico D.F.

Several OECD countries have set up inter-ministerial mechanisms to foster policy coherence with water-related sectors (Figure 1.6). In France, the Inter-ministerial Mission on Water under the leadership of the Ministry for Environment, Ecology, Energy, Sustainable Development and Maritime Affairs and, more specifically, the Water and Biodiversity Department created in 1968, brings together all ministries concerned with water policies under the authority of the Prime Minister. This mechanism advises the government on any legislative project related to water resources. In 2009, Chile set up an Inter-ministerial Committee on Water Policies to advise on strategic planning, make proposals for institutional mechanisms and create incentives for implementation of water policies in rural and urban areas. The committee is led and co-ordinated by the Ministry of Public Works, and has representatives from the General Secretary of the Presidency, the Ministry of Economy, the Ministry of Agriculture, the Ministry of Mining, the National Energy Commission and the National Environment Commission.

Figure 1.6. **Water-related co-ordination mechanisms at the central government level in OECD countries**

17 OECD countries surveyed



Source: OECD (2011), *Water Governance in OECD Countries: A Multi-level* Approach, OECD Publishing, Paris, doi: 10.1787/9789264119284-en.

Create incentives for making reform happen at all levels and beyond political mandates

There is a range of options to overcome the discontinuity of political mandates and support medium- and long-term reform. In a political context where extending the mandate of mayors through constitutional reform may not be possible (and in any case is not the magic blueprint) many governance instruments can be contemplated to ensure that objectives and capacities are kept and improved over time. They include tools such as multi-annual budgeting and investment plans; inter-municipal arrangements; introduction of a professional career system for water professionals; and alignment across local, state, regional and national water programmes. Contracts among levels of government can also

help manage interdependencies in complex policy domains without requiring any specific constitutional or legislative change.

Box 1.11. **Fostering policy coherence across water-related areas**

Water and territorial development

In the **United Kingdom**, the Department for Environment, Food and Rural Affairs (DEFRA) has responsibility for the management of water resources and water quality policies and works with the Department for Communities and Local Government on links with development planning. One example is the development of regulations relating to the water efficiency of fixtures and fittings in new homes. Wider areas of responsibility, such as planning powers and policy, are also devolved to DEFRA. The Floods and Water Management Act (2010) closely links development planning with the delivery of effective flood risk and water quality management at national, regional and local scales. A National Flood and Coastal Erosion Risk Management Strategy is being produced by the Environment Agency to inform the production of local flood risk management strategies and plans by local authorities; this will also determine sustainable drainage applications for new development and roads.

In **Spain**, the harmonisation between water and urban planning is also ensured through river basin authorities (deconcentrated bodies of line ministries in regions), which regularly provide information on territorial development, fisheries, irrigation, infrastructure and other areas affecting the allocation of water.

Water and agriculture

In **Brazil**, ANA signed a technical co-operation agreement with the Ministry of Agriculture, Livestock and Food Supply in 2006 in order to better articulate water resources, agricultural and irrigation policies. Workshops are organised regularly to discuss water use in the agricultural sector. Previous thematic meetings include "The Present and Future of Irrigated Agriculture in Brazil from the View Point of Water Resources Management", "State of the Art Irrigated Agriculture in Brazil – The Point of View of Water Resources Management"; a Permanent Forum on Irrigated Agriculture Development provided by the Ministry of National Integration was also held.

Water and energy

In **Israel**, the co-ordination between policies for water allocations and energy consumption is explicitly addressed in the Israeli Water Authority's 2010 Master Plan for National Water and Wastewater Management, which includes several measures for minimising water-related demands on the national power supply (approximately 6% of the total national demand for electricity). These measures include adapting national energy demands to diurnal shifts and reducing costs, conserving energy and minimising greenhouse gases.

Source: Based on OECD (2011), *Water Governance in OECD Countries: A Multi-level Approach*, OECD Publishing, Paris, doi: 10.1787/9789264119284-en.

At the municipal level there is little capacity or incentive to promote multi-year investment programmes because the local Congress must approve them. The challenge, therefore, is to facilitate local authorities' access to **multi-year budgets**, perhaps based on the sequential completion of targets. **Inter-municipal arrangements** can also help pool resources at the sub-national level and align objectives. State water laws foresee this option but experience is limited. The case of the Inter-municipal Environment Board for the Integrated Management of the Lower Ayuquila River Basin (JIRA – *Junta Inter-municipal del Medio Ambiente para la Gestión Integral de la Cuenca del Rio Ayuquila*)

established in 2008 provides interesting lessons from biodiversity and forestry environmental sub-sectors.[22] This public deconcentrated body aims to foster integrated management of natural resources of ten municipalities in the state of Jalisco, establish socio-economic conditions to recover the natural resources of the river basin, and improve the quality of life of its citizens. It is integrated by an Administrative Council, a Citizen's Council and a board acting as operational body providing technical support to municipalities to elaborate, manage and implement environmental projects and programmes. The board executes the budget, deals with technical studies, and oversees implementation of projects and programmes. JIRA's operational resources come from municipal and state contributions executed through an annual operational programme. More than ten years of experience have led to more transparent, efficient and professional decisions.

Box 1.12. **Inter-municipal management of WSS in the state of Colima**

In the state of Colima, the municipalities of Colima and Villa de Alvarez came together to create the CIAPACOV, an inter-municipal commission for the provision of water and sanitation services (*Comision Intermunicipal de Agua Potable y Alcantarillado de los Municipios de Colima y Villa de Alvarez*) with the objectives to: *i)* extend service coverage; *ii)* ensure safe drinking water and adequate treatment of wastewater; *iii)* promote integrated management of water resources; and i*v)* ensure the population's health.

The CIAPACOV executive board gathers representatives from both municipal administrations. They benefit from advice and recommendations of the consultative council comprised of representatives from the Chamber of Commerce and Industry; associations from the tourism sector; associations of engineers, architects, accountants and lawyers; and organisations of public landowners and legal user associations. CIAPACOV has been successful at providing efficient services with 100% coverage for potable water and 98% for sanitation (in 2009). It also has fostered transparency by publishing management diagnoses and evaluations based on various indicators of operational and commercial efficiency such as the number of rehabilitation operations and the management of customer complaints. The commission is engaged in information campaigns to raise awareness on water conservation, health benefits and ecosystem protection.

Source: CIAPACOV official website: *http://ciapacov.gob.mx* (last consultation: October 2012).

The 13 regional water programmes (RWPs) published after the adoption of the 2030 Water Agenda can support continuity of water policy if aligned with other local and national water planning tools. Each of the regional water programmes provides:

- a general *description of the region* and its water issues;
- *project portfolios* across planning units engaging one or several municipalities to bridge the water supply-demand gap assessed by the technical prospective study;
- *cross-cutting strategies* to ensure regional governments' efficiency regarding natural resources management, including water, and secure the necessary and appropriate financial resources;
- an *expenditure plan* with the overall budget required – ranging from MXN 21.3 million in the northwest region to MXN 72.28 billion in the Balsas region – and evaluation of investment needs for each project;
- implementation and performance *indicators* and *milestones* for 2012, 2018, 2024 and 2030.

Box 1.13. **Contractual arrangements in OECD countries' water policy**

Contracts and compacts at the river or aquifer level have become common practices in various OECD countries to manage resources, execute river basin actions at a more local scale and co-ordinate the relevant actors.

In **Belgium**, 16 different river contracts have been established throughout Wallonia since 1993. Their objective is to engage representatives from local authorities and administrations, academics, associations and scientists to develop a consensual programme of actions to restore rivers, aquifers and their ecosystems. Established on a 10- to 15-year period, river contracts stem from a summary of the challenges facing the targeted watershed and the future areas of work (e.g. surface and groundwater quality, water-related risks, nature conservation, tourism, solid waste management, etc.). A river committee is created for each contract to support the implementation of their respective action plan. After a running period, river contracts are evaluated and can be the subject of renegotiations and updates.

In **France**, contracts (*contrat de milieu*) can be established for river, aquifers, lakes or bays as financial and technical agreements for integrated, concerted and sustainable management of water resources at a coherent hydrographic unit scale. In addition to sub-basin management plans (SAGE – *Schéma d'aménagement et de gestion des eaux*), these contracts are a useful tool to align and implement the objectives established by the river basin management plans (SDAGE – *Schéma directeur d'aménagement et de gestion des eaux*). Contracts are signed for five years and represent a voluntary financial commitment (designating operative authorities, methods of financing and completion dates) between government representatives, local authorities and water agencies. In 2010, 236 of these contracts were being implemented in France.

In the **United States**, the Colorado River is managed and operated under numerous compacts, federal laws, court decisions and decrees, contracts, and regulatory guidelines collectively known as the "Law of the River". This collection of documents apportions the water and regulates the use and management of the Colorado River among the seven basin states (Arizona, California, Nevada, New Mexico, Utah and Wyoming) and Mexico. One element of this apparatus is the *Colorado River Compact*, an agreement signed in 1922 among the seven states of the Colorado river basin to allocate the water rights of the river. The compact was the result of several years of negotiations and its approval by the Federal Congress ended many years of dispute.

In the **Netherlands,** a governance agreement was signed in 2011 between the Ministries of Infrastructure and the Environment, the Association of Water Boards and the Water Governance Centre to create a new Delta Plan with the long- and short-term objectives to: *i)* protect the Netherlands against high water; and *ii)* keep freshwater supply up to standard. The *Governance Agreement on Water* is a method to formulate binding, practical, feasible and affordable measures between multi-level agencies for the relatively short term (a maximum of ten years). For the long term (2050 and beyond), the *Delta Programme* determines, with all relevant agencies, the direction and framework (financial and normative) and puts it into legislation. This contract, based on mutual co-ordination and co-operation, is expected to generate substantial yearly savings, up to EUR 750 million in 2020.

Sources: Wallonia Environmental Service website, *http://environnement.wallonie.be/contrat_riviere*; French Public Water Information System website, *www.eaufrance.fr*; US Department of the Interior – Bureau of Reclamation website *www.usbr.gov*; Dutch Delta Commission website, *www.deltacommissaris.nl/english/topics*.

Table 1.4. **Examples of inter-municipal projects in the Regional Water Programmes**

Projects	Hydrographic region concerned	Municipalities involved	Planning units	2030 Water Agenda goal	Investment needed (MXN)
Design of feasibility studies to build dams for water storage in the state of Mexico	Region IV Balsas	Tejupilco, Amatepec, Tlatlaya and Zacazonapan	Medio Balsas Mexico	Balanced supply and demand for water	350 000
Maintain and protect Meca river bed, reinforce the river banks with excavation materials covering 5 km at the Guadalupe river confluence	Region IV Balsas	Altazayanca and Huamantla	Alto Balsas Tlaxcala	Settlements safe from catastrophic floods	7 828 400
Construction and renovation of protective infrastructures in productive areas (*areas productivas*) and urban centres in the state of Tamaulipas	Region VI Rio Bravo	Reynosa and Matamoros	Tamaulipas Norte	Settlements safe from catastrophic floods	150 000 000
Evaluate the quantity of heavy metals in drinking water supply for populations close to mining municipalities	Region VII Cuencas Centrales del Norte	Miguel Auza, Juan Aldama, Vetzgrande, Panuco, Fresnilla, Zacatecas, Guadalupe and Noria de Angeles	Cuenca Alta Aguanaval Zac	Clean water bodies	700 000
Construction of 29 drinking water networks in indigenous towns	Region XI Frontera Sur	Tacotalpa, Macuspana, Nacajuca, Tenosique	Various	Universal access to water services	100 000 000
Revision and integration of project to improve and amplify the capacity of the entry portal in the Agua Escondida tunnel and the Los Berros purification plant	Region XIII Aguas del Valle de Mexico	Donato guerra and Villa de Allende	Medio Balsas Mexico	Balanced supply and demand for water	8 000

Source: OECD own elaboration based on CONAGUA Regional Water Plans, March 2012

Projects designed in the regional water programmes fit into two categories: structural and non-structural projects. The first category, which represents the vast majority of programmes, encompasses all technical and technological fixes contemplated to bridge the water supply-demand gap (e.g. technification of irrigation devices, new modelling systems to monitor water quality), and new infrastructures (e.g. hydroelectric plants, dams). The second category includes actions on capacity building, administrative reorganisation and investments. Although none of these projects were planned in a cross-hydrologic region approach, they do in several cases engage more than one municipality (this depends on how many planning units are involved in each project and how many municipalities they encompass). An overview of the categories of projects for each of the 2030 Water Agenda policy goals shows that:

- for **balanced water supply and demand**, 92.3% of regional water programmes focus on structural projects and only 7.7% contain projects encompassing both structural and non-structural measures;

- similarly, for **clean water bodies**, 92.3% of regional water programmes also focus on structural projects and only 7.7% on projects encompassing both structural and non-structural measures;

- for **universal access to water services**, 84.6% of regional water programmes focus on structural projects and only 15.4% include both structural and non-structural measures;

- for **settlements safe from catastrophic floods**, 53.8% of regional water programmes will carry out projects that are both structural and non-structural, while 30.8% have set only non-structural projects and 15.4% include only structural projects.

While they represent an important step in the implementation of water reform at the territorial level, regional water programmes are still largely infrastructure-driven and responsibilities for their implementation are not clear. Many institutions participated in their elaboration following the launch of the 2030 Water Agenda (river basin authorities, IMTA, federal agencies, states, municipalities, etc.) but the distribution and structure for monitoring and assessing the impact of regional water programmes' strategies identified at sub-national level is ambiguous. In order to move beyond technological fixes, institutional strengthening at basin, local and state levels is necessary and deserves more attention.

Strengthen capacity at all levels for effective implementation of water responsibilities

Important efforts have been already devoted to allocating human and technical resources to address capacity gaps at the sub-national level. Some river basin organisations have promoted capacity-building programmes and trainings for local staff using the Global Water Partnership (GWP) Toolbox and World Bank training courses. Annual meetings, workshops and thematic discussions on commercial and financial systems also enhance capacity for utilities. The 2030 Water Agenda seeks to strengthen "CONAGUA and State Water Commission capacities and attributions to promote, supervise and regulate drinking water and sanitation services" (Initiative 13) and to "facilitate contributions from the scientific and technical community in formulating and deploying sustainable water policy" (Initiative 34).

Mexico's water scientific and technological community can help reach the 2030 Water Agenda vision. In particular, they can help foster evaluation, bench-learning processes, training and capacity-building activities for municipalities, utilities, states, river basin authorities and their auxiliary bodies. Local, national and international fora where water officials can exchange practices and lessons learnt are also crucial. The participation in international networks, closer co-ordination with academia to develop tools and instruments, and further co-operation with universities are also options. The thematic water network (*Red Temática del Agua*) maintained by the National Council of Science and Technology (CONACyT – *Consejo Nacional de Ciencia y Tecnología*) and other existing networks dealing with water issues can contribute to capacity building.

Box 1.14. **Institutions with capacity-building programmes in Mexico's water sector**

Several Mexican institutions have made significant efforts to offer activities and educative courses for water professionals and civil society.

The Mexican NGO ***Consejo Consultivo del Agua A.C.*** has long been engaged in sharing information, exchanging knowledge and raising awareness on water issues, mostly targeting civil society. The organisation regularly hosts capacity-building events, and organises seminars and dialogues with professionals from media. In 2010, it started the publication of an annual report on urban water and sanitation utilities in Mexico ("La Gestion del Agua en las Ciudades de México – Indicadores de Desempeno de Organismos Operadores") with the objectives to share information, encourage efficiency and innovation in service provision and raise awareness on utilities' performance in Mexican cities.

The **National Association of Water and Sanitation Utilities** (ANEAS) also has capacity-building programmes targeting integrated management of urban water and water professionals. In co-operation with different institutions (e.g. IMTA, World Bank), academics (e.g. UNAM), ANEAS programmes offer diplomas, courses and short seminars with a focus on: *i)* wastewater treatment; *ii)* technical management of water networks; *iii)* business management; and *v)* integrated management of urban water.

The **Mexican Institute of Water Technologies** (IMTA) has developed a panel of educative services ranging from water bacteriology analysis to treatment plant operation. Options include full-time courses and e-learning tailored to interested utilities or institutions. IMTA also developed partnerships with professionals from public and private utilities.

Additional institutions with capacity-building prerogatives include the **Water Center for Latin America and the Caribbean** (CAALCA), the **Engineering Institute of the National University of Mexico** (IIUNAM), the **College of Civil Engineers of Mexico** (CICM), the **College of Mexico** (COLMEX) and **Ibero-american Programme on Water** (CODIA).

Sources: Consejo Consultivo del Agua A.C official website, *www.aguas.org.mx;* ANEAS official website, *www.aneas.com.mx;* IMTA Education Services official website, *www.imta.edu.mx*.

Improve water information for effective decision making

There are several options to harmonise data production and disclosure and produce independent benchmarks and evidence-based analysis in support of decision making. Three of the 2030 Water Agenda initiatives seek to develop **regional information systems** to reinforce water management by catchment, and aquifer harmonised with national databases and systems (Initiative 35); create an **information system on investment** in the water sector made by the three levels of government and users (Initiative 36); and consolidate **regional and national hydrological services** to better measure and respond to meteorological phenomena. However, these initiatives do not address the need to improve the availability and use of **economic information**, which means strengthening the design of water programmes and projects through the use of cost-benefit analyses and value-for-money evaluations, and/or the creation of a programme of economic information and analysis (possibly within IMTA) to collect, analyse and publish information on the geographical and sectoral distribution and **efficiency of public investments**. Together with the need to better articulate, harmonise and streamline existing information systems as well as performance indicators and monitoring tools, this is an important reform option to consider in the implementation of the 2030 Water Agenda.

Box 1.15. **Strengthening capacities in irrigation districts**

The 2012 Inter-agency Report to the Mexican G20 Presidency recalled that improving the technical, managerial and operational capacities is crucial to formulate effective water policies, and called for a new emphasis on agricultural education and training in the water sector to:

- Provide farmers and rural small and medium enterprises with the skills, understanding and innovative capacity that they require to practice sustainable agricultural intensification and market-oriented activities.
- Train a new generation of agricultural specialists, scientists and service providers who can work with smallholders in new ways to develop the skills needed to make sustainable agricultural intensification work.

In **Mexico**, irrigation districts and units benefited from various capacity-building tools. The Programme for Modernisation and Technification of Irrigation Units provides the financial support (mainly through subsidies) to users and well owners for optimising the use of water. In 2012, CONAGUA published a manual as part of its programme for rehabilitation, modernisation and equipment of irrigation districts. It features detailed information, complementary data and various criteria to support irrigation users to comply with the rules set by the hydro-agricultural infrastructures programme. The National Association of Irrigation Users (ANUR) also provides capacity-building activities through regular workshops and seminars throughout the country (Guanajuato, Oaxaca, Sinaloa and Sonora). They engage several irrigation districts at a time to share experience, learn from past lessons and build on good practices. Existing initiatives to build and strengthen the technical, managerial and operational capacities in irrigation efforts illustrate the dedication of CONAGUA to support productivity in irrigation-related activities and foster the sustainable use of water in the agriculture sector. It is important that such efforts also benefit river basin institutions (organisations, councils, committees, COTAS, clean beach committees, etc.)

Peru has recently implemented a capacity-building programme funded by the Ministry of Agriculture (through a sub-sector irrigation programme) to strengthen the National Board of Irrigation District Users organisations so that it can adequately match new norms and promote the efficient management of water. In addition, to limit conflicts of use arising among small farmers, the National Water Agency (ANA) launched a programme to settle water rights use. Thus far, the programme has granted 365 000 rights to farmers in different parts of the country.

Box 1.16. **The National Observatory of Water and Sanitation Services in France**

The observatory was designed as a tool for regional governments, mayors and local authorities to guide their decision-making processes, monitor the evolution of water and sanitation services from year to year, and benchmark services' performance across the country. The observatory is a **public online platform** where users and civil society can access transparent information on water tariffs and service quality. The website provides a **national database on water prices** and **public service performances** updated by local authorities and validated by state services. The observatory provides an overview of the national water sector and aims to inform the public, feed discussions and promote knowledge sharing across all stakeholders.

The comparison of water and sanitation services is based on a series of **indicators** that promote progress among services. These indicators address both the characteristics and the performance of services, and were developed and standardised by a task force of public and private experts and representatives from the water sector.

The National Observatory also provides access to all relevant **legislation** and **laws** related to the water sector, as well as to annual national overviews of the overall performance of French public water and sanitation services with detailed **maps** and **tables** updated in real-time.

Source: Observatoire national des services d'eau et d'assainissement, *www.services.eaufrance.fr.*

Encourage public participation for inclusive water policy design and implementation

River basin councils and their auxiliary bodies, along with the three levels of government, are responsible for engaging users and civil society in water resources management. There are 119 operative offices, with technical, legal, and administrative units to support their co-ordination tasks, operating co-along with the state governments. One year after the implementation of the 2030 Water Agenda, 38 management programmes were designed and implemented in river basins, and 18 beaches were certified so far. An average of 800 meetings were organised annually by these authorities to co-ordinate and develop new actions to improve the water management, build the necessary water infrastructures and solve water problems in each river basin and aquifer. In 2013, almost 20 000 people will be working in the river basin and aquifer authorities, and the president of six river basin councils will be independent from the CONAGUA Director General. This number is expected to grow to 24 out of the 26 existing river basin councils following increased citizen involvement.[23] River basin councils and their auxiliary bodies provide an opportunity to dialogue with civil society and restore trust in decision and rule-making. The involvement of users in the river basin organisation should be expanded to give them more of a voice in water resources management.

Box 1.17. **Examples of participatory water governance in Mexico**

The **Santo Domingo aquifer** (Baja California Sur) is a good example of successful multi-stakeholder co-ordination for water resources management. It gathers the local office of CONAGUA in Baja California Sur, the state government, the users association for livestock farming from the Santo Domingo Valley irrigation district, the local delegation of SAGARPA and the technical groundwater committees (COTAS –*Comités Técnicos de Agua Subterráneas*) to overcome the deterioration of water quality and the over-exploitation of groundwater. These issues have led to a crisis in the livestock farming sector, which is economically crucial to the region. In the absence of regulation for the management of groundwater volumes, key stakeholders organised to take action and mediate the use of water. Measures to improve the efficiency in water use through modernised irrigation techniques and capacity building of farmers have been taken, as well as efforts to collect storm water and recharge the aquifer.

In **Chiapas**, "***patronatos***" have emerged as good practices in community management of water and sanitation services. In 2000, these forms of citizen boards were included in the State Water Law with the objectives to: *i)* strengthen community participation in water and sanitation services; *ii)* facilitate organisational and regulatory processes; and *iii)* contribute to the sustainability of water and sanitation services. They can help to ensure public participation in planning, construction and operation processes for water and sanitation systems, improve their performance, and raise collective awareness and co-responsibility between users. However, adapting them to local contexts can be challenging. The scope and format of participation is tailored in each town according to historical rules and customs. *Patronatos* have their own legal entity, granted by the town council, and therefore have regulatory prerogatives on the use of water, reforestation and sanitation. In each town, a community fund is created to manage users' financial contributions and to ensure the costs of operation and maintenance are covered. To date, more than 800 *patronato*s have been created in over 100 municipalities in the state of Chiapas.

Source: Based on data from the Government of Baja California Sur, and Government of Chiapas.

Strengthening user participation in the consultative bodies of water utilities and in water decision making is an essential accountability mechanism, and a necessary step in ensuring effective and efficient public services. Most state laws have opened up the possibility for water utilities to have a consultative body where public participation is expected. Consumers can also rely on legal and administrative recourses in case of complaints, although their efficiency is often questioned as the existing mechanisms leave ample discretion to authorities to solve the cases. The Federal Consumer's Attorney (PROFECO) can serve as a mediator between consumers and service providers (see chapter 4 on institutionalising regulatory functions for water supply and sanitation); it can also give the service provider a report (*dictamen*) that specifies the compensations to the consumer. In case an amicable solution cannot be found, the consumer can use the report in courts.

Box 1.18. **Monitoring service delivery: The example of the IMCAS-X in Veracruz**

The IMCAS-X (*Initiative for Citizens Monitoring of Water and Sanitation in the Metropolitan Area of Xalapa*) is an alliance of citizens, academics, civil society organisations, governmental representatives and private companies dedicated to resolve water issues in the metropolitan area of Xalapa in the state of Veracruz. Its aims to involve civil society in the management of water and sanitation services and the environmental protection of river basins and aquifers neighbouring the metropolitan area.

To do so, IMCAS-X:

- Carries out **quantitative studies of citizen perception** on water and sanitation services. Their latest survey shows that 74% of the population is interested in participating in activities to develop more efficient use of water.
- Supports **inter-institutional co-operation** and joint action between public authorities and citizens to support integrated water resources management in river basins supplying the metropolitan area.
- Promotes the **restoration of rivers** in the region through better management of urban solid waste, monitoring of urban development projects and the use of storm and reclaimed water.
- Develops **indicators** to monitor the impact of communication campaigns on public awareness.

Source: IMCAS-X official website, *http://imacs-x.org*.

Conclusions and recommendations

Conclusions

Mexico has the opportunity to invent its own model for water governance. As a federal country with huge regional variations between water availability and water demand, Mexico would benefit from tailored, place-based responses to water challenges. For instance, the responsibilities devolved to one particular state or basin organisation need to match the particular water challenge in that territory and the funding capacities, know-how and appetite for reform. Under such a scenario, Mexico could make the best of initiatives that are flourishing at state, basin or local levels.

Further progress is needed to address Mexico's fragmented institutional setting through better co-ordination for integrated, coherent and inclusive implementation of water reform. Several institutions, agencies and bodies are involved in water management at federal, state, municipal and basin levels. While some progress has been achieved in better managing interdependencies across stakeholders and creating an overarching framework for water resources management, much remains to be done to overcome the scattered regulatory framework for water services.

There is a need to address governance issues related to the wide range of informal actors and community-based water management systems operating outside legal frameworks. In particular, irrigation units typically operate without legal identity and are not organised to voice their concerns. While community-based solutions have been successful at times (e.g. state of Oaxaca) in terms of coverage and health benefits, uncertainty about their status complicates oversight and monitoring.

There is a need for incentives to manage trade-offs for what regards decisions taken in other sectors (agriculture, energy, land use, etc.) that clearly work against water policy objectives, increase costs and put water security at risk in several basins. For instance, energy subsidies to farmers have detrimental impacts on water demand and groundwater management. Therefore policy coherence, which is based on flexibility, is essential and requires multi-stakeholder platforms and effective multi-level co-ordination. A good example of policy coherence is the General Law for Climate Change that designates functions to federal, state and municipal levels to co-ordinate (within the Inter-ministerial Commission on Climate Change). Another tool that can play a role in aligning incentives and signalling the value of the resource is economic instruments. Upscaling initiatives that have worked at local and state levels (e.g. voluntary schemes with accompanying measures to remove harmful subsidies) is possible when lessons can be shared among decision makers and entities.

Successful water reforms can spillover to other sectors and benefit wider institutional and economic reforms. Many water governance gaps faced by Mexico are not specific to the sector but relate to broader governance challenges: enforcement and compliance, accountability, uneven nature of decentralisation, informality, institutional quality and capacity of public administration, and limited transparency and accountability. The high-level commitment to reform the water sector is a good signal, and should positive results be forthcoming, water reform could trigger wider reforms countrywide.

Recommendations

Develop a whole-of-government implementation Action Plan, building on the 2030 Water Agenda policy goals and initiatives. The Action Plan should seek to foster coherence across policy areas (energy, climate change, agriculture, territorial development); bridge multi-level governance gaps; sequence priorities; and foster co-ordination of targets and indicators across federal, regional and state water instruments and actors. One solution could be to align the multi-level planning apparatus (National Development Plan, National Water Programme, National Water Information System, regional water programmes, water programmes at state level and multi-annual investment plans), with the 2030 Water Agenda policy goals while preserving some flexibility. The potential for policy coherence at watershed level also needs to be explored.

Set up mechanisms and incentives for enhancing water policy outcomes in the current decentralisation framework and leave sufficient flexibility to adjust to the features of each state and basin institutional structure. Capacity building, inter-municipal arrangements, multi-annual budgeting and investment plans; a professional career system for water staff and contracts across levels of government are examples of pragmatic tools that can bring consistency to water governance to carry out responsibilities at the level where they can best be managed. Many of these tools are experimented at subnational level, but their replication has been slow due to the lack of platforms to exchange practices.

Foster information sharing, integrity and public participation across all levels of government for more transparent, accountable and inclusive policy making. Improved access, quality and disclosure of information and communication and wider engagement of key stakeholders in the decision-making process are prerequisites for better evaluation, monitoring, integrity and accountability in the water sector. In recent years, CONAGUA has made important efforts to build and consolidate databases such as the National Water Information System (SINA – *Sistema Nacional de Información del Agua*) with useful technical, economic and institutional data. The downscaling of such information at local, state and basin levels should mobilise further existing institutions (e.g. IMTA and river basin organisations) to develop stronger interactions between users and government bodies, produce economic information, , limit the risks of corruption, and set up appropriate channel for public participation.

Notes

1. This law was originally published in the *Official Gazette* (*Diario Oficial de la Federación*) on 31 December 1981. The latest reforms to this law were published on 27 November 2009.
2. This law was initially published in the *Official Gazette* (*Diario Oficial de la Federación*) on 1 December 1992. A modified version of this law was published on 29 April 2004.
3. At the beginning of the 20th century, approximately 80% of the population in Mexico lived in settlements of less than 2 500 people. However, by 2000, 60% of the population lived in settlements with more than 15 000 people.
4. These are heavily marginalised areas with low economic productivity, high unemployment and outmigration rates, and poor access to basic services.
5. According to the National Water Plan (2007-12), irrigation units use 57% of underground and 43% of surface waters.
6. According to the National Bank for Public Works and Services, the traditional way of making decisions (vote in popular assembly) can delay the credit authorisation process (see *www.elsurdiario.com.mx/index.php?option=com_content&view=article &id=6788:dificil-que-banobras-de-creditos-a-municipios-regidos-por-costumbres- &catid=51:estado&Itemid=96*).
7. This was led by the International Centre for Demonstration and Training in Rainwater Harvesting (CIDECALLI – *Centro Internacional de Demonstración y Capacitación en Aprovechamiento del Agua de Lluvia*). The systems comply with the Ministry of Health's federal treatment standards for physical and chemical parameters of drinking water (NOM-127-SSA1-1994 and NOM-041), but the methods of water supply do not fit neatly under state authority.
8. See Initiatives 5, 6, 7, 13, 30 and 32 of the 2030 Water Agenda.
9. Article 4 of the Constitution reads: "Every person has the right to access, disposal and water sanitation for personal and domestic consumption in a sufficient, healthy, acceptable and affordable way. The Mexican state will guarantee this right, and the law will define the ground, support and modalities to an accessible and fair access and use of water resources, establishing the participation of the federation, the state authorities and the municipalities, as well as citizen's participation to achieve the above mentioned goals".
10. An analysis conducted in 2006 (Becerra *et al*., 2006) on conflicts related to water issues included the identification of 5 000 cases between 1990 and 2002 in national newspapers reporting on water conflicts.
11. A few examples include federal Law on Rights, penal law, General Law on Ecological Equilibrium and Environment Protection, laws on health issues, federal Law on Public Education, and laws related to justice and sanctions.

12. A study on informal use of water in Tijuana (Meehan, 2010), for instance, showed that Tijuana is known for its unusually high proportion of illegal settlements (45% of the municipality, 53% of the population).

13. For more information please see Chapter 4.

14. The 2004 National Water Law foresees that river basin organisations will have a consultative council composed by representatives of various ministries, such as Finance, Social Development, Energy, Environment, Health, Agriculture and public agencies like CONAGUA and the National Commission for Forests (CONAFOR). In addition, a representative of the state where the RBO is located, as well as representatives of the municipalities within the boundaries of the RBO, can participate with a voice and a vote. A water users' representative can also participate, but without the right to vote, or representatives of the river basin councils can take part in the consultative council. The same 2004 law foresees that river basin councils be composed of a mix of representatives from the federal, state and municipal government, as well as users and civil organisations.

15. The two main instruments are the 1906 Convention on Equitable Distribution of the Grande and Bravo Rivers and the 1994 Treaty on Distribution of the International Waters of the Colorado and Tijuana Rivers and the Rio Grande. In the case of the Colorado River, the treaty specifies that the United States should deliver 1 850.2 million m3 of water to Mexico. As regards the Tijuana River, the treaty establishes that both countries, through the International Boundary and Water Commission (IBWC), will make recommendations for the equitable sharing of its waters, draw up projects for storage infrastructure and flood control, estimate the costs and build the infrastructure agreed upon, and share the construction and operation costs equitably (SEMARNAT, 2011a).

16. The number of registrations in REPDA amounted 457 803 by 31 March 2012, according to data available at *www.conagua.gob.mx*.

17. See Initiatives 1, 2, 13, 16, 19, 20, 21, 35 and 36 of the agenda.

18. SIGA uses cartographic and alphanumeric information in a geo-database that processes information on water resources; see *http://siga.cna.gob.mx*.

19. *www.conagua.gob.mx/CONAGUA07/Contenido/Documentos/Portada%20BANDAS.htm.*

20. The Technical Committee involves, amongst others: SEMARNAT, SHCP, the National Institute of Public Health, PEMEX, CONAFOR, the National Institute of Ecology (INE – *Instituto Nacional de Ecología*), the National Commission of Natural Protected Areas (CONANP –*Comisión Nacional de Áreas Naturales Protegidas*), the Federal Electricity Commission (CFE – *Comisión Federal de Electricidad*), IMTA, the National University of Mexico (UNAM), the Naval Secretariat (SEMAR – *Secretaría de Marina Armada de México*) and the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA – *Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación*).

21. Despite an increase in domestic water tariffs between 2009 and 2010, tariffs still do not allow operation and maintenance cost recovery. According to CONAGUA (2011b) and based on data collected in 31 cities in Mexico, 8 cities had no increase in tariffs, 2 of the increased tariffs were below the inflation rate (4%) and 21 (including Aguascalientes, Ensenada, Leon, Morelia, Naucalpan and Tijuana) had increases of about 7%.

22. *www.jira.org.mx*.

23. For further development, see Chapter 2 on strengthening river basin governance.

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Annex 1.A1
Main legislations for water management in Mexico

1917 National Constitution (and recent amendments)		1981 Federal Duties Law		2004 National Water Law	
Article 4	Recognition of access to water as a human right in Mexico	Article 222	Enforcement of Water Users Pays and Polluter Pays principles; Attribution of water rights through concession titles to be registered in the REPDA	Article 9	Establishment of CONAGUA as sole central water institution
Article 27	Institution of all national waters as public goods owned by the federal government	Article 223	Fixing of water rights based on nine extraction zones and their water resources availability	Article 5	Decentralisation of WRM at river basin level
Article 115	Municipalisation of WSS responsibilities	Article 224	Establishment of water rights, exception for agricultural use and reclaimed water use	Chapter III BIS, Chapter IV	Creation of a multi-layered river basin apparatus with planning and programming functions
				Articles 30-32	Reform of concession titles for use and exploitation of national waters
				Chapter V, Title VIII	Promotion of users', civil society and private sector's participation
Complete text available at : *www.diputados.gob.mx/LeyesBiblio/pdf/1.pdf*		Complete text available at : *www.diputados.gob.mx/LeyesBiblio/pdf/107.pdf*		Complete text available at: *www.diputados.gob.mx/LeyesBiblio/pdf/16.pdf*	

Source: Federal Chamber of Deputies, *www.diputados.gob.mx/inicio.htm*.

Annex 1.A2
CONAGUA's water information systems

Water information systems/databases	Description	CONAGUA directorate in charge
Information systems and databases in use		
National Information System on Water Quantity, Quality, Users and Conservation (SINA)	Statistical and geographical information on water at national level (infrastructures, water resources administration)	Office of Water Information System – Planning Sub-directorate (SGP)
Quick finder on climate information (ERIC)	Data and maps on precipitation (from climate station)	Office of Surface Water and River Engineering – Technical Sub-directorate (SGT)
National data bank on surface water (BANDAS)	Hydrometric measures	Office of Surface Water and River Engineering – SGT
Geographical Information System for Groundwater Management (SIGMAS)	Groundwater data	Office of Groundwater – SGT
Database of the Water Rights Public Registry (REPDA)	Data on concessions' volumes	Office of the Water Rights Public Registry – SGAA
System for Declaration and Online Payment webpage (DECLARAGUA)	Water volumes declared by users and total volume for each type of use	Sub-office of Registry – CGRLF
Information System on Water Basic Services (SISBA)	Location and characteristics of wastewater treatment plants and purification plants	Office of Purification and Treatment – SGAPDS
Inventory of Wastewater Treatment Plants (IPTARI)	Volumes of flow for wastewater treatment plants	Office of Purification and Treatment – SGAPDS
National Information System on Tariffs (SIT)	Comparison of tariffs across cities	Office for Support to Utilities – SGAPDA
Hydrological Information System (SIH)	Volumes of water stored in dams and lakes	Office of Surface Water and River Engineering – Technical Sub-directorate (SGT)
Dam Security System (SISP)	Location and characteristics of dams	Office of Technical Advisory – SGT
Water Quality Information System (SICA)	Maps on water quality	Office of Water Quality – SGT
Computerised Climate System (CLICOM)	Climate data	Central Office for the Climate Database Project – General Co-ordinator for the National Meteorological Service (CGSMN)
Monitoring of WSS utilities information (SISAPS)	Information on urban water infrastructures	Office of Drinking Water and Sewage Network Studies and Projects – SGAPDA
National Monitoring Network System (SIRNM)	Water quality information	Office of Water Quality – SGT
Monitoring system for the National Water Program's targets	Monitoring of institutional targets	Office of Planning – SGP
Information systems and database in development		
Managerial Information System (SIG)	Summary of information for mobile operation	Office of Water Information System – SGP
Information Systems on Water Infrastructure Projects (SIPROIH)	Mapping of infrastructure projects	Office of Projects Mapping Management – SGP
Regional information systems on water quantity, quality, use and conservation (SIRAs)	Statistical and geographical information on water at regional level (including indicators for technical and prospective analysis)	Office of Water Information System – SGP

Source: Based on CONAGUA (2011), "Sistemas Institucionales Relacionados con la Información Estadística y Geográfica del Agua", CONAGUA.

Annex 1.A3
Mexico's federal programmes in the water sector

Federal programmes	Leading agency	Year of launch	Targeted audience/areas	Mission	Specific objectives in the water sector						
					Water and sanitation coverage	Water resources protection	Technical efficiency	Financial efficiency	Capacity building	Infrastructure development	Private sector participation
APAZU – Urban Potable Water and Sewerage Program	CONAGUA	1990	Municipalities of more than 2 500 inhabitants	Meet demands in drinking water and wastewater treatment	X	X	X	X		X	
FONADIN – National Fund for Infrastructures	SHCP, BANOBRAS	2008	Federal, state and local entities, private utilities in the case of concessions	Support infrastructure development			X	X		X	X
FONDEN – Natural Disaster Fund	SHCP, SEGOB, SFP	1996	Federal entities	Support federal entities for the protection against natural disasters			X			X	
Fund for Residual Water Treatment Programme -	CONAGUA	2009	Utilities and operators in areas with less than 500 000 inhabitants	Improve the access and quality of sanitation services and strengthen utilities in charge of such services	X		X		X	X	
PAL – Clean Water Program	CONAGUA	1991		Improve the quality of water to limit health risks	X		X			X	
PRODDER – Water Rights Tax Rebate Program	CONAGUA	2002	Local governments in urban areas	Support improvement in efficiency and infrastructures for water and sanitation	X		X	X		X	
PROMAGUA – Program for Water Supply, Sewerage and Sanitation in Urban Areas	CONAGUA	2001	Service operators in municipalities of more than 50 000 inhabitants	Strengthen service utilities and promote environmental protection	X	X	X	X	X	X	

Mexico's federal programmes in the water sector (*cont.*)

Federal programmes	Leading agency	Year of launch	Targeted audience/areas	Mission	Specific objectives in the water sector						
					Water and sanitation coverage	Water resources protection	Technical efficiency	Financial efficiency	Capacity building	Infrastructure development	Private sector participation
PROME – Water Utilities Efficiency Improvement Program	CONAGUA	2010	Service operators	Support and strengthen WSS operators	X		X	X	X	X	
PROSANEAR – Federal Program for Wastewater Treatment	CONAGUA	2008	Local government and wastewater treatment operators	Promote IWRM principles and improve treatment of wastewater		X	X			X	
PROSSAPYS – Rural Waterworks Development Program	CONAGUA	1996	Municipalities and service operators in rural areas	Support local governments and WSS operators in rural areas	X		X		X	X	
PROTAR – Wastewater Treatment Program	CONAGUA	2009	Local governments and operators in charge of wastewater treatment	Maintain and improve wastewater treatment facilities	X		X		X	X	

Source: Based on information provided by CONAGUA and SEMARNAT.

Annex 1.A4
Participation of CONAGUA in high-level bodies

CONAGUA is involved in a series of collegial bodies and participates in decision making and strategic dialogues on a variety of issues. These bodies include:

- **Mexican Council of Sustainable Rural Development** (*Consejo Mexicano para el Desarrollo Rural Susrenable*) – *www.cmdrs.gob.mx/prev/inicio.htm*: The mission of the commission is to bring together representatives from national institutions (national commissions such as CONAGUA, the Agricultural and Livestock Commission of the Federal Congress, etc.), agro-industrial organisations, local production committees, research and education institutions and NGOs to: *i)* formulate recommendations; *ii)* co-ordinate activities for the dissemination and promotion of programmes of work, action plans and norms; and *iii)* promote social participation in the rural sectors in accordance with the Sustainable Rural Development Law.
- **National Energy Council** (*Consejo Nacional de Energia*) – *www.normateca.gob.mx/Archivos/55_D_2130_31-07-2009.pdf*: The Director General of CONAGUA is one of the 16 members of this council that advises the SENER on its energy policy making (e.g. proposal of criteria) and the design of energy planning measures for the medium and long term. The council also participates in the elaboration of the National Energy Strategy.
- **Inter-ministerial Commission on the SHCP Financial Expenditures** (*Comisión Intersecretarial de Gasto Financiamiento de la SHCP*) – *http://ordenjuridicodemo.segob.gob.mx/Federal/PE/APF/CI/CIGP.pdf*: The commission is a co-ordinating body for the management of the public expenditure and its financing, and oversight of SHCP's programmes of competences.
- **Inter-ministerial Commission on Climate Change** (*Comision Intersecretarial de Cambio Climatico*) - *www.ordenjuridico.gob.mx/Federal/PE/APF/CI/CICC/25042005%281%29.pdf*: The commission is made of representatives from seven different ministries including SEMARNAT and is responsible for formulating and submitting national policies and strategies on climate change to the President of the Republic all the while promoting and co-ordinating the implementation of national climate change strategies in the various related policy sectors.
- **Mexican Committee for the Sustainable Use of Water** (*Comité Mexicano para el Uso Sustentable del Agua*): As a member of the committee, along representatives other governmental institutions, civil associations and academics, CONAGUA participates in decision-making processes regarding the National Water Programme to raise awareness on the value and importance of water and see it reflected in sectoral and specific programmes.

- **Executive Committee of the INEGI National Information System** (*Comité Ejecutivo de Sistema Nacional de Informacion de INEGI*).
- **Consejo Consultivo del Agua –** *www.aguas.org.mx/sitio/index.html*: The *Consejo Consultivo del Agua* promotes social participation mechanisms in the water sector by sharing information and fostering exchange of experience, debate, transparency and accountability.
- **Government Board of the CONAFOR** (*Junta de Gobierno de la CONAFOR*).
- **Government Board of the Institute of the National Fund for Workers' Housing** (*Instituto del Fondo Nacional de Vivienda para los Trabajadores – INFONAVIT*)
- **Technical Committee of Water Works Operation** (*Comité Técnico de Operacion de Obras Hidraulicas*): Presided by CONAGUA, this committee is a consultative body with representatives of IMTA, CFE, SAGARPA, UNAM, CILA and governments of the state of Mexico and the Federal District, that discusses, analyses and formulates recommendations on the operation of water works and infrastructures in the main hydrological systems of the country.
- **Government Board of the IMTA** (*Junta de Gobierno del IMTA*): The board is the highest authority of the IMTA and its secretary is a representative from SEMARNAT. The board meets every four months and oversees all activities of the IMTA.
- **Information Committee of SEMARNAT** (*Comité de Informacion de SEMARNAT*) - *www.semarnat.gob.mx/transparencia/comite/Paginas/iniciocomite.aspx*: The committee co-ordinates and oversees actions to disseminate information and established procedures to insure more efficient management of request for the access to information. It decides on the classification or inexistence of information and supervises the application of specifics criteria for the conservation of documents and archive.
- **Technical Council of the FONADIN** (*Comité Técnico del FONADIN* – Fedeicomiso 1936) - *www.fonadin.gob.mx/work/sites/fni/resources/LocalContent/388/2/DecretocreacionFNI.pdf*: The Technical Committee comprises representatives from SHCP, SCT, SEMARNAT, SECTUR, BANOBRAS and the National Credit Society. Its mission is to approved the acts necessary for the FONADIN to carry out its functions.
- **Executive Council of BANOBRAS** (*Consejo Directivo de BANOBRAS*): The council is the highest authority of BANOBRAS and approves the business strategy and the operations of the bank, as well as the design and allocation of the budget and the structure of the bank.
- **SHCP's Trust to Support the Development of States and Municipalities** (*Fideicomiso para Coadyuvar al Desarrollo de las Entidades Federativas y Municipios* [FIDEM] *de la SHCP*) - *www.hacienda.gob.mx/EGRESOS/PEF/temas_gasto_federalizado/Paginas/FIDEM.aspx*: The fund was created by the government to support priority areas and development strategies in states and municipalities.

- **Commission CONAGUA-Mexican Chamber of Industry and Construction** (*Comisión Mixta CONAGUA-CMIC*) - *www.cmic.org/mnsectores/agua/conagua/Acciones%20concretas%20CMIC-CONAGUA%20260109.htm*: The commission was created with the objective to develop better infrastructures in support of the water sector's strategies.
- **Inter-ministry Commission on Social Development**, co-ordinated by SEDESOL (*Comisión Intersecretarial de Desarrollo Social*) – *www.sideso.df.gob.mx/documentos/legislacion/decreto_2.pdf*: SEMARNAT is one of the 13 ministries to be represented in the inter-ministerial commission whose role is to formulate recommendations regarding the co-ordination the federal government's actions for social development. It suggests to the competent institutions measures to guarantee the coherence, transversality and synergy across social development programmes.
- ***"Estrategia 100x100"*** (in thematic groups on housing and infrastructure): The "*Estrategia 100 x 100*" is a development programme that targets Mexican municipalities with the lowest human development index in order to improve the population living conditions, economic productivity and employment.

Chapter 2

Strengthening river basin governance

This chapter focuses on the role of river basin organisations, councils and auxiliary bodies as vehicles for water reform implementation. It provides insight on the current state of integrated water resources management in Mexico, achievements witnessed since the decentralisation of water resources management in 1992, as well as remaining institutional and capacity challenges of the different river basin authorities.

Introduction

Mexico's lakes, rivers and aquifers are under threat. The decline in water availability, along with uneven natural distribution of water around the country, population dynamics, the development of economic activities and unordered urban settlements, have impacted the quality and quantity of water resources and ecosystems. The 2030 Water Agenda states that 78.4 billion m^3 are required annually to meet water demand, of which 11.5 billion m^3 are taken from non-sustainable sources. This gap is expected to double within a period of 20 years (CONAGUA, 2011b).

Restoring the quality of water bodies is a primary concern. Their quality is threatened by pollution loads from point and diffuse sources and insufficient attention to wastewater discharges. Irrigated agriculture, industry and increasing urbanisation have had disastrous consequences on streams and groundwater quality. In the Valley of Mexico and Panuco River basins (that spread across the states of Hidalgo, Mexico, Tlaxcala and the Federal District), for example, 200 or more wells are estimated to be contaminated by untreated wastewater coming from the industrial areas neighbouring the capital city. It has affected numerous municipalities such as Chiautla, Ecatepec, Jatlenco and Coyotepec, and trends show that the metropolitan population of Mexico City will continue growing, placing more pressure on the watersheds. Industrial sectors such as textile use of agrochemicals also present contamination risks (from both solid waste and wastewater).

The excessive use of groundwater is a structural problem. Currently, 101 of the 653 aquifers in Mexico are overdrawn. Intensive agriculture of water demanding crops and domestic demand for water are responsible for the decreasing water table. In the Tulancingo Valley, for example, irrigated cultures of alfalfa, corn and wheat and pressure from nine of the river basin's municipalities have impacted the productivity of groundwater wells and the cost of extraction has risen. In Guanajuato, on average seven out of the eight litres of water necessary for domestic uses, especially in urban areas, come from groundwater sources. The direct consequence is the important imbalance between abstraction and recharge.

Evolution of river basin governance framework

Two decades of reforms

Mexico has been a pioneer among Latin American countries in river basin governance. Almost 60 years ago, Mexico launched a large-scale initiative to develop the arid plains of the north and the tropical areas in the east and southeast of the country. Specific river basins were selected as pilots for promoting integrated water, industrial, agricultural and forestry development.

In the 1940s, river basin commissions were created as the first implementing agencies of water-based development plans in the country. The Ministry of Hydraulic Resources (previously the National Commission for Irrigation) became the co-ordinating institution at the federal level. Populations from the central part of the country, where agricultural land was a constraint, were expected to migrate to these river basins and provide the labour that would be necessary for the development of the areas. River basin commissions had full authority to plan and execute programmes for integrated development within the river basins. The Papaloapan Commission and the Tepalcatepec Commission (to become Balsas River Basin Commission) were first established in 1947, followed by the Fuerte and Grijalva Commissions in 1951. In most cases, their tasks

included planning, design, co-ordination and construction of flood control, irrigation and hydropower generation projects. Commissions were also responsible for expenditures on urban and rural development, health, education, transport and communication services, including roads, train and telephone services.

River basin commissions were the co-ordinating agencies for the activities of several ministries within the river basin. Under the leadership of the Ministry of Hydraulic Resources, other ministries participated in the development of the river basins, including the Ministry of the Interior, the Ministry of Finance and Public Credit, the Ministry of Agriculture and Livestock, and the Ministry of Communications and Public Works. They had limited authority within the river basin but were able to have some influence. River basin commissions included more than one state and were therefore more powerful than the states and municipalities, which generated tensions among water institutions (Tortajada, 2005).

As implementing agencies, river basin commissions failed to achieve their objectives. When the river basin commissions were established, Mexico's economic policies focused on large-scale agricultural and industrial development projects. Therefore, their main achievements were primarily in terms of infrastructure building. Efforts in this area had beneficial impacts on flood management, electric generation and public works projects. But at the basin level, development programmes managed neither to reduce regional inequalities nor alleviate poverty, and basin level activities and performance evolved along the socio-economic and political conditions of Mexico. River basin commissions had full support at the presidential level and benefitted from semi-autonomy and minimal budgetary limitations. However, the administrations that followed did not share the same views on what their role should be within the overall economic development strategy of the country. Their different approaches were reflected in the activities authorised and budgets allocated.

In 1975, the first National Water Programme stated that the management of water resources would be carried out at the regional level. The programme divided the country into 13 regions, aggregated into 4 zones of similar features. There were 102 sub-regions established following the boundaries of municipalities within states and river basins. These 13 regions would concentrate the decision-making power and the authority to formulate the regional water development plans, implement projects and collect users' fees. A National Water Planning Commission was established to set up a systemic planning process and support programmes, projects and policy related to water in line with the overall national objectives.

In the early 1980s, as part of a decentralisation effort, regional offices of the Ministry of Agriculture and Water Resources replaced the river basin commissions. The Ministry of Agriculture and Livestock and the Ministry of Water Resources were merged into the Ministry of Agriculture and Water Resources. The newly established agency delegated activities to state offices and established regional co-ordinating agencies to improve the integrated management of water at the river basin level. The ministry's state offices took over the responsibilities of the river basin commissions regarding planning, management and development of water resources, and the river basin commissions were dissolved. In 1989, these responsibilities were gathered under one institution, the National Water Commission.

The 1992 National Water Law triggered the decentralisation process of water resources management in Mexico. The law established river basin councils as co-ordinating and consultative authorities with representatives from the National Water

Commission, the federal, state and municipal bodies, and users. The secondary legislation of the law provided insight on the structure of river basin councils. The 2004 National Water Law[1] included significant changes for river basin management in Mexico. It established 13 river basin organisations as autonomous structures with technical, administrative and legal prerogatives, acting as CONAGUA implementing agencies. In parallel, river basin councils were to remain the main institutions under federal authority for water management at the river basin level and users' concerns and opinions were to be taken into account through the councils' general assemblies.

River basin management strategies and planning tools at the federal level

The National Development Plan (2007-12) and the National Water Program (2007-12) have been crucial in setting principles for integrated water resources management and public participation in Mexico. Respectively led by the federal government and CONAGUA, these two strategic documents are implemented over the same period of time (6 years), and both feature objectives regarding sustainable management of water resources at the river basin level.

The National Development Plan (2007-12) promotes co-operation between the federal, state and municipal governments to jointly design environmental policies and programmes. Objective 2 (Chapter 4, Section 4.1 of the National Development Plan) focuses on integrated and sustainable management of water resources. It promotes the implementation of a strategy that considers both consumptive uses of water and the protection of the environment within a framework of public participation. The plan also lays down the principles of a management of water at the river basin scale with a priority regarding the conservation of land and aquatic ecosystems as part of the large hydrologic cycle, covering the extraction of water to its discharge. The strategy explicitly underlines the need to set official prohibition for maximum extraction to ensure water balance.

The National Water Program (2007-12) designs river basin councils as the suitable structures to achieve the objectives of the water sector and engage citizens in sustainable use of water resources. Endorsed by the President of Mexico, the National Water Program is grounded on a wide public consultation process and thematic workshops with experts. Its objectives are to *i)* improve the productivity of water in the agricultural sector; *ii)* increase the access to and quality of drinking water, wastewater management and treatment; *iii)* promote the integrated management of water in river basins; *iv)* improve the technical, administrative and financial development of the water sector; *v)* strengthen users' and civil society's participation in the management of water, and promote a culture of responsible use; *vi)* prevent risks related to weather and hydro-meteorological phenomena, and manage their effects; *vii*) evaluate the consequences of climate change on the water cycle; and *viii)* apply the National Water Law. The programme formulates a series of seven targets for what regards public participation.[2] The National Water Program also underlines the key role of auxiliary bodies, such as river basin commissions and committees, COTAS (technical groundwater committees) and clean beach committees, to support the river basin councils in their tasks. Strategy 6 of the Programme calls on the central and state governments to provide the necessary technical and financial resources for the bodies to participate in the design and implementation of water programmes in river basins and aquifers, and reinforce representativeness of vulnerable populations, in particular women and indigenous communities.

Several initiatives of the 2030 Water Agenda relate to river basin governance. A strategic line of the agenda is to ensure "[…] that all the country's catchments have a sound governance structure, with sufficient capacity to manage water resources with joint

responsibility and in a sustainable manner". To do so, it seeks the consolidation of river basin councils and their auxiliary bodies in each of Mexico's major catchments to *i)* establish and implement agreements and memoranda; *ii)* effectively protect aquifers in or risking overdraft; and *iii)* technify and modernise their productive units. Many other strategies and initiatives target river basin councils and their support structures (see Box 2.1). In particular, the "balanced supply and demand for water" and "clean water bodies" policy goals of the 2030 Water Agenda encompass actions to reinforce the policy framework, regulation, financing and prerogatives of river basin councils and their auxiliary bodies.

Box 2.1. **Initiatives and actions of the 2030 Water Agenda related to river basin management**

Initiative 1: Giving a more relevant role to technical groundwater committees (COTAS) in aquifer management

- Legally reinforce their intervention in aquifer monitoring activities.
- Develop the capacity of their representatives to intervene in the management and planning of aquifer use.
- Develop information systems on the dynamics of the aquifer and the knowledge of withdrawals and recharge.
- Ensure their financial operation through some legally binding procedure linked to withdrawals and users.

Initiative 2: Strengthening the organisation and functioning of the river basin councils and their auxiliary bodies

- Reinforcing the normative framework for a better organisation and functioning.
- Revitalising the assemblies of water users in each of the country's catchments and aquifers.
- Reviewing the election process of the user members and of civil society representatives to give them greater representation and legitimacy.
- Proposing and intervening in the drawing up of regulations for the distribution of surface water and other specific instruments for each catchment.
- Developing public consultation schemes to capture the opinion of broad segments of citizens and of the users themselves on water problems and possible solutions in each catchment and aquifer.
- Developing continuous training processes that foster better skills and capacities among the members of the river basin councils.
- Applying evaluation schemes to verify that the plans, programmes and actions developed at the catchment scale are achieving their targets and are heading in the direction shown by the long-term goals contained in the 2030 Water Agenda.
- Establishing co-ordination and consultation agreements and memoranda to collaboratively develop and implement specific projects that aim to meet the demands and needs of each catchment or aquifer.

Box 2.1. **Initiatives and actions of the 2030 Water Agenda related to river basin management** (*cont.*)

Initiative 3: Consolidating the governance functions and regional organisation of the CONAGUA

Initiative 4: Involving civil society irrigation user associations (ACUs) and COTAS in driving the saving of water and the technification of irrigation

- Substantially increasing the budgets allocated to the modernisation and technification or irrigation infrastructure and assigning them in priority through co-operation agreements to users with whom commitments are established to save water and to free up allocated volumes.
- Increasing the technical quantity and quality of staff to appropriately manage investments and operate the modernised infrastructure.
- Optimise water saving by duty recovery projects, infrastructure modernisation and irrigation technification and increasing productivity, with the aim of reducing over-concessioning and overdrafting.
- Offering training for irrigation users to view water as a strategic resource and as such to foster its use under schemes of sustainability and self-control.
- Promoting the development of research aimed at irrigation technification.

Initiative 5: Formulating regulation for the distribution of surface water by catchment and groundwater by aquifer

Initiative 9: Promoting and reinforcing intensive reforestation programmes associated with soil conservation in priority catchments.

Source: Based on data from CONAGUA (2011), "2030 Water Agenda", CONAGUA, Mexico City, Mexico.

River basin councils and organisations were involved in the design process of the 2030 Water Agenda and proved to be good catalysts for public participation of a wide range of stakeholders. The agenda builds on consultation dialogues that were conducted in each of the 13 hydrological-administrative regions of Mexico. More than 1 100 proposals and initiatives came out of these debates and were reflected in a synthesis report featuring key challenges for Mexican river basin management, which is available online. River basin councils served as intermediaries to channel the considerations and opinions of local stakeholders such as representatives of irrigation associations, environmental organisations, academics and citizens.

Regional water programmes were designed to support the implementation of the 2030 Water Agenda at the river basin level. They were prepared in co-operation with IMTA (Mexican Institute of Water Technology) after a consultation process, gathering representatives from the three levels of government, academics, researchers, farmers, the private sector and civil society. Each regional water programme presents detailed strategies, projects and expenditure plans required to meet the strategic lines and objectives of the 2030 Water Agenda. In addition, 32 programmes for sustainable water management at state level have also been produced to help define investment needs and align them with the state water budget adopted in Parliament. These plans are meant to guide local governments in designing their own water and development programmes. Each of the regional water programmes provides:

- *a general description of the region* and its water issues;
- *project portfolios across planning units* engaging one or several municipalities to bridge the water supply-demand gap assessed by the technical analysis;
- *cross-cutting strategies* to ensure regional governments' efficiency regarding natural resources management, including water, and secure the necessary and appropriate financial resources;
- *an expenditure plan* with the overall budget – ranging from MXN 21.3 million in the north-west region to MXN 72.28 billion in the Balsas region – and the evaluation of investment needs for each project;
- implementation and performance *indicators* and *milestones* for 2012, 2018, 2024 and 2030.

Projects designed in the regional water programmes fit into two categories: structural and non-structural projects. The first category, which represents the vast majority of programmes, encompasses all technical and technological fixes contemplated to bridge the water supply-demand gap (e.g. technification of irrigation devices, new modelling systems to monitor water quality), and new infrastructures (e.g. hydroelectric plants, dams). The second category includes actions on capacity building, administrative reorganisation and investments. Although none of these projects were planned in a cross-hydrologic region approach, they do in several cases engage more than one municipality (this depends on how many planning units are involved in each project and how many municipalities they encompass). A clear evaluation of obstacles and limits to their implementation is still needed to assess their ability to achieve targets and to raise necessary funding. In addition, it is crucial to understand the linkages with other areas that have an impact on water use, as well as with national priorities *vis-a-vis* water management.

While they represent an important step in the implementation of the water reform at territorial level, regional water programmes present some limits and weaknesses. They are still largely infrastructure-driven and not truly based on river basin plans, and the budget to implement their project portfolios has yet to be mobilised Many institutions participated in their elaboration following the launch of the 2030 Water Agenda (river basin authorities, IMTA, federal agencies, states, municipalities, etc.) but their elaboration remained driven by a top-down approach, with no clear guidance on which entity would be in charge of monitoring and assessing the impact of regional water programme strategies identified at the sub-national level. In addition, a stronger focus on institutional strengthening at basin, local and state levels is necessary beyond technological fixes.

Institutional setting

Mexico's river basin governance is characterised by an important apparatus of organisations, councils and auxiliary bodies. Since 1992, in addition to the 13 river basin organisations implementing CONAGUA's policies in each hydrographic region, 26 river basin councils have been created as consultative bodies, working closely with 32 river basin commissions and 41 river basin committees, 82 COTAS, 38 local clean beach committees, 85 irrigation districts and 23 technified rainfed districts.

Box 2.2. **Water resources management plans at federal, state and river basin levels in Brazil**

At the federal level, the National Water Resources Plan (PNRH) is structured around four main components, each with sub-programmes:

- institutional framework for integrated water resources management;
- inter-sectoral, inter-institutional and intra-institutional articulations related to multiple uses of water;
- place-based targeted actions and special planning approaches;
- monitoring and assessment of the PNRH progress and results.

The National Water Agency is responsible for the implementation of PNRH, in partnership with the Committee of Co-ordination and Implementation of PNRH including the Ministry of Environment. The National Water Council reports on implementation, and a Result-Oriented Management System (SIGEOR) is in place to monitor progress. After PNRH approval, the Ministry of Planning revises the structure of its Multi-annual Investment Plan (PPA) accordingly.

State water resources plans organise information on state domain basins and help state governments build up their views on water resources conditions and initiatives to take. The preparation of these plans has improved since 2006 in terms of engaging more stakeholders and addressing critical issues at basin level.

At the river basin level, water resources plans (WRPs) are developed in line with PNRH plans under ANA's responsibility. As of December 2012, ANA had finished a total of seven WRPs, which cover 51% of Brazilian territory, where a population of 35.8 million people live. Programmes in these plans must state their correspondence to PNRH programmes.

Source: Based on data received from the Brazilian National Water Agency in September 2012.

River basin organisations as implementing agencies

Mexico has been divided into regions and sub-regions and features an interlocking river basin apparatus. There are 13 regions based on the hydrology of the country, and more than 100 sub-regions that include a number of municipalities from the same state within the hydrological boundaries thus creating hydro-administrative regions to plan and carry out regional programmes. Each of the 13 hydrological regions encompasses one or more river basin council.

River basin organisations are windows for CONAGUA at the subnational level. They are technical, administrative and legal entities with autonomous personality and financial resources allocated by CONAGUA's Technical Council. Their missions include promoting integrated management of water resources; improving the technical, administrative and financial development of the water in their respective river basin; and preventing risks from hydro-meteorological events while evaluating the effect of climate change on water cycles. River basin organisations also foster user and civil society participation through a culture of sustainable water use. In co-ordination with other river basin institutions (mainly river basin councils), river basin organisations suggest priority actions and preferences for water allocation. They are in charge of administrating concessions titles, authorisations, discharge and construction permits as well as infrastructure for water, drainage and sanitation.

River basin councils as co-ordinating agencies at basin level

The National Water Law defines the tasks of river basin councils. They are meant to propose and promote the implementation of plans, programmes and actions toward *i)* the balance of supply and demand between uses in the river basin; *ii)* the cleanup of basin, sub-basin, ravines, aquifers or any body of water to prevent, contain and overturn their contamination; *iii)* the conservation, preservation and improvement of ecosystems in the basin; *iv)* the efficient and sustainable use of water in every phase of the hydrological cycle; and *v)* a new culture that promotes the economic, social and environmental value of water and engages civil society in its protection.

Table 2.1. **Mexico's river basin system: Interlocking hydrological regions and river basin councils**

Hydrological regions (13)		River basin councils (26)	
I	Peninsula de Baja California	1	Baja California Sur
		2	Baja California
II	Noroeste	3	Alto Noroeste
		4	Rios Yaqui y Matape
		5	Rio Mayo
III	Pacifico Norte	6	Rios Fuerte y Sinaloa
		7	Rios Mocorito al Quelite
		8	Rios Presidio al San Pedro
IV	Balsas	9	Rio Balsas
V	Pacifico Sur	10	Costa de Guerrero
		11	Costa Oaxaca
VI	Rio Bravo	12	Rio Bravo
VII	Cuencas Centrales del Norte	13	Nazas-Aguanaval
		14	Del Altiplano
VIII	Lerma-Santiago-Pacifico	15	Lerma-Chapala
		16	Rio Santiago
		17	Costa Pacifico Centro
IX	Golfo Norte	18	Rios San Fernando Soto la Marina
		19	Rio Panuco
X	Golfo Centro	20	Rios Tuxpan al Jamapa
		21	Rio Papaloapan
		22	Rio Coatzacoalcos
XI	Frontera Sur	23	Costa de Chiapas
		24	Rios Grijalva-Usumacinta
XII	Peninsula de Yucatan	25	Peninsula de Yucatan
XIII	Aguas del Valles de Mexico	26	Valle de México

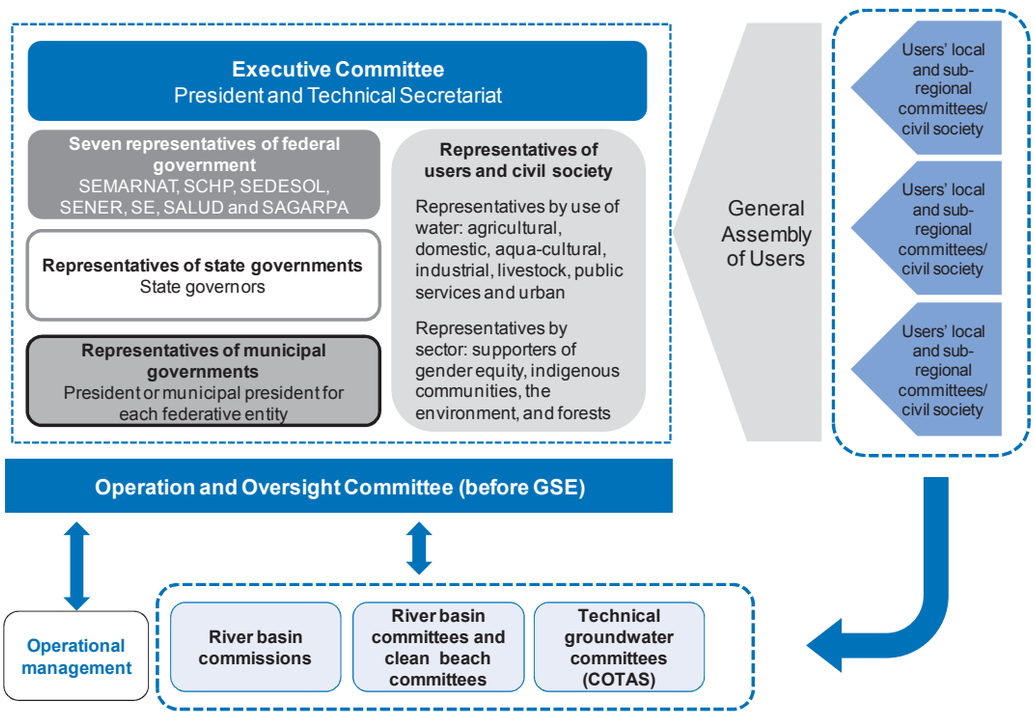
Source: Elaborated based on CONAGUA (2010), "Documentos Básicos de los Consejos de Cuenca", CONAGUA, Mexico D.F., Mexico.

The governance of river basin councils involves representatives from the federal, state and municipal levels and different categories of users. Their structure includes:

- *an executive committee*, chaired by a president – either elected, or appointed as representative from CONAGUA's local or regional office, depending on the rules of operation set by each council – who is in charge of proposing planning instruments for the river basin and for appointing members of its technical secretariat, which is the co-ordinating organ and holds logistical and administrative functions. Members of the executive committee all have voting power over the council's programme of work;

- *an operation and oversight committee* responsible for gathering information and data, supporting the council's decision-making process and evaluating its performance and progress according to the programme of work;
- *an operational management unit* in charge of internal technical and administrative tasks;
- *a general assembly* within which other representatives from the federal, state and municipal governments; NGOs and academics hold an honorary and observatory status.

Figure 2.1. **Structure and constituencies of Mexico's river basin councils**

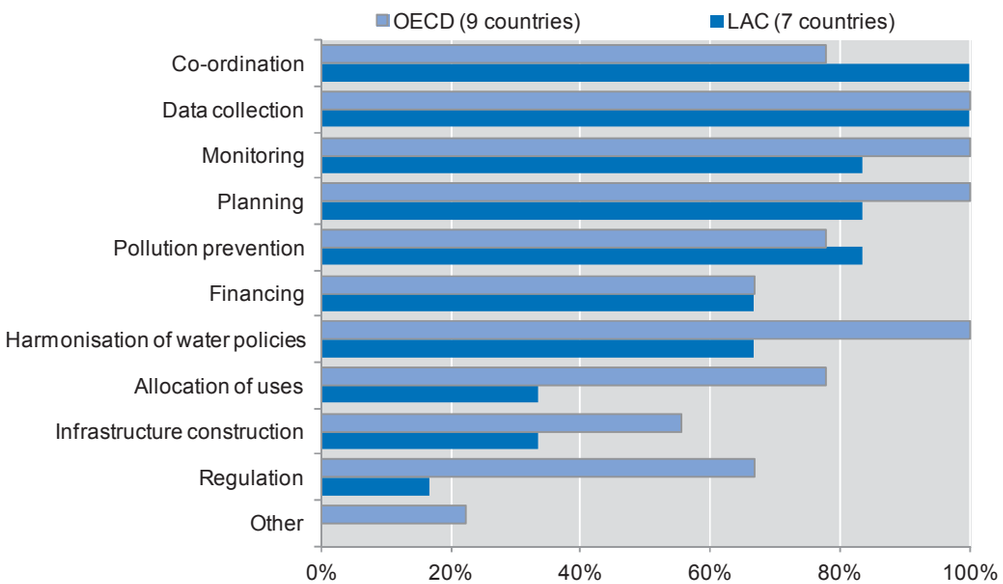


Note: The GSE (*Grupo de Seguimiento y Evaluacion*) is the Monitoring and Evaluation Group

Source: Elaborated based on CONAGUA (2010), "Orientaciones para la Elaboración de la Reglas Generales de Integración, Organización y Funcionamiento de los Consejos de Cuenca" Gerencia de Consejos de Cuenca de Mexico.

River basin councils have different types of tasks. They have planning, data collection and co-ordination prerogatives usually devoted to river basin organisations. As collegial structures, they can also arbitrate and prevent conflicts over water use. They provide fora to reach compromise on water allocation disputes, and they are key interlocutors of CONAGUA regarding the management of water risks such as drought, overexploitation and contamination in order to develop mechanisms in line with the national strategy. In addition, the councils participate in the development of financial studies with CONAGUA to best determine the necessary users' contribution to support their programmes of work.

Figure 2.2. **Missions of river basin organisations in OECD and LAC countries**



Note: In all 17 OECD and 13 LAC countries were surveyed, but on this specific aspect, only 9 OECD countries and 7 LAC countries answered this question (i.e. countries having river basin organisations).

Sources: OECD (2011), *Water Governance in OECD Countries: A Multi-level Approach*, OECD Publishing, Paris, doi: 10.1787/9789264119284-en; OECD (2012), *Water Governance in Latin America and the Caribbean: A Multi-level Approach*, OECD Publishing, Paris, doi: 10.1787/9789264174542-en.

River basin councils rely on the contribution of different auxiliary bodies at the sub-basin level. They were established to address crucial and complex challenges that required particular attention, such as contamination, groundwater overexploitation and natural disasters:

- **32 river basin commissions** and **41 river basin committees** operate in sub-basins. Their president can be a representative from the state government or civil society. They are expected to facilitate *i)* the implementation of river basin councils' strategy; *ii)* inter-governmental co-ordination; and *iii)* social participation at the sub-basin level.
- **82 COTAS** were created at the aquifer level with the primary objective to protect and restore groundwater bodies and reach a balance of extraction and recharge.
- **38 clean beach committees** operate in coastal areas to protect the environmental quality of national beaches and ensure users' health safety.
- **Users' regional committees** at the basin, sub-basin and aquifer levels have been developed for each sector: irrigation, industry, service provision, agriculture and drinking water supply. According to the National Water Law, these regional committees are eligible to form **assemblies of users** to discuss water issues independently from governmental authorities and elect their river basin council representatives.

Technical groundwater committees

Technical groundwater committees were created to foster self-regulation of groundwater extractions. For example, since 1998 the Guanajuato State Water Commission (CEAG) in central Mexico has supported the establishment of 14 COTAS as a complement to other measures to reduce groundwater extraction, including user self-regulation and state regulation through pumping bans, pumping permits and the reduction of electricity subsidies. The initiative was based on the assumption that top-down regulatory approaches had not worked. COTAS stimulate the organised participation of aquifer users so that agreements for reversing declines in groundwater levels can be reached. Their prerogatives also include managing users' complaints and queries, developing educative and informative programmes on aquifers' sustainability, and resolving conflict over groundwater allocation and use. The COTAS have the ability to create funds to carry out studies, projects and activities on groundwater management.

Table 2.2. **Comparative achievements and limits of stakeholder participation in selected Mexican COTAS**

Groundwater body (state)	Mechanisms of stakeholder participation	Achievements	Limits
Santo Domingo aquifer	COTAS was formed following unenforceable federal regulations, larger farmers bought-out small farmers and invested in modernising irrigation technology	– More than 60% reduction in groundwater abstraction between 1995 and 2006 – Groundwater abstraction metering installed and maintained with monitoring of groundwater levels and quality – Full agreement on future groundwater and soil conservation measures	Concerns about socio-economic consequences of displacement of smaller farmers
San Luis Potosi Valley aquifer	COTAS was formed by private users, municipal water-supply utility and state government. Surface water dam and reservoir were also built to reduce groundwater dependency	– Good co-operation with full water-well inventory, users directory and well metering – Participatory drafting of regulations to stabilise aquifer and reserve good-quality groundwater for potable supplies	Uncertain federal endorsement and financial support to implement the aquifer stabilisation plan
Silao-Romita aquifer	Since 1998, the state government has strongly supported cross-sector groundwater management associations such as COTAS and has promoted aquifer management actions	– COTAS raised awareness leading to watershed conservation programmes – Numerous aquifer models prepared by the State Water Commission – Elaboration of aquifer stabilisation plans at the federal level	– Water-well drilling bans have been ineffective due to poor enforcement – COTAS have not been able to mobilise effective action to reduce net abstraction and stabilise aquifer water levels – Inadequate devolution of resource administration from federal level to state and COTAS

Source: Elaborated based on Garduno, H., F. van Steenvergen, and S. Foster (2010), "Stakeholder Participation in Groundwater Management: Enabling and Nurturing Engagement", Sustainable Groundwater Management Concepts and Tools, *Briefing Note Series*, No. 6, World Bank.

The creation of COTAS was driven by the urgency to address the groundwater overexploitation challenge in the agricultural sector. Poor farmers in pockets of rural Mexico suffer more immediate impacts from the groundwater depletion because they

typically lack the necessary capital to adapt to falling water tables and therefore are more likely to give up their productive activities than wealthier farmers. Groundwater depletion also contributes to the migration of farmers from rural areas to urban centres in Mexico and to the United States. Finding a sustainable solution to Mexico's water resources management challenges, therefore, played a role in developing COTAS as viable solutions even if farmers largely continue to use traditional irrigation methods. COTAS were expected to provide a platform at the sub-basin scale within which groundwater users from all sectors were to co-operate to provide expertise and advice on aquifer management.

Contrary to most river basin councils, COTAS' presidents are elected by representatives of groundwater users (as at October 2012, 11 river basin councils [RBCs] had democratically elected their presidents). The majority of COTAS' members are organised in regional committees according to their sector, i.e. agriculture, industry, public urban services, fishery and domestic use. They form assemblies of users that decide who will represent each sector in the COTAS (with a maximum of three people per sector). The assembly is also responsible for electing the president, secretary and treasurer. COTAS receives the support for their activities from multiple groups:

- A *consultative technical group* that gathers representatives from the federal and state governments tied to the productive activities in the aquifer.
- *External consultants*, such as academics, research institutes, NGOs, professional associations and other organisations share their knowledge and expertise.

Box 2.3. **Groundwater management challenges in the United Kingdom**

In the **United Kingdom**, the case of groundwater governance in East Anglia reflects implementation of integrated water resource management principles and connections to the larger regional European Union Water Framework Directive. As one of England's most productive agricultural areas, farmers and food processing industries depend on groundwater. Groundwater resources are managed by the United Kingdom Environment Agency (an executive non-departmental public body) through a first-come first-served licensing (most recently with a twelve-year validity) and with a drought allocation prioritisation of drinking water first, followed by environment and irrigation. Future droughts and groundwater loss would mean huge economic losses for the region. As a result, the Environment Agency East Anglia initiated **water abstractor organisations** enabling local groundwater stakeholders to participate in policy making. In a participatory fashion, the following adaptive measures were developed: reduction of licenses' time limit to six years, changes in land practices to reduce groundwater contamination, more efficient irrigation techniques and on-farm winter water harvesting.

Source: Varady, R.G. *et al*. (2012), "Groundwater Policy and Governance", *Thematic Paper No. 5*, commissioned by UNESCO IHP, in the framework of the UNESCO Groundwater Governance Project: A Framework for Global Action.

Local clean beach committees

Local clean beach committees are responsible for applying environmental norms and managing beaches in an integrated perspective. They periodically formulate diagnosis, action plans and projects to restore degraded beaches and protect their ecosystems. In addition to representatives from federal, state and municipal governments, the committees also involve members of the private sector, especially linked to tourism, catering and the hotel business. These private actors often provide financial resources to support the

committees' activities such as solid waste management and education initiatives to raise awareness among local populations. An **Inter-institutional Committee for Clean Beaches** created in 2003 gathers representatives from the Ministry of Environment (SEMARNAT), the Ministry of Marine (SEMAR), the Ministry of Tourism (SECTUR), the Ministry of Health (SALUD), CONAGUA, the Federal Commission for the Protection against Sanitary Risks (COFEPRIS) and the Federal Attorney for Environmental Protection (PROFEPA) to discuss clean beaches-related issues. It oversees the organisation and operation of local clean beach committees and monitors sanitation programmes for coastal areas as well as sea water quality. The committee carries out studies and research on the status of marine ecosystems and takes part in the certification of restored beaches.

Although a certification process has been launched for beaches in Mexico, progress in improving the environmental quality of coastal areas is still needed. Stemming from the Inter-institutional Committee's initiative, a nationwide campaign started in 2003 to evaluate the ecological status of Mexican beaches and develop a certification rewarding efforts to resolve pollution issues. The certification process, however, does not solely rely on water standards and takes into account various aspects such as harbour infrastructures and solid waste management. At present, 18 beaches have received this certificate. A positive outlook is the Clean Beach Program on marine water quality that thus far has monitored 164 kilometres out of the 11 122 kilometres of Mexican shores. It corresponds to 237 beaches and 325 sampling sites in 50 touristic destinations of the 17 coastal states monitored by the state health authorities.

Irrigation districts

In Mexico, three types of institutions manage water for irrigation. They include **water boards** (*junta de agua*), organised **irrigation units** (*urderales*) and **irrigation districts** (*distrito de riego*), the latter being the most common. Irrigation districts were first established and managed by the federal government. Agriculture and crop production have long played a major role in the economy of Mexico. To sustain growing population and demands, farmers and their agricultural models had to adapt, and irrigation has become a regular practice in rural areas.

Table 2.3. **Evolution of irrigated surfaces in Mexico: Key figures and milestones**

Year or period	Line authority	Irrigated surface
1926		820 000 ha
1926-1946	Irrigation National Commission	1.7 million ha
1947-1976	Secretariat for Water Resources	4.2 million ha
1977-1988	Secretariat for Agriculture and Water Resources	5.5 million ha
1989-2005	CONAGUA	6.5 million ha

Source: Elaborated based on CONAGUA (2008), "Planeación Estratégica y Operativa en Materia de Consejos de Cuenca 2008-2012", CONAGUA, Mexico D.F., Mexico.

Since 1989, irrigation competences have been decentralised to the local level. The National Water Commission engaged in a transfer process, granting concession titles to users' associations composed of farmers, therefore allowing them to use national water resources and to operate federal infrastructures. CONAGUA remains the line authority in terms of policy design, subsidies, programme and norm setting. Users' associations

manage irrigation districts through various activities: maintenance and operation of irrigation infrastructure and machinery, rehabilitation and modernisation of canals, measuring instruments and parcels, conservation, capacity building and conflict resolution. In 1994, the National Association of Irrigation Users (ANUR – *Asociacion Nacional de Usuarios de Riego*) was established to provide technical support to farmers, improve the management of irrigated agriculture and advise on the operation of irrigation systems and institutions. At present, 85 districts are in charge of managing, conserving and administrating water. They cover a surface of 3.5 million hectares and involve 477 users' associations and over 500 000 farmers and producers. While CONAGUA is in charge of dams for strategic and security reasons, irrigation districts' prerogatives include funding and operating irrigation infrastructure and machinery, arbitrating conflicts over allocation and uses, and promoting a sustainable exploitation of water resources. They also gather information and collect data on production value, irrigated surfaces, crops and harvest, and the volumes of extracted water. These statistics are passed on to CONAGUA that annually publishes reports on agricultural statistics in irrigation districts in co-operation with INEGI (National Institute of Statistic and Geography).

Box 2.4. **Irrigation districts' challenges in Sonora**

The state of **Sonora**, located in the north-eastern part of Mexico, is one of the most agriculturally productive regions in the country. However, 30 years of unplanned and unmanaged abstraction of water for irrigation have left the farmers with serious resource **overexploitation** and **salt intrusion** problems, which impact the health and productivity of ecosystems. During the 1960s, most irrigated crops in Sonora relied on water pumping from aquifers. As a result, low soil levels and poor natural drainage spawned high salt levels. The situation worsened with the frenetic use of surface and groundwater, either through gravity systems or pumping, lowering the levels of aquifers and overexploiting resources. Massive saline intrusions in numerous irrigation districts of Sonora have contaminated wells, rendering large cultivated areas useless and generating high socio-economic and environmental costs. Consequently, the organisation of production and crops has been impacted, especially regarding very demanding cultures, and the annual productivity rates have decreased.

In the face of these challenges, the federal and state governments have worked with irrigation districts and farmers to carry out **reconversion processes** according to the profitability of each culture, and they have instituted changes to production models. Users' associations and irrigation districts have also designed and implemented **annual programmes** to *i)* reduce the volumes of pumped water; *ii)* limit the surface or irrigated crops; and *iii)* improve the technological performance of irrigation systems.

Source: Based on data from Reyes Martinez, A. (2009), "Problemática del Agua en los Distritos de Riego por Bombeo del Estado de Sonora", *Revista Digital Universitaria*, Vol. 10, Universidad Autonoma del Estado de Mexico, Mexico.

The informal sector is important in the field of irrigation. In contrast to irrigation districts, whose members are organised in formal water user associations fully recognised by the government, Mexico's 40 000 irrigation units[3] typically operate on the basis of informal arrangements without legal identity and have been historically neglected by the government. They are neither monitored nor organised to voice their needs and concerns, and they have limited scope for command and control. This lack of institutionalisation restricts their participation in water management institutions such as COTAS to contribute to solving the challenge, for example, of aquifer overexploitation. It also limits their application for government funding and complicates the oversight and monitoring role of CONAGUA and other institutions. The challenge ahead is relevant as the National

Water Plan (2007-12) established a low but challenging target – 10% of the 40 000 irrigation units – to strengthen organisational capacities and consolidate the formalisation of the users' associations. Reaching this target requires political will, human and financial resources, and a set of incentives (including in relation to water rights in the agriculture sector).

River basin governance challenges

The OECD Multi-level Governance Framework (see Chapter 1 on addressing multilevel governance) is relevant for assessing the challenges of river basin institutions in Mexico. Table 2.4 shows a tentative categorisation of challenges mostly related to the unclear missions and weak capacities of river basin councils, limited engagement of stakeholders in decisions implemented by river basin organisations, diverging objectives and constituencies of the various river basin institutions, and limited evaluation and information sharing across river basin institutions.

Table 2.4. **Multi-level governance gaps hindering Mexico's river basin management**

Type	Description and examples
Administrative gap	Territorial division into 168 cells has helped align the hydrological and administrative boundaries, but river basin organisations and river basin councils report to different constituencies.
Information gap	Absence of common framework or organised information sharing among river basin councils to define their strategy and develop their actions. Most proceedings in river basin councils are neither documented nor updated.
Policy gap	Absence of strategic plans at the basin and sub-basin levels articulated with state priorities and programmes.
Capacity gap	Lack of staff, expertise, skill, know-how and infrastructure in river basin organisations and river basin institutions to carry out their duties. As a result, several river basin councils are not yet fully operational.
Funding gap	Absence of basin plans backed by investment plans and lack of financial autonomy (neither fundraising nor fund allocation prerogatives) in river basin institutions.
Objective gap	Competing uses of water resources across river basins between irrigated agriculture, industry, domestic demand and ecosystem needs.
Accountability gap	Little evaluation of performances and progress in river basin institutions. The absence of objective and independent assessment constrains experience sharing.

Sources: Adapted from OECD (2011), *Water Governance in OECD Countries: A Multi-level Approach,* OECD Publishing, Paris, doi: 10.1787/9789264119284-en; Charbit, C. (2011), "Governance of Public Policies in Decentralised Contexts: The Multi-level Approach", *OECD Regional Development Working Papers*, 2011/04, OECD Publishing, Paris, doi: 10.1787/5kg883pkxkhc-en; and Charbit, C. and M. Michalun (2009), "Mind the Gaps: Managing Mutual Dependence in Relations among Levels of Government", *OECD Working Papers on Public Governance*, No. 14, OECD Publishing, Paris, doi: 10.1787/221253707200.

Unclear prerogatives and weak capacities

Despite the creation of a comprehensive river basin apparatus, the federal government still retains significant powers for water resources management in Mexico. The majority of river basin council presidents are not elected, putting into question the legitimacy of their representative functions and risking political capture (on this issue, changes have occurred in 11 RBCs where the president was elected and is no longer a CONAGUA representative). Mexico has a 70-year history of hierarchical and top-down management in water and planning practices. In addition, although they were legislatively established, there is no consensus on the role of river basin councils' participation on the ground because their value added is unknown and their work is still in its infancy. A major constraint is their lack of experience, both technical and managerial, to formulate policies

and properly use economic instruments like water pricing and demand management. At present, there is no specific Directorate of CONAGUA dedicated to river basin management (contrary to drinking water and sanitation for example). River basin governance issues come under the purview of the Emergency and River Basin Councils' Co-ordination of CONAGUA (*Coordinación General de Atención a Emergencias y Consejos de Cuenca*) with limited capacity and insufficient political support to effectively strengthen river basin governance.

The role of civil society remains unclear despite achievements reached in the design of the 2030 Water Agenda. Decades after the first National Water Law, there are no clear rules on the financial and managerial attributions for river basin council activities, COTAS and clean beach committees. Their prerogatives therefore rest on a fragile regulatory framework, which in turn makes for subjective responsibilities in terms of user implication and citizen participation in the protection of water resources. There has been strong resistance to decentralise the appropriate decision-making powers, investment funds and technical and managerial resources; the National Water Commission retains control, ordinance and sanction responsibilities. Overall, this has contributed to the incapacity of COTAS to effectively reduce groundwater overexploitation.

River basin councils and COTAS are not all fully operational on the ground. As co-ordinating units, they already make recommendations to governmental authorities and to users, but the role and functions of their staff are not always well understood, especially regarding public participation. Similarly, the National Water Law failed to allocate a clear role and prerogatives to COTAS, and left users with subjective responsibilities to sustainably manage water in a context of already limited citizen participation. COTAS are therefore not empowered with any legal authority, thus they are unlikely to enforce any agreement or contribute in an efficient way to the reduction of groundwater overexploitation and contamination.

COTAS face important challenges but they lack human expertise to deal with groundwater resources. There is a relative absence of hydrogeological and socio-economic data to make informed decisions. Provisions to control groundwater abstraction and pollution are weak or non-existent as are provisions for the establishment of aquifer management organisations. Responsibilities, roles, tasks and resources are not clearly assigned between the various scales. Bottom-up movements toward public participation tend to be poorly recognised or enabled. Ecosystem services of aquifers are rarely recognised despite the existence of the Ecological Reserve.

The roles of COTAS are restricted to discussion and formulation of recommendations. On 22 and 23 September 2011, the Seventh National Meeting of COTAS was held in the state of Guanajuato. A specific session during the event was dedicated to the evaluation of achievements and progress. One of the evaluations looked at which types of actors involved in aquifer quality and quantity management were really benefiting from COTAS' technical and advisory work. Results showed that two groups were benefiting: a large majority of groundwater users (mostly farmers) and very few government authorities (they only represented 12%). Thus, COTAS still lack legitimacy as well as political and technical support to effectively tackle the issues of over-bearing withdrawals and pollution in groundwater bodies. Moving in the right direction, the 2030 Water Agenda seeks to give a more relevant role to COTAS through selected initiatives aiming to *i)* legally reinforce their intervention in aquifer monitoring activities; *ii)* develop the capacity of their representatives to intervene in the management and planning of aquifer use; *iii)* develop information systems on the dynamics of the aquifer

and the knowledge of withdrawals and recharge; and *iv)* ensure their financial operation through legally binding procedures linked to withdrawals and to users.

River basin institutions need further support and capacity to perform better towards integrated water management. Many of the river basin councils' representatives, including some RBCs' presidents, are not experts from the water sector and carry out parallel activities (e.g. farmers, etc.) and therefore have little resources and time to devote to their tasks. Contrary to what happens in other sub-sectors such as irrigation, the federal programme's operating rules do not specify CONAGUA's support to build the capacity of river basin organisations' members.

The National Water Law did not set specific rules on how to finance river basin organisations. Currently, river basin organisations do not have financial autonomy (see chapter 3 on economic efficiency and financial sustainability). Most funds for river basin management come from federal programmes that target sub-sectoral problems (such as infrastructure development construction) without an integrated, basin-wide perspective; this renders river basin organisation entirely dependent on the federal budget. For example, in 2012, depending on how water expenditures are classified, CONAGUA will spend between MXN 10 to 20 billion on water resources management. Furthermore, river basin organisations have no revenue-raising powers and their river basin plans fail to guide funding for projects: water abstraction and pollution charge rates are set at federal level by the Federal Duties Law, collected by CONAGUA, but proceeds go back to the federal budget. This goes against the tentative Water-Pays-for-Water principle, the Law on Contributions for Improvements Generated by Federal Public Works of Water Infrastructure (*Ley de Contribuciones de Mejoras por Obras Públicas Federales de Infrastructura Hidráulica*), which establishes the regulations and procedures for recovering the cost of public investments in water infrastructure; in Mexico this has not yet been applied.

Increasingly, state and municipal governments and users have provided financial support to river basin councils. Until the councils can generate their own financial resources, CONAGUA will develop a bi-part budget (50% federal funds and 50% counterpart funds) to reduce the federal contribution to 15% to 20% by 2015. The federal contribution will be derived from a percentage of the water charges managed by CONAGUA. There are some cases where river basin councils generate their own revenues, such as local clean beach committees (e.g. Huatulco), through fundraising mechanisms targeting private donors, including hotels, food and drink companies that share a similar interest in keeping coastal areas clean and attractive.

Limited stakeholder engagement

While river basin councils and auxiliary bodies were conceived as participatory mechanisms, citizens and small-scale farmers tend to be overshadowed. In addition, local and state governments tend to not recognise these platforms since stakeholders are often merely consulted but their options are not binding or necessarily taken into account.

Pluri-cultural challenges in water management are a critical issue at the river basin level in indigenous regions. According to the National Census on Population and Housing, in 2010, indigenous people represented 15% of the Mexican population and 3% of the territory belonged to indigenous lands. These lands were divided into 26 indigenous regions: the National Commission for Biodiversity Knowledge and Use (CONABIO) defined 71% as priority bio-cultural areas. Currently, most hydrographical regions (11 out of 13) cut across several indigenous regions.

Table 2.5. **Sub-national capacities for river basin governance**

Stage of water resources management cycle	Goal	Capacity	Achievements and challenges of Mexico's river basin governance
Planning and project development	To design a portfolio that encourages integrated water resources management	1. To design river basin plans that are tailored, results-oriented, realistic, forward-looking and coherent with national objectives.	Thirteen regional water programmes were designed for each hydrographic region according to the 2030 Water Agenda template. However, they are no real river basin management plans, rather infrastructure-driven project portfolios without clear assessment of obstacles and limits to their implementations.
		2. To co-ordinate across sectors to achieve an integrated place-based approach.	The constituency of RBCs, COTAS and clean beach committees includes among others representatives from the agricultural, industrial and tourism sectors who work together to design strategic plans (e.g. payment for ecosystem services in Tecocomulco, voluntary schemes with accompanying measures for small farmers to remove harmful subsidies).Co-ordination is taking place more on an *ad hoc* rather than systematic basis, as decisions in RBCs are not binding.
		3. To co-ordinate across levels of government to ensure complementarities and achieve economies of scale across boundaries.	There is a multi-level planning apparatus made of interlocking strategic plans, programmes and systems for vertical co-ordination across federal, state and river basin levels, but co-ordination could be further developed if all these plans could be aligned to the 2030 Water Agenda.
		4. To involve stakeholders in planning for inclusive river basin plans reflecting local concerns, etc.	RBCs, COTAS and clean beach committees include, among others, academics, representatives from private utilities and water users' associations, and civil society who participate in the planning and decision-making process, but farmers, indigenous and other informal actors are still largely under-represented.
		5. To build technical and managerial capacities in river basin institutions.	There are capacity-building activities for water professionals (e.g. IMTA) but RBCs lack the time, staff and necessary expertise. In COTAS, members are farmers with parallel responsibilities but little experiences and resources to devote to their tasks
Finance and budgeting	To ensure adequate financial resources	6. To link strategic plans to multi-annual budgets.	The regional water programmes were designed with multi-annual budgets with milestones in 2012, 2018, 2024 and 2030. However, these expenditure plans need to be backed by financial plans, which state payment arrangements (what and when).
		7. To decentralise fundraising and allocation prerogatives for priority investment.	Gradual financial autonomy could be given to river basin organisations (RBOs) if the fiscal system of the country is reviewed. However, policy objectives need to be clearly defined and recurrently reviewed to avoid risks of ring fencing budgets for water policies, suboptimal allocation of fiscal resources, and incentives for fundraising.
		8. To mobilise private sector financing, without compromising long-term financial sustainability of public investment projects.	Private tourism, catering and hotel businesses can provide financial resources to support clean beach committees' activities.

Table 2.5. **Sub-national capacities for river basin governance** (*cont.*)

Stage of water resources management cycle	Goal	Capacity	Achievements and challenges of Mexico's river basin governance
Implementation	Adequate human resources	9. To engage in transparent practices.	Though civil society and users' associations have a seat at the table of river basin institutions, accountability, transparency and access to information should be improved to ensure the presence of marginal groups and avoid their "capture" by power elites.
	To ensure accountability for public resources	10. To design and use monitoring indicator systems with realistic performance promoting targets.	CONAGUA has set indicators to monitor RBOs' activity and progress regarding planning, evaluation, capacity building, representativeness, application of laws and norms, and participation. They should be widened to all river basin institutions.
Evaluation	To promote results and learning	11. To share experiences and conduct rigorous *ex post* evaluations.	There are examples of bench-learning through exchange of lessons learnt and councils and their auxiliary bodies' practices across river basin institutions (e.g. annual COTAS meeting in Guanajuato). However, they need to be backed by sound evaluation and platforms to share experiences across states/basins and learn from what has and has not worked.
		12. To use monitoring and evaluation information to enhance decision making.	Information is shared but quality, reliability, comparison and public disclosure is a challenge.

Source: Adapted from Allain-Dupré, D. and L. Mizell (forthcoming 2013), "Creating Conditions for Effective Public Investment and Regional Economic Growth: Sub-national Governance Capacities in a Decentralised Context", working paper, OECD Publishing, Paris, forthcoming.

Table 2.6. **Indigenous and hydrographic regions in Mexico**

CONAGUA hydrographic regions	Indigenous regions, as defined by the Commission for the Development of Indigenous people (CDI)
Baja California	None
Balsas	Mazahua-Otomí, Miteca, Montana de Guerrero, Purepecha
Cuencas Centrales del Norte	None
Frontera Sur	Chontal de Tabasco, Frontera Sur, Los Altos de Chiapas, Norte de Chiapas, Selva Lacandona
Golfo Centro	Chimalapas, Chinanteca, Cuicatlán, Mazateca, Tehuácan y Zongolica, Huasteca, Istmo, Mixe, Mixteca, Sierra de Juarez, Sierra Norte de Peubla y Totonacapan, Tuxtlas, Popoluca-Náhuatl de Veracruz
Golfo Norte	Huasteca, Mazahua-Otomí, Otomí de Hidalgo-Queretaro
Lerma Santiago Pacifico	Huico ó Gran Nayar, Mazahua-Otomí, Pupépecha
Noroeste	Mayot-Yaqui, Tarahumara
Pacifico Norte	Huicot ó Gran Nayar, Mayo-Yaqui, Tarahumara
Pacifico Sur	Chimalapas, Costa y Sierra Sur de Oaxaca, Istmo, Mixe, Mixteca, Montana de Guerrero, Sierra de Juarez, Valles centrales
Peninsula de Yucatan	Maya
Rio Bravo	Tarahumara
Valle de Mexico	Mazahua-Otomi, Otomi de Hidalgo-Querétaro

Source: Elaborated based on CONAGUA, (2008), "Estadisticas del Agua en Mexico 2007", CONAGUA, Mexico.

To date, authorities in Mexico have failed to recognise the need for a specific water management instrument in indigenous regions. Water is of great cultural, social and economic significance to indigenous societies and has been managed through indigenous governance and management systems for thousands of years in many parts of the world. Barriers to effective water management in indigenous communities include the lack of political and broader community understanding about indigenous water rights, values and management responsibilities; low indigenous representation in local, regional and policy level decision making; technical difficulties in quantifying indigenous water requirements; limited monitoring and evaluation of indigenous participation in water resource planning and management; and low capacity for collaboration within the indigenous sector and water planning agencies. These are important challenges when it comes to issues of poverty and marginalisation as well as supporting community-based water management options while respecting cultural beliefs and habits. While indigenous people account for one third of the population in the Yucatan Peninsula, no programme exists to promote integrated water management in multi-ethnic and pluri-cultural areas. The challenges ahead for indigenous water management are to develop a holistic and co-ordinated approach to water resources management that incorporate indigenous knowledge, cultural and social relationships and economic well-being. Co-management should establish a locally applicable value principle to evaluate trade-offs so that policy decisions can be made. Alternative integrated approaches should also be promoted based on normative values and multidisciplinary, sustainability and multi-cultural principles.

Diverging objectives and strategies

River basin organisations report to different constituencies and authorities than river basin councils. The recent definition of 168 cells as territories of catchment hydrological regions corresponding to a given state helps align the hydrological and administrative boundaries while creating sub-regions for better planning; however, co-ordination is

currently ensured on an *ad hoc* basis.[4] River basin councils' auxiliary bodies work mainly at sub-river basin levels and therefore tend to be closer to users and communities, but they are not institutionally linked to the hydro-administrative regions. There is also scope for increasing the participation of irrigation districts and units to save water, which would significantly contribute to the sustainability of catchments and the balance of aquifers.

Limited evaluation and information sharing

Apart from some *ad hoc* efforts to compile existing experiences, there has been little evaluation of the performance of institutions for river basin management in Mexico. The absence of an objective and independent assessment represents an important constraint as river basin councils and their auxiliary bodies have not been able to reflect on their failures and learn from past experiences. Official reports tend to focus mainly on the description of past or future projects but hardly assess the experiences resulting from implemented action plans. The 2030 Water Agenda and the 13 regional water programmes follow the same approach. They compile upcoming actions but have not diagnosed obstacles, nor identified limits to their implementation. While milestones (for 2012, 2018, 2024 and 2030) set in regional water programmes monitor the progress of project implementation, evaluation is only considered from a quantitative perspective and gives limited room to bench learning.

Box 2.5. **Water management in indigenous communities in OECD member countries**

In the **United States**, a water management approach based on property rights and privatisation was adopted. It argues that market strategies alone can determine appropriate water uses by solving the problem of diverging private and social measures of value. However, on American Indian reservations in the American west, and among the indigenous populations around the world, there exists a great concern about the application of neoclassical economics to water (Steenstra, 2009). Although the costs of a water allocation, such as equipment, labour and time, may be easily identified by market prices, monetising the benefits of preserving American Indian cultures, species, ecosystems and clean rivers are very difficult.

In **Australia**, the National Water Initiative (NWI) foresees that planning frameworks and processes should include indigenous people; recognise indigenous needs in relation to water access and management; and include indigenous customary, social and spiritual objectives whenever possible. Native indigenous water social, spiritual and customary objectives are to be assessed and addressed in plans where they can be developed. In 1998, amendments to the Native Title Act introduced indigenous land use agreements (ILUAs). These are agreements between a native title group and an interested party in the use and management of lands or waters. ILUAs cover a wide array of topics and may be used as part of the negotiations leading to a consent determination of native title, thus providing a flexible means of reaching agreement in which future acts can proceed.

New Zealand has favoured a co-management approach between local tribes and the central government. Frameworks in place allow significant indigenous representation on committees and the identification of cultural water values. Beyond consultation, this approach incorporates the indigenous authority and rights of control into a governance framework, indigenous traditional leaders in a statutory board, and a natural resources management framework.

Sources: Steenstra, A. (2009), "Accommodating Indigenous Cultural Values in Water Resource Management: The Waikato River, New Zealand; the Murray- Darling Basin, Australia; and the Colorado River, USA", contributed paper to the Australian Agricultural & Resource Economics Society's Annual Conference, Cairns, 11-13 February; Jackson, S. and C. Robinson (2009), "Indigenous Participation in Water Planning and Management", *Northern Australia Land and Water Science Review 2009 Chapter Summaries*, Department of Infrastructure, Transport, Regional Development and Local Government, Canberra.

Better information sharing and mutual learning across river basin councils is needed. There is no common framework or organised information sharing among river basin councils to define their strategy and develop their actions. Technical secretariats do not have a jointly established procedure manual, and most proceedings are neither documented nor updated. Furthermore, the development of river basin councils does not follow a common strategy and is rather disorganised because of heterogeneous conceptions and unclear indicators. At a larger scale, river basin institutions, state water commissions and academics could benefit from a sophisticated scheme to integrate water information systems in place and improve their access and public disclosure.

Box 2.6. **River basin committees in Brazil**

While the first river basin committee was created in 1988, the committees were institutionalised in 1997 when the *National Water Resources Management System* framework was approved. The most striking innovations included:

- the National Council of Water Resources (CNRH);
- the National Water Agency (ANA);
- the state (and the Federal District) water resources councils (CERHs).
- the hydrographic basin committees (or river basin committees – CBHs);
- water agencies.

Roles and responsibilities of basin committees include: *i)* co-ordinate the integrated management of water resources; *ii)* arbitrate conflicts related to water resources; *iii)* implement the National Policy for Water Resources; *iv)* plan, regulate and control use, preservation and restoration of water resources; and *v)* charge for water resources.

Considering the hydrographic basin as the planning unit, and the multiple use of water as one of the main goals, river basin committees aim to reflect the main objectives of the National Water Resources Policy and ensure they are effectively achieved, particularly the decentralisation and integration of water resources management principles co-operatively with the government, users and society. There can be interstate or state committees depending on which the river they refer. All the relevant stakeholders of water resources management are constituents of the river basin committees, which approve the water resources plan for the basin, and they are in charge of implementing and establishing water resources charges in the basin.

There are presently seven interstate basin committees and two more are under development; they are all very heterogeneous in their performance and administrative autonomy. While some contribute to state procedures to collect and pre-select projects for fund allocation, others operate under limited conditions or are not fully established; they all, however, share common challenges:

- **implementation** lags after approval of basin water resource plans;
- **weak mobilisation** of actors responsible for political, financial and administrative decisions;
- generation of **conflicts** due to misalignment between river basin and municipal boundaries;
- user **resistance** to committee decisions ("strong" sector users) and/or requests for support ("weak" sector users) because of underlying, previously existing **asymmetries** amongst users (sectors) that are articulated with the establishment of river basin committees;

Box 2.6. **River basin committees in Brazil** (*cont.*)

- state secretariats responsible for water management neither internalise nor align basin water resources plans and the proposed programmes with their operations and processes;
- lack of **human and material resources** by some state secretariats responsible for water management, including budgetary skills.

More work is needed to render committees fully efficient and foster continuity and coherence to achieve decentralised and participatory management. In addition, the issue of river basin financing is critical to foster place-based policies, clearly allocate roles and responsibilities, and develop pluri-annual investment plans beyond project portfolios.

Source: Based on data received from the Brazilian National Water Agency in September 2012.

Identifying good practices and options for reforms in river basin management

Empower river basin organisations with real planning prerogatives

The federal framework needs to empower river basin authorities with broader autonomy and responsibilities. Twenty years after the National Water Law, river basin councils and their auxiliary bodies remain, in practice, advisory agencies with very little power. Their contribution needs to be clarified within the administrative structure of the country, aligned with state and municipal governments, to implement a true operational water resources management system at the territorial level.

Box 2.7. **River basin management in Australia**

In **Australia**, the concept of river basin management was initially advocated by states under the terms "integrated catchment management" and "total catchment management". In the late 1980s, several states passed integrated watershed management policy directives or legislation, establishing a number of stakeholder committees to implement the concept.

The identification of natural resources management regions based on catchments or, where considered more appropriate, bioregions, was further formalised through bilateral agreements between the Commonwealth government and the state and territory governments concerning large Commonwealth funding programmes such as the Natural Heritage Trust and its successor, the Caring for our Country programme. Fifty-six such regional or **catchment natural resources management (NRM) groups** have been identified covering all of Australia. Because resource management is largely the responsibility of the states, and there are diverse environmental, economic and social circumstances across the country, multiple objectives and integrated approaches have evolved differently in each state. In New South Wales, the boards of catchment management authorities established under the NSW Catchment Management Authorities Act 2003 are composed, as far as practicable, of residents in the catchment who have skills called for under the act, including primary production, biodiversity conservation, cultural heritage, water quality and government administration.

Each committee develops a **Catchment Action Plan**, which is a strategic, statutory plan that provides a framework for NRM in the catchment. In Queensland, Integrated Watershed Management has been initiated through state policy rather than legislation. Community-based, non-statutory, regional NRM bodies develop, review, implement and co-ordinate regional natural resources management plans there, which guide state and Commonwealth government investment.

Box 2.7. **River basin management in Australia** (*cont.*)

In the Murray-Darling Basin, which supports much of Australia's intensive agriculture and 16 wetland systems of international significance, a new river basin governance system was established in 2007 and amended in 2008 under Commonwealth legislation based on a combination of Commonwealth constitutional powers and a referral of certain powers from the basin states to the Commonwealth.

The new arrangements include

- the **Murray-Darling Basin Authority (MDBA)**, which is responsible for planning the integrated management of the water resources of the basin;
- The **Murray-Darling Basin Ministerial Council**, which has an advisory role in the preparation of the Basin Plan by the MDBA and policy and decision-making roles for the funding and delivery of natural resources management programmes;
- the **Basin Community Committee** which provides a community perspective on water resource, environmental, cultural and socio-economic matters; and
- the **Basin Officials Committee** which facilitates co-operation and co-ordination between the Commonwealth, the MDBA and the basin states in funding works and managing the basin's water and other natural resources.

In undertaking its work, the MDBA liaises with the **21 catchment management authorities** within the basin.

Source: Based on data received from the National Water Commission of Australia in October 2012.

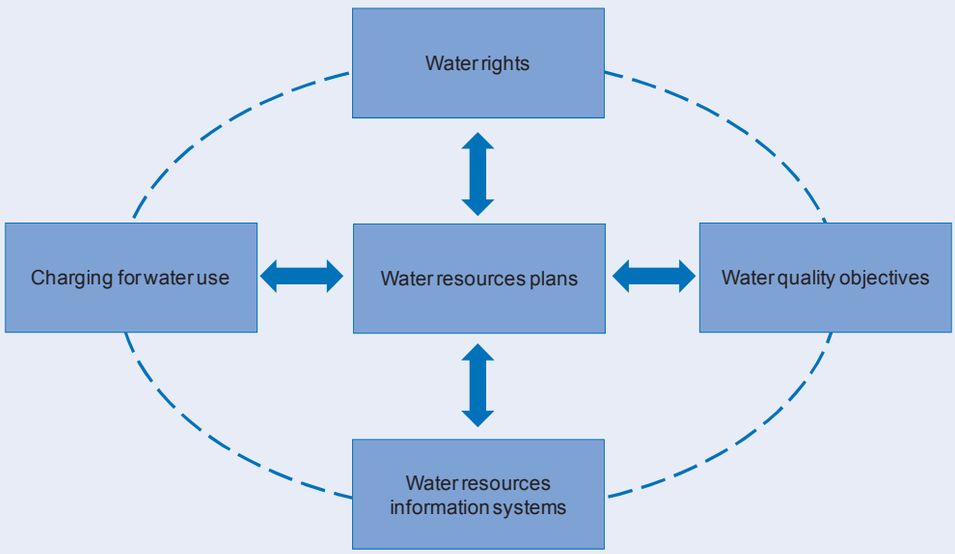
Fully operational river basin councils could play an important role in designing context-tailored policies. They would help to identify necessary projects and develop strategic plans at the basin and sub-basin levels, and they could expand work previously started through state and regional water programmes. This would imply making the most of the decentralisation of responsibilities and allowing river basin councils to use their decision-making powers on important issues. It would help co-ordinate and articulate river basin plans with national and state priorities and programmes to foster more coherent and effective decision making and information sharing.

Decentralise funding prerogatives

Greater financial autonomy of river basin organisations could help to ensure the sustainability of their actions. Although there are some optimistic signs at the sub-basin level with several COTAS, clean beach committees and river basin commissions attracting financial resources from governmental institutions to address local problems, the lack of binding basin plans and financial autonomy remain serious constraints to the relevance and efficiency of river basin authorities. River basin organisations should be capable of managing a portion of their allocated budget or of raising and allocating their own financial resources while providing a regulatory system for ensuring transparency and accountability. Simultaneously, their dedicated staff should receive the appropriate capacities to manage these resources. On this issue, proposals have been made in front of the Senate to modify the National Water Law in order for river basin organisations and river basin councils to receive financial resources through operation contracts (*convenios operativos*) (see Chapter 3 on improving economic efficiency and financial sustainability).

Box 2.8. **River basin plans in Brazil**

Key instruments of water resources management in Brazil



The 1997 Brazilian National Water Act established water resources plans (WRPs) in each hydrographic basin as one of the five instruments of the national water resources policy. WRPs take into account the different uses of water, the identified fragilities of the basin and the required responses in terms of water resources management. As such, WRPs represent the first rational intervention in a basin and have a central role in orienting the implementation of the National Policy on Water Resources. All WRPs should include:

- a **diagnosis** of present conditions of the river basin water resources;
- an **analysis** of demographic growth, evolution of productive activities, and changes in patterns of use of territory, as well as possible alternatives;
- **data** on the balance between present and future water availabilities and uses in different points of the basin to identify potential conflicts;
- **goals** for rational use, increase in water supply and improvements in the quality of available water resources;
- **measures**, **projects** and **works** to be carried out to achieve the established goals;
- priorities for the **water rights** granting in the basin;
- directives and criteria for the **charging for water use**;
- a proposal for creating **areas of restricted use** aiming at water resources protection.

Public participation is mandatory along the development of the WRPs from the early stages. River basin committees and related working groups contribute to the design process with data and interpretations, assessments, weightings, suggestions and singular views, and help with internal discussions among its members to produce consensus on specific themes. Once the plan is completed, it is formally submitted to the river basin committee for approval.

Source: Based on data received from the Brazilian National Water Agency in September 2012.

Box 2.9. River basin management plans under the EU Water Framework Directive

Articles 13 and 14 of the European Water Framework Directive (WFD) establish that each member country has to produce and publish **river basin management plans** (RBMPs) by 2009 for each river basin district, including the designation of heavily modified water bodies, while encouraging the active involvement of all interested parties in its development and implementation.

The plan is primarily intended to: *i)* record the current status of water bodies within the river basin district; *ii)* set out, in broad terms, what measures are planned to meet environmental objectives; and *iii)* represent the main reporting mechanism to the Commission and to the public. Each should summarise how the objectives set for the river basin (ecological status, quantitative status, chemical status and protected area objectives) will be reached within the timescale required.

Annex VII of the WFD details the **information to be included in the plans**:

- general **description of the characteristics** of the river basin district, including a **map** showing the location and boundaries of surface water bodies and groundwater bodies and a map showing the different surface water body types within the river basin;
- **summary of significant pressures** and impact of human activity on the status of surface water and groundwater, including estimations of point source pollution, diffuse source pollution (including a summary of land use) and pressures on the quantitative status of water including abstractions, and an analysis of other impacts of human activity on the status of water;
- map identifying **protected areas**;
- map of the **monitoring network**;
- presentation in map of the results of the monitoring programmes showing the **ecological and chemical status** of surface water, the chemical and quantitative status of groundwater and the status of protected areas;
- list of the **environmental objectives** established for surface waters, groundwater and protected areas, including where use has been made of the derogations;
- summary of the **economic analysis** of water use;
- summary or **programmes of measures**;
- register of any **more detailed programmes and management plans** and a summary of their contents;
- summary or the **public information** and **consultation** measures taken, their results and the changes to the plan as a consequence;
- list of **competent authorities**;
- **contact points** and procedures for obtaining background documentation and information, including actual monitoring data.

Source: European Commission (2003), "Common Implementation Strategy for the Water Framework Directive (2000/60/EC)", Guidance Document No. 11 Planning Process, Office for Official Publications of the European Communities, Brussels.

Box 2.10. **River basin financing in OECD member and non-member countries**

Spain has one of the longest histories in developing formal governmental authorities at the river basin scale. Since 1926, the country has established 13 hydraulic confederations (HCs), 9 of which are inter-regional (across several autonomous communities) and 4 intra-regional (within one autonomous community). In their early years, HCs were hydro-technical agencies devoted to building dams, reservoirs and water conveyance facilities, while water law administration and management of water uses were handled by a separate agency, before the central government merged these functions into one basin-wide authority. Since 1985, HCs have had combined responsibilities for *i)* physical (monitoring of water resources conditions, water transfers); *ii)* infrastructural (water works); and *iii)* water use management (water licensing, water planning and enforcement of national and EU regulations). Two separate boards, *Junta de Gobierno* and *Junta de Explotacion*, govern HCs. The boards are composed of government representatives and water users (public and private water supply companies, irrigation associations, hydroelectric companies and industrial users). In addition, the Water Users Assembly makes recommendations concerning HC's policies for the co-ordinated management of hydraulic works and water resources, while the Basin Water Council (*Consejo del agua de Cuenca*) approves the basin hydrological plan. HCs' administration and operations are funded by a combination of revenues from the central government and revenues generated by the HC, mainly by tariffs (on water users and basin residents) and taxes (discharge fees, severance taxes on sand and gravel, and tax on hydroelectric power).

In 1964, **France** established six water agencies (*agences de l'eau*) for each of the main river basins (Water Law – 16 December 1964). The agencies levy pollution and water intake charges, grant subsidies for reducing pollution, and formulate the basin management plan, called *SDAGE* (*Schéma directeur d'aménagement et de gestion de l'eau*). The SDAGE contains the principles for "balanced water resources management", encompasses the principal plans and programmes, and defines the principal objectives with respect to quantitative and qualitative aspects of water as well as the instruments to reach these objectives. At the sub-basin level, a local water commission (*commission locale de l'eau)* designs the sub-basin management plans (called SAGE – *Schéma d'aménagement et de gestion de l'eau*) within the framework of the SDAGE. These consist of 50% local government representatives, 25% national government representatives and 25% users' group representatives.

Brazil's first river basin organisation was created in the 1970s and was officially integrated into the national Water Resources Strategy in 1997 with the 1997 Federal Law on Water. Brazil's National Water Resources Management System shares similarities with the French model as two kinds of river basin institutions were created. The **basin committees** are deliberative bodies in charge of the administrative management where negotiations and participatory decision making take place to debate on water issues, arbitrate use conflicts and design basin management plans. The **basin agencies** are the "executive arms" of the committees, providing technical support and implementing their decisions. The latter are financed through the collection of bulk water fees with the objectives to *i)* better balance water demand and supply; and *ii)* provide the necessary funds for the adequate operation and maintenance of existing systems and new projects at the basin scale. The allocation of revenues follow investment plans approved by the basin committees and operationalised by the basin agencies, guaranteeing the financial sustainability of the new basin institutions.

Source: Based on data provided by ANA (Brazil) and data from OECD (2011), "Water Governance in OECD Countries", OECD publishing, Paris.

Strengthen public participation in river basin councils

Better public participation in river basin management at the sub-national level is needed within a framework of joint responsibility, transparency and accountability. It is

important that the work accomplished by river basin councils and their auxiliary bodies is consolidated and refined – for example through the establishment of operative management offices in river basin councils and COTAS – and widely disseminated – for example through the launch of **viable websites** for each river basin councils in areas with internet connection and a **consolidated river basin information system** or **portal at national level** to share data across river basin councils. In addition, the distribution of didactic **material** in more secluded areas or the instrumentalisation of already existing networks and organisations could also help disseminate practices across basins. It would foster self-diagnosis and assessment to elevate their approach and learn from successes on the ground. Similarly, it is necessary to revitalise users' associations. The informal participation of civil society also helps to raise awareness on the strategic value of water and reinforce the efforts towards a new culture for water use and preservation. Social participation should not be limited to generic consultation but must be extended to an active role in decision-making processes. The definition of a **social participation strategy or "scheme"** could be a useful tool if it included key characteristics such as:

- being part of a water policy that aims to effectively democratise decision making and public trust through dialogue, co-operation and the conciliation of interests;
- opening channels which promote individual, group, institutional, local and regional participation, and identifying criteria and mechanisms for a balanced representativeness of the various water users and sectors;
- including access to information as a key component of participation processes to ensure the presence of marginal groups in the river basin council and avoiding their "capture" by power elites.

River basin councils need to gain legitimacy through capacity building and better representation. The fragility of sectoral organisation and the unawareness of the participation processes in river basin authorities make fair representation of all stakeholders a permanent challenge at the territorial level. A more informed public could be a solution to round out participation: citizens interested in solving water problems can be efficient catalysts for river basin councils' initiatives. The education of civil society could be achieved through information campaigns on the river basin councils (their prerogatives, the actors involved) and the role that citizens can play. Secretariats in river basin institutions tend to lack technical expertise and experience to effectively take decisions, implement action plans and tackle specific issues. In turn, users in basins or sub-basins fail to recognise the value added of structures such as COTAS. Staff in river basin institutions must build on their experiences and capacities to raise the profile and visibility of their structures. They will gain in financial and social support, further develop their work and strengthen their legitimacy. As such, river basin councils and their auxiliary bodies could play an active role in data collection and information sharing to improve monitoring, involve their members in policy design processes, and raise civil society's awareness on present and future challenges.

Another step forward would be to promote formal organisation of irrigation users. Many poor producers are unable to access government support programmes because they lack the necessary capital to contribute the required investment costs. Supporting the organisation of irrigation units and increasing investments in these structures would allow members to jointly apply for government resources and facilitate monitoring functions.

Box 2.11. **Meeting the water reform challenge: Lerma Chapala River Basin Council**

Neighbouring the Valley de Mexico River Basin, the Lerma Chapala River Basin spreads across the states of Mexico, Querétaro, Guanajuato, Michoacán and Jalisco. The Lerma River, with a length of 750 kilometres, is originated in Mexico's central high plateau at an altitude beyond 3 000 metres above sea level and ends in Lake Chapala, the largest tropical lake in the country. The river basin faced a three-faceted conflict:

- *a territorial conflict* between the different states that the river basin crosses; each one wants to protect its own interests and secure the necessary volumes for its population and activities;
- *a water allocation conflict* between the different water services sector, the industrial sector and the agricultural sector, the latter accounting for 85% of the total volume of water abstracted from the basin;
- *a financial conflict* among actors on the necessary investment to encourage change in water consumption, irrigation and production practices, as well as metropolitan development trends.

In 1989, to mitigate and solve these problems the federal government and the five state governments in the river basin signed an agreement to establish a **Consultative Council** with four main objectives:

- to balance the distribution of water among users according to a **new water allocation** policy;
- to **improve water quality** by treating municipal and industrial raw effluents;
- to **increase water use efficiency**;
- to **protect the river** basin system.

In 1993, the Consultative Council became the Lerma Chapala River Basin Council, the first river basin council in Mexican history. Between 2002 and 2005, the Lerma Chapala River Basin Council, in its search for a solution to the depletion and contamination of Lake Chapala, entered into a negotiation process to reach a new water allocation agreement. The process focused on defining a new algorithm to allocate surface water between users and to avoid the disappearance of the lake. This process was led by the National Water Commission, the representative of the federal government in the Lerma Chapala River Basin Council, and included representatives of the five states in the basin as well as water users associations of the irrigation districts in the basin.

Progress has been achieved in the Lerma Chapala river basin thanks to co-ordination efforts from all involved stakeholders. The monitoring of surface and groundwater has shown that the level of Lake Chapala is gradually increasing, the economic and technical participation of the states in investment projects has improved, more volumes of wastewater are treated in the river basin and agricultural users have invested money and skills in institutional programmes to modernise their use of water.

Source: IMTA (*Instituto Mexicano de Technologia del Agua*) (2004), "Reaching Negotiated Agreements for Surface Water Allocation in the Lerma-Chapala Basin, Mexico: Putting Social Participation First", LA-0063-Negotiations between users and agencies to rescue Lake Chapala in Mexico, IMTA, Mexico.

Box 2.12. **An innovative concept: Groundwater councils in Guanajuato**

Located in central Mexico, the state of Guanajuato faces critical water challenges:

- a challenge regarding the **obsolete legislation** regulating groundwater extraction, water rights transfers and relocation of water abstraction;
- a challenge to **update databases on aquifers**, balance of extraction/recharge, as well as developing new mathematic models for hydrodynamics;
- a challenge to **assess the economic impact** of water use reduction and carry out a **cost-benefit analysis** of changes in the production models;
- a challenge to promote effective **integrated water resources management**.

To face these challenges, the state of Guanajuato has established groundwater technical bodies; however, contrary to other states in Mexico, it chose to create **groundwater councils** (*Consejos*) instead of the traditional COTAS (technical groundwater committees) as in the rest of the country. The governing body of these groundwater councils is comprised of 12 representatives, 3 from each sector (agriculture, domestic, industrial and tourism). It is supported by a **technical taskforce** and a consultative taskforce for the design of plans and projects. The structure of the groundwater councils in Guanajuato includes civil society, users from each of the main sectoral activities, technical experts and the financial, technical, legal and political support from the government. The flexible **participatory structure** of the groundwater councils has brought progress in the region's management of aquifers through:

- *dialogue between public authorities and users* to jointly discuss and design solutions;
- *improvement of users' awareness and knowledge* in terms of existing legal framework, challenges of efficiency and sustainable use
- *the development of a culture of water* across the levels of government (municipal and state);
- *financial support received from state authorities* for their five first years of development through the FIPASMA (Fund for Social Participation in Water Management in Guanajuato - *Fideicomiso para la Participación Social del Manejo del Agua en Guanajuato*);
- *action programmes and strategic plans* designed by the users' representatives who also participate in the design of the State Hydrological Plan 2000-2025 (Plan Estatal Hidráulico de Guanajuato 2000-2025);
- *an evaluation system* with performance indicators to monitor their progress.

Despite successful results, the state of Guanajuato and its groundwater councils still face important challenges. First, although they have developed a real representation of stakeholders within their structure, groundwater councils must also gain legitimacy and recognition of their work. They must continue their efforts to provide updated databases on water uses and to encourage a change in behaviours toward sustainable use of resources. Second, the role of users must be extended from strategic design to implementation of the groundwater councils' vision and hydrologic policy. The administrative regulation regarding water concession and allocation must also be revised by taking into account technical studies in order to achieve a long-term balance of abstraction and recharge volumes in Guanajuato's aquifers.

Sources: COTAS de Guanajuato official website, *http://cotas-guanajuato.blogspot.com*; Sandoval. (2001), "Los COTAS de Guanajuato en el Contexto del Manejo del Agua en México", available at *http://seia.guanajuato.gob.mx/panel/document/phpver.php?Id=1985*; Maranon, B. (1999), "La Gestión del Agua Subterránea en Guanajuato. La Experiencia de los COTAS", based on a presentation during the CIESAS-IRD workshop "Transiciones en Materia de Tenencia de la Tierra y Cambio Social", 9-11 March 1999, Mexico City.

Since the launch of the 2030 Water Agenda, progress has been achieved regarding public participation in Mexico's water management. Co-operatively with the state governments, river basin councils have created 119 operative offices, with technical, legal, operative and administrative units to support their co-ordination tasks (20 in RBCs and 99 offices in auxiliary bodies at the date of drafting in November 2012). In all, 96 management programmes have been designed and implemented in river basins, and 18 beaches were certified. At present, 800 meetings are organised annually by river basin authorities to co-ordinate and develop new actions to improve the administration of water, build the necessary water infrastructures and solve water problems in each river basin and aquifer. In addition, for 11 river basin councils, the president is now independent from the CONAGUA Director General (CONAGUA, 2012). Participation and functions in water resources management have been strengthened in COTAS to improve irrigation techniques and foster water saving in over-exploited aquifers.

The promotion of a water culture that involves citizens, the three levels of government and the private sector needs to be pursued. National campaigns are carried out through the media to raise awareness on the social and economic value of water and to promote its sustainable use. For example "*Nuevos Hábitos*" and "*El agua es como tu familia ¡Protégela*!" were designed by the three levels of government, chambers of commerce, utilities, schools, academics and various social organisations. To date, 1 500 water cultural centres were created in the country. However, these communication campaigns target mostly urban areas and the impact of future campaigns could have greater benefits if the areas were regionally differentiated. Several river basins, Rio Santiago for example, have also carried out specific campaigns on water such as "*Conoce la Cuenca*" (Initiative 37 of the 2030 Water Agenda). In 2011, river basin councils allocated MXN 53.2 million in financial support (CONAGUA, 2012) to gradually strengthen their functions and develop the managing capacities of their auxiliary bodies as part of Initiatives 1 and 2 of the Agenda. These initiatives respectively aimto "give a more relevant role to COTAS and strengthen the organisation and functioning of the river basin institutions", and "develop continuous training that fosters better skills and capacities among members in order to promote, co-ordinate and consult on joint actions with shared responsibilities".

Foster co-ordination cross river basin organisations and councils

River basin organisations, river basin councils and their auxiliary bodies should foster regular communication and consultation on decision-making process, design of action plans and information sharing. Periodical meetings between executive boards of river basin councils and their respective committees, commissions, and other bodies could be positive opportunities to exchange on local issues and specific matters while improving the effectiveness of actions at basin and sub-basin levels. In addition, river basin institutions should carry out a comprehensive evaluation of the outcomes of their projects and programmes and share the results. Authorities could therefore build on better and more systematic assessments and monitoring, and improved co-ordination among river basin institutions would allow for real inter-fitting.

In order for river basin councils and COTAS to be effective, control mechanisms need to be transparent and open to the public. For COTAS to become sustainable water users organisations, a careful system of checks and balances needs

to be developed to ensure accountability, legitimacy and transparency. This could include functioning mechanisms and credible incentives for groundwater users to engage in self-regulation and to ensure the accountability of users' representatives to both users and government agencies. Citizen observatories are also an option for public monitoring of RBCs' activities.

Conclusions and recommendations

While Mexico used to be a river basin management pioneer in Latin America, the comprehensive system of river basin organisations, councils and auxiliary bodies created in 1992 is not yet fully operational. Decision-making power related to river basin management is still centralised and largely top-down, and river basin councils lack the necessary legal, planning, capacity, regulatory and financing powers to carry out their functions. Regional water programmes designed as a follow-up to the 2030 Water Agenda are a step in the right direction, but they are, at present, more infrastructure-driven project portfolios than effective basin plans as implemented in other OECD and non-OECD countries.

Recognising river basin councils and their auxiliary bodies as the formal structures established by the National Water Law and strengthening their planning and co-ordination prerogatives are prerequisites for good governance at the basin level. This would help achieve convergence of public policies across the three levels of government, co-responsibility in decision making, transparency and consensus across all actors working toward the common goal of protection and sustainable use of water resources.

Though civil society has a seat at the table of river basin councils, further efforts are needed to ensure that all relevant stakeholders are engaged in the decision-making process. In particular, small farmers and indigenous communities are still under-represented, and greater participation of irrigation districts and units would contribute to the sustainability of catchments and the balance of aquifers.

While river basin institutions face common challenges, there are limited opportunities to share lessons and experience. River basin organisations and river basin councils report to different constituencies and there are only limited platforms to share concerns and take consistent and mutually beneficial decisions. Co-ordination is currently undertaken on an *ad hoc* basis. More systematic communication and sharing of experience would contribute to building technical and managerial capacities of river basin institutions, in particular in the formulation of policies and the design of such instruments as water pricing to manage water demand.

Good governance practices in various river basin councils could be further replicated in Mexico, especially in regions that share similar socio-economic or hydrological contexts. Several initiatives taken in the states of Jalisco, Guanajuato, Colima and Hidalgo proved successful to overcome key water challenges such as aquifer over-exploitation or monopolistic water concessions. They explored innovative approaches to set water tariffs and to put a price on ecosystem services. Replication has been slow because of the lack of a robust assessment of the prevailing river basin governance scheme and of local experiments.

Recommendations

- **Strengthen the role, functions and autonomy of river basin councils and their auxiliary bodies** with the objective to develop effective basin plans that go beyond infrastructure project portfolios, identify and prioritise projects; and foster co-ordination across local, basin and state actors. This may require a tailored approach as basins are faced with specific challenges and are endowed with distinct capacities.
- **Establish a platform to share good practices across river basin organisations, councils and auxiliary bodies to enhance capacities through peer learning.** Several actions could be considered, including the organisation of periodical meetings between river basin council executive boards and their respective auxiliary bodies to exchange on local issues and specific matters, viable websites and communication tools, as well as operative offices on the ground.
- **Consider giving river basin organisations a gradual degree of autonomy to raise and allocate funds locally for priority investment.** This could be considered when policy objectives are well defined and recurrently reviewed, and would allow river basin organisations to generate the resources needed to carry out their duties closer to local stakeholders.
- **Engage stakeholders in river basin councils within a framework of joint responsibility, transparency and accountability.** Participation should not be restricted to consultation and approval of programmes, but extended to an active role in the decision making.

Notes

1. The 2004 National Water Law is an amendment to the 1992 National Water Law.

2. The seven targets are: *i)* users and authorities should work harmoniously with common objectives in each river basin; *ii)* concepts of common good and water solidarity should be developed and implemented in all river basins; *iii)* the population should be informed of issues and progress in the water sector; *iv)* awareness should be raised on the matter of responsible use and fair price of water; *v)* civil society organisations should be involved in water management and preservation of all river basins; *vi)* vulnerable groups should be represented in river basin councils and their auxiliary bodies; and *vii)* river basin councils should be strengthened, as stated in the National Water Law, as key elements of the integrated management of water resources.

3. Irrigation units are normally small units around one well that are controlled by one person or by a limited group of people. According to the National Water Plan (2007-2012), irrigation units use 57% of underground and 43% of surface waters.

4. According to the 2004 National Water Law (Article 12 BIS 2), the river basin organisations (RBOs) will have a consultative council, composed by representatives of various ministries, such as Finance, Social Development, Energy, Environment, Health, Agriculture, CONAGUA and the National Forestry Commission (CONAFOR). In addition, a representative of the state where the RBO is located, as well as representatives of the municipalities within the boundaries of the RBO, can participate with voice and vote. A representative from users can also participate, but without the right to vote, or representatives of the river basin councils (RBCs) can take part on the consultative council. According to the 2004 National Water Law (Article 13 BIS), the RBCs are composed of a mix of representatives, from the federal, state and municipal government, as well as users and civil organisations. RBCs have various auxiliary bodies to take up their responsibilities, such as river basin commissions, river basin committees or COTAS.

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Annex 2.A1
Challenges, good practices and factors of success in various river basin case studies in Mexico

Case studies	Location (state(s) concerned)	Key issue(s)	Challenge(s)	Actions and good practices accomplished	Key factors of success
Valley of Santo Domingo aquifer	Baja California	– Over-bearing agricultural sector – Over-exploitation of groundwater	– Achieve aquifer recovery – Guarantee future of activities – Identify recharge opportunities	– Balance of extraction and natural recharge – Respect of volumes allocated in concessions	– Tangible impact of social participation in decision making – Political will and institutional arrangements to support co-ordination between three levels of government – Converging policies – Involvement of COTAS – Information sharing with the agricultural sector – Matching actions and solutions to preserve and assess water resources
Tecocomulco lagoon	Hidalgo Puebla Tlaxcala	– Loss in storage capacities – Soil erosion	– Invest in soil and water conservation – Develop capacities	– Co-ordinated actions, projects and resources – Dredging of canals – Vegetation removal	– Participative process – Continuous dynamic of meeting and monitoring by the river basin commission
Lake Cuitzeo River basin	Michoacán Guanajuato	– Discharge of untreated wastewater – Spread of aquatic weeds	– Foster integrated cleaning of the river basin	– Include state Congress in management process – Mobilise additional funding	– Political will and guidance regarding funds allocation – Institutional arrangements supporting interactions between levels of government – Converging public policy and co-ordination mechanisms between levels of government users – Tangible impact of social participation in decision making

Challenges, good practices and factors of success in various river basin case studies in Mexico (*cont.*)

Case studies	Location (state(s) concerned)	Key issue(s)	Challenge(s)	Actions and good practices accomplished	Key factors of success
Lake Patzcuaro River basin	Michoacán	– Environmental damages to forests, water resources and fauna	Develop effective governance of the river basin with all stakeholders	– Inter-institutional co-ordination – Creation within the Congress of a commission to monitor the cleaning process of the basin – Design of a strategic programme to support the process	– Co-responsibility – Political will – Information and knowledge sharing – Matching actions and solutions to preserve and assess water resources – Institutional arrangements supporting interactions between levels of government – Converging public policy and co-ordination mechanisms between levels of government users – Tangible impact of social participation in decision making
Zanjon River aquifer	Sonora	– Hasty allocation of concessions – Lack of knowledge – Groundwater over-exploitation	Raise awareness among users to guarantee sustainable evolution of the aquifer	– Capacity-building for users – Monitoring of concession process	– Tangible impact of social participation in decision making – Information sharing on norms – Political will – Co-responsibility – Adequate financing from three levels of government – Supportive legal system
Yaqui River irrigation district	Sonora Chihuahua New Mexico and Arizona for the American part	– Infrastructures and agricultural soil reaffectation – Water loss – Impact on productivity	Transfer of the irrigation district n. 041	– Participation of irrigation users – Promotion of secure allocation of water for each agricultural cycle	– Users' participation – Co-responsibility – Technical capacity – Consensus and capacity building – Institutional arrangements supporting interactions between levels of government – Converging public policy and co-ordination mechanisms between levels of government users – Tangible impact of social participation in decision making – Information and knowledge sharing supporting social action
Colorado River delta	Baja California American states of the Colorado river basin	Deterioration of wetlands	Develop a consensual planning vision to protect wetlands	– Design of a management programme by the Specialised Group for the Colorado Delta Wetlands – Restoration of ecosystem	– Converging public policy and co-ordination mechanisms between levels of government users – Matching actions and solutions to preserve and assess water resources – Tangible impact of social participation in decision making

Challenges, good practices and factors of success in various river basin case studies in Mexico (*cont.*)

Case studies	Location (state(s) concerned)	Key issue(s)	Challenge(s)	Actions and good practices accomplished	Key factors of success
Balsas River	Jalisco Michoacán Mexico Guerrero Federal District	– Locked agreement prohibiting new concessions – Over-bearing hydro-electricity sector	Modify the agreement prohibiting new concession titles	– Change in agreement – Relieved social pressures – Balanced distribution of water allocation among sectors	– Transparency – Accountability – Technical capacities – Political will
Santiago River basin	Guanajuato Jalisco San Luis Potosi Zacatecas Nayarit Durango	– Lack of knowledge and awareness about sustainable use of water	Develop didactic tools to build capacities and environment education	– Integration of the GETCA with representatives from the three levels of government, users, academics and civil society	– Tangible impact of social participation in decision making – Capacity building – Institutional arrangements – Consensus building – Political will – Matching actions and solutions to preserve and assess water resources – Information and knowledge sharing supporting social action – Transparency, accountability and independent monitoring – Adequate financing and economic instrument
Yucatan Peninsula	Campeche Quintara Roo Yucatán	– Lack of information on deep pools characteristics – Contamination by solid waste – Inadequate use of deep pools – Lack of regulation and norms	Promote knowledge on deep pool conservation	– Organisation of fora at state and regional levels – Proposal for institutional mechanisms – Monitoring and studies on deep pools – Inventory and diagnosis of deep pools	– Users involvement and active river basin council participation – Participation of three levels of government – Federal and state funding – Capacity building – Institutional arrangements supporting interactions between levels of government – Tangible impact of social participation in decision making – Information and knowledge sharing supporting social action

Chapter 3

Improving economic efficiency and financial sustainability

This chapter discusses economic efficiency and financial sustainability of water policies in Mexico. It provides an inventory of existing economic instruments in place to manage water resources, discusses shortcomings in their design that limit their contribution to water policy objectives, and suggests ways forward, in particular accompanying measures that can ease reform.

Introduction

This chapter builds on the approaches to water economics and finance developed by the OECD. The traditional interest of the OECD in the water sector has been economic instruments as incentives to achieve water policy objectives efficiently. Since 2007, however, the OECD has been working intensely on issues of water financing – initially with a focus on water services and more recently on water resources management. The key message from this recent and growing body of work has been that the water sector must focus less on attracting financial resources and more on achieving financial sustainability. That entails paying greater attention to the expenditure side (financial realism of water policy objectives, efficiency of public expenditures, attention to low-cost options) in contrast with the usual bias towards infrastructure and supply augmentation; establishing a policy framework for water financing (including principles and instruments for water financing); achieving the right balance between the ultimate sources of revenue for the sector (users, tax payers, and, in the case of aid-receiving countries, official development assistance); and putting in place strategic financial planning processes.

This chapter is structured around seven sections. After this introduction, the second section discusses the policy and institutional framework for water financing in Mexico, including the financial sustainability aspects included in the 2030 Water Agenda. The following section provides an overview of the water sector's finances. For the purposes of this document, the water sector has been divided into three sub-sectors: water resources management, irrigation services and water supply and sanitation services. The next three sections discuss expenditures, financing structure and use of economic instruments in those three sub-sectors. They compile the most recent information on financial flows in each sub-sector, and on the use of economic instruments to improve water management; issues for discussion are highlighted and preliminary recommendations are sketched. A section with main conclusions and recommendations closes the chapter. Particular attention is paid to actions that can be taken now, in the current institutional and regulatory framework, and to accompanying measures that can facilitate the reform of water policies in Mexico. It builds on good international practices and on recent initiatives in Mexico, at federal, state or local level.

Policy and institutional framework

Policy framework

The National Water Law entails a number of principles that would guarantee the financial sustainability of water management. Article 14 BIS 5 fraction XV of the National Water Law (CdD, 2012) establishes the principle of Water-Pays-for-Water, specifying that water management must generate the economic and financial resources to carry out its inherent tasks. Article 14 BIS 5 fraction XVI establishes the User-Pays principle, specifying that water users must pay for the abstraction and use of water according to the National Duties Law (*Ley Federal de Derechos*). Article 14 BIS 5 fraction XVII establishes the Polluter Pays principle, specifying that those who pollute water resources are responsible for restoring their quality; the Polluter-Pays principle shall apply according to the relevant laws. (Box 3.1 offers international definitions of these principles.)

Box 3.1. **Principles for financing water management**

The OECD identifies four principles to frame water resource management financing (see OECD [2012] for further development and related issues).

The Polluter-Pays principle is the principle according to which the polluter should bear the cost of measures to reduce pollution according to the extent of either the damage done to society or the exceeding of an acceptable level (standard) of pollution.

The User-Pays principle is a variation of the Polluter-Pays principle that calls upon the user of a natural resource to bear the cost of running down natural capital (United Nations [1997], as cited by the *OECD Glossary of Statistical Terms*).

The Equity principle addresses the issue of proportionate costs of water management for water users. For example, both France and the Netherlands consider equity as a core dimension of water financing. Cross-subsidies across water users have been used if the charges requested from some groups are disproportionate with their capacity to pay. This is one mechanism to address affordability issues, although in many instances it may be more efficient and targeted to use broader social policy tools. Equity arguments are also sometimes used when considering the impacts of water policies on revenues (for farmers) or competitiveness (for farmers or industries).

A fourth principle is policy coherence and alignment of incentives across areas that affect water availability and use (energy, agriculture, land use, etc.). When they pursue incoherent objectives, incentives generate excessive social costs and adversely affect the outcomes of water resource management. Reforming allocation of public moneys in adjacent sectors (for example, in agriculture, hydropower, energy, urban planning) can be more cost effective than mobilising additional funding in the water sector.

In addition, some countries consider that Water-Pays-for-Water. According to French policy (*www.developpement-durable.gouv.fr/L-eau-paie-l-eau.html*), water-pays-for-water means that water users ("consumers" and "polluters") must pay for the infrastructure construction and operation necessary for the production and distribution of drinking water and the provision of sanitation services; at the same time, the water-related expenses of the authorities in charge must be balanced with the revenues received from the water users. This principle highlights that no public subsidy (explicit or hidden) should be provided to the water sector, while allowing for cross-subsidisation between categories of water users as well as between individual water users. Another consequence of this principle is that revenues from water charges or taxes are earmarked for water-related services.

This principle raises a couple of issues: *i)* the public good character of some water-related services can justify public transfers; *ii)* earmarking revenues from water taxes can lead to suboptimal allocation of fiscal revenues. These issues will be explored further in this chapter.

The User-Pays and Polluter-Pays principles have been implemented in Mexico, but only to a limited extent. The principles are applied mostly through the National Duties Law that defines and sets the rates for water abstraction and water pollution charges. But, as discussed later, many users do not pay for water and water pollution, because they are either exempted, under-report consumption or pollution, or abstract water or discharge wastewater illegally. In the case of the Water-Pays-for-Water principle, the Law on Contributions for Improvements Generated by Federal Public Works of Water Infrastructure (*Ley de Contribuciones de Mejoras por Obras Públicas Federales de Infrastructura Hidráulica*) establishes the regulations and procedures for recovering the cost of public investments in water infrastructure but it has never been applied. On the one hand, some revenues from water charges or taxes accrue the central budget (which makes sense, from a fiscal perspective). On the other hand, several federal water

programmes represent important subsidies for the water sector, even though they include some contributions from water users. Federal subsidies for the water sector (either in the form of direct investments, which cost is not recovered, or in the form of financial transfers to other water actors) are increasing (see the next section).

The National Water Law mandates the creation of a Water Financing System. The 2004 reform to the National Water Law (NWL) in its Title 8 BIS introduced the concept of a Water Financing System (WFS). The aim of the Water Financing System is to support the application of integrated water resources management (IWRM) in Mexico. According to the NWL, the WFS shall determine the financing sources, financing mechanisms, criteria for spending resources, recovery of financial resources, accountability, management indicators, and the outcomes of the application of financial resources and instruments. The NWL mandated the federal government to define the WFS and create the instruments to operate it, and it mandated CONAGUA (National Water Commission) to operate the WFS under the supervision, and with the support of the Ministry of Finance (SHCP – *Secretaría de Hacienda y Crédito Público*). However, there has been little progress with the implementation of the WFS since 2004. In order to implement the WFS, implementation of two of the National Water Law's secondary regulations (*reglamento*) needs to be approved. However, the two articles (Art. 262 and 263) in the current draft of the secondary implementing regulations[1] neither define the WFS nor create the instruments to operate it. The WFS would need to explain how the principles highlighted above shall be understood and implemented in Mexico, including whether and to what extent the cost of federal investments shall be recovered.

The National Water Law identifies a number of additional issues that would help to ensure the financial sustainability of the sector. On the expenditure side, it specifies that the planning system will include multi-annual investment plans (as well as annual operative plans). The challenge will be for local authorities to access such multi-year budgets, as they lack the capacity to develop multi-year programmes. On the revenue side, it specifies that water charges aim to prioritise demand management and also to recover the cost of federal investments (Article 112 BIS).

Economic instruments are acknowledged as important mechanisms for water management, beyond their financing role. Article 14 BIS 6 of the National Water Law acknowledges water abstraction and pollution charges as part of the set of basic instruments for water management, which includes most prominently water abstraction and water pollution quotas. Article 14 BIS 5 of the National Water Law establishes that those who make an efficient and clean use of water will benefit from economic incentives. Article 28 IV establishes that water right holders will have the right to transmit the rights of the titles that they possess (as well as the duty to install water meters and pay water charges), thus paving the way to water markets.

Institutional framework

Federal level

Multiple institutions are involved in water financing in Mexico (see Figure 3.1). The federal level has traditionally been the main actor in financing water resources management and irrigation, but this role has been evolving: first, with the transfer of irrigation districts to water user associations in the 1990s, and second with the current transition towards river basin management. With regard to water supply and sanitation, the federal level increased its role in the 2000s to provide greater support to

municipalities that are constitutionally responsible for the provision of those services. The state and municipal levels have been growing in importance in the last decades, as they have asserted their powers and are increasing their share in the distribution of tax receipts. Figure 3.1 provides an overview of the directions of the key financial flows in the Mexican water sector. Further information on the organisation and role of federal institutions for water management is provided in Chapter 1.

State level

State governments have responsibilities for planning, regulating, developing and financing water infrastructure. In some cases, they directly provide water and sanitation services, which have to be funded. State governors negotiate with CONAGUA the inclusion of projects in the federal programme.

State congresses, in most cases, are responsible for approving water and sanitation tariffs (sometimes delegated to the State Water Commission).[2]

State water commissions (*Comisiones Estatales de Agua*) co-ordinate between municipalities and the federal government, including infrastructure planning and financing.

Municipal and other levels

Municipal governments are responsible by constitutional mandate to provide water and sanitation services, and thus implicitly to assure the services financial sustainability and to set tariffs.[3] Some municipalities issue general bonds and use part of the proceeds to subsidise water investments. A portion of municipal funds contribute to flood protection projects.

River basin organisations (*Organismos de Cuenca*) are the territorial units of CONAGUA in the 13 hydro-administrative regions. They execute CONAGUA's programmes from water administration to the operation of strategic infrastructure.

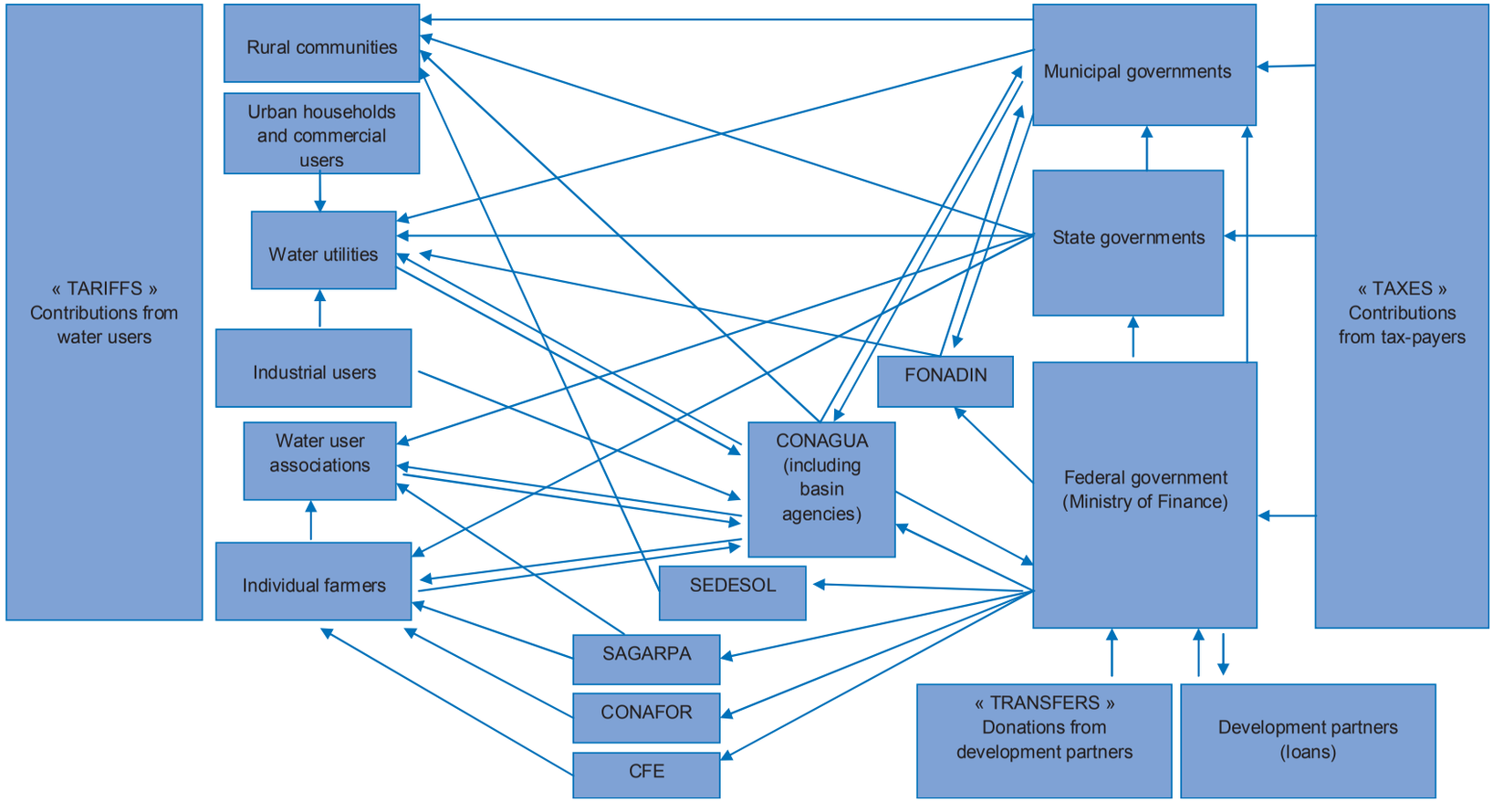
Water utilities (*Organismos Operadores*) suggest retail water tariff reforms, manage retail water tariffs and execute projects co-financed by the federal government.

Agricultural water users finance variable proportions of the operation and maintenance and capital expenses associated with irrigation. Most irrigation districts are managed by water user associations (ACUs – *Asociaciones Civiles de Usuarios*) through concessions, although the infrastructure belongs to the Mexican republic. The National Association of Irrigation Water Users (ANUR – *Asociación Nacional de Usuarios de Riego*) negotiates the financial conditions of federal programmes with CONAGUA.

Water financing and the decentralisation process

The financing aspects of the process of decentralisation of water management are still to be defined. The 2004 reform of the National Water Law established, as the basis for national water policy, the integrated management of water resources by hydrological basin. Institutionally, it emphasised the roles of the river basin organisations and the river basin councils. The implementing secondary regulations (*reglamento*), yet to be issued, will need to clarify two important issues: the degree and mechanisms of financial autonomy of the basin authorities and the financing of the river basin councils. The current draft of the implementing regulations implies that the river basin organisations remain deconcentrated units of CONAGUA (without financial independence) and it is silent on financing of the river basin councils.

Figure 3.1. **Key financial flows in Mexico's water sector**



CONAGUA's planning and programming system has been partially reformed to support the decentralisation of water management envisaged in the National Water Law. CONAGUA has started to design national programmes of a sub-sectoral nature (e.g. water supply and sanitation, irrigation, flood control) that are managed through its central offices; CONAGUA officials located in the basin authorities report on their implementation to their superiors in the headquarters. There is a close co-ordination between CONAGUA's central, regional and state-level offices in terms of generating plans and programmes, and the river basin councils are consulted. However, regional basin plans are not led by the river basin organisations, taking into account basin priorities agreed and approved at the basin level. While a batch of regional plans by hydro-administrative region has been issued in 2012, these plans (*Programas Hidrológicos Regionales*) essentially represent a compilation of projects to be financed by the federal budget (and to a lesser extent by state and municipal budgets and users) that would contribute to achieve the national goals identified in the 2030 Water Agenda. They do not necessarily derive from a consistent, financially realistic strategy at basin level.

River basin organisations do not have financial autonomy. Currently, river basin organisations depend entirely on the federal budget, as they have no revenue raising power. As discussed later, water abstraction and pollution charge rates are set at federal level by the Federal Duties Law, collected by CONAGUA and the proceeds integrated in the federal budget by the Ministry of Finance (which contradicts the Water-Pays-for-Water mentioned above).[4] CONAGUA raises funds through water charges, which amount to about 80% of CONAGUA's regional spending (IMTA, 2009). This average hides cross-subsidies between regions. Regions that generate more resources than they receive from CONAGUA include Lerma-Santiago-Pacífico, Rio Bravo, Cuencas Centrales del Norte and Golfo-Centro; regions that receive more resources than they generate include Baja California, Pacífico Norte and Mexico Valley (IMTA, 2009).

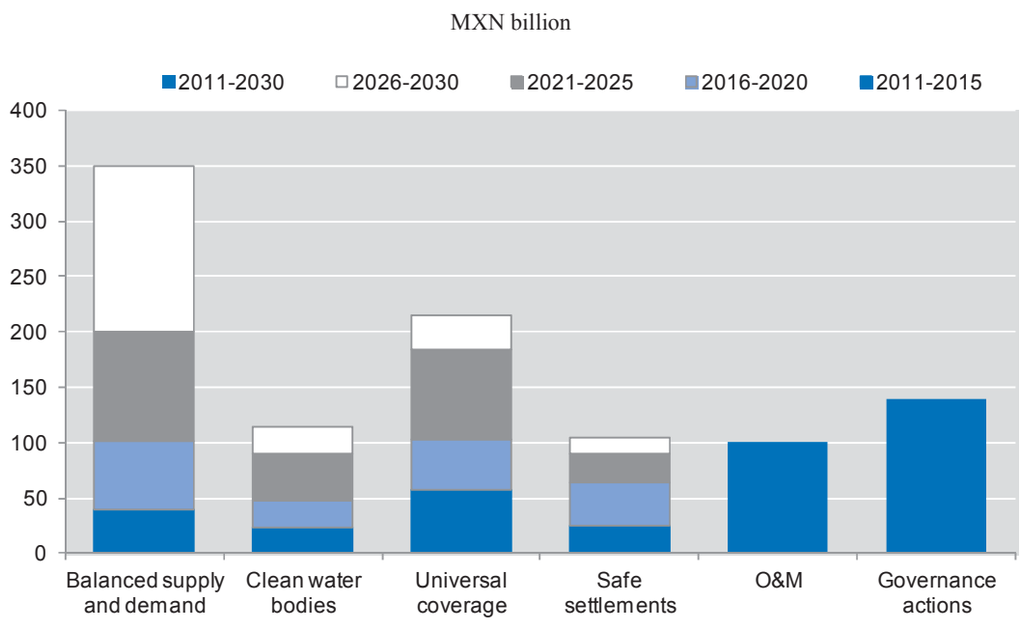
Water financing in the Water Agenda 2030

The 2030 Water Agenda highlights the importance of achieving financial sustainability and the role of economic instruments, but does not explore their full potential. Among the ten "main challenges" identified in the process of elaborating the 2030 Water Agenda, two relate to water financing and economic instruments. Among the "strategic lines", the 2030 Water Agenda includes guaranteeing financial sufficiency for water supply and sanitation services (by defining tariffs and establishing subsidies and guarantees), developing vigorous financial systems at national, regional and local level, and establishing incentives so that the different actors change their behaviour to sustainability requirements. In addition, more than half of 2030 Water Agenda's 38 "initiatives" are related to financial sustainability and economic instruments (see Box 3.2). They aptly signal the importance of these issues. Some will deliver best when framework conditions are set. For instance, Initiative 4d will work best when investment plans are based on cost-efficiency analyses, when low-cost options are considered and when water saved is allocated to high-value uses. Initiative 9 will contribute to water policy objectives when PES schemes are designed so that they promote low-cost measures and do not contradict the Polluter-Pays principle.

The initiatives seem to have been developed independently from the planning and programming of measures under each of the 2030 Water Agenda's four themes that rely on technical fixes to solve the different water challenges, failing to explore the full potential of economic instruments. The 2030 Water Agenda estimates its implementation costs at MXN 1 trillion over 20 years (CONAGUA, 2011b). Those costs focus on the

investment needed over 20 years (between 2010 and 2030) to "close the gaps" identified under each of four goals (see Figure 3.2). Rough estimates of operation and maintenance costs of the new infrastructure as well as governance actions are also provided. The total cost represents an average of MXN 51 billion per year (roughly EUR 3 billion per year), of which MXN 39 billion are for infrastructure investments, MXN 5 billion for infrastructure operations and maintenance, and MXN 7 billion for governance and soft-management actions. The 2030 Water Agenda indicates that average investment in 2007-2010 was MXN 37 billion per year and that the financing gap[5] is thus MXN 14 billion per year; however, this figure does not seem to take into account potential savings from increasing the effectiveness and efficiency of current water infrastructure. These costs are additional to the ongoing expenditures needed for managing water resources and providing water services in Mexico. In 2012, total water sector expenses are in the order of MXN 90 billion per year.

Figure 3.2. **Estimated costs of implementing the 2030 Water Agenda**



Note: Estimates by theme include investments only.

Source: Elaborated based on data from CONAGUA (2011b), *Water Agenda 2030*, CONAGUA, Mexico.

The 2030 Water Agenda asks for an increase in water user contributions to water management but does not specify targets. Two ultimate sources of finance support water policies and water services in Mexico: users (through water resources charges and water services charges) and tax payers (through budgetary resources earmarked for water projects and general budgetary resources). The financing mix is currently excessively supported by public budgetary resources, and is not sustainable. However, the 2030 Water Agenda does not provide details on the current financing mix and it does not identify targets for increasing the share of water users in the financing of the sector. This also applies to the regional water programmes designed at hydro-administrative level.

Box 3.2. The 2030 Water Agenda on financial sustainability and economic instruments

Balance water demand and supply

- Initiative 1d. Ensure the financial sustainability of the technical groundwater committees (COTAS) through a share of CONAGUA's revenues from water charges.
- Initiative 4d. Increase the public budgets for modernisation and technification of irrigation infrastructure.

Clean water bodies

- Initiative 7a. Increase the rates of water pollution charges.
- Initiative 7c. Reduce the rates of water abstraction charges and increase the subsidies for non-polluting industries.
- Initiative 7f. Establish a pollution tax on fertilisers.
- Initiative 7h. Steer federal subsidies towards full systems of water supply, distribution, wastewater collection, wastewater treatment and water reuse.
- Initiative 7i. Increase economic incentives for municipalities and states interested in wastewater treatment costs.
- Initiative 9. Implement schemes of payments for ecological services.

Universal coverage of water services

- Initiative 10b. State congresses must guarantee the financial sustainability of water operators, defining the right balance between tariffs and subsidies.
- Initiative 12. Promote tariff setting that follows technical criteria and is delinked from political aspects.

Safe settlements

- Initiative 18. Increase investments in risk mapping, zoning, building protective infrastructure and maintaining current water infrastructure.

General

- Initiative 23. Create an entity to guarantee sufficient budget resources and expedite use to create a robust and strategic project portfolio.
- Initiative 25. Strengthen the process of formulating, monitoring and evaluating long-term water programmes by hydrological region oriented towards water sustainability.
- Initiative 26. Apply results-oriented evaluation to all public programmes with an impact on water sustainability.
- Initiative 27. Use the receipts from water resources charges to finance water governance functions.
- Initiative 28. Create revolving funds to support access by water operators and irrigation associations to the commercial financial system.

Box 3.2. **The 2030 Water Agenda on financial sustainability and economic instruments** (*cont.*)

- Initiative 29. Establish a clear and transparent system of water prices and block water tariffs including economic costs and environmental externalities.
- Initiative 30. Repeal the Law on Contributions to Compensate for Improvements Generated by Federal Public Works integrating those contributions in the water services tariffs, to recover investment costs.
- Initiative 31. Increase the investments in modernisation and technification of irrigation infrastructure.
- Initiative 32. Modify state laws and regulations to regulate public-private investments in water infrastructure.
- Initiative 33. Create a national fund for the maintenance and rehabilitation of dams and other major water infrastructure.
- Initiative 36. Create an information system of water sector investments undertaken by the three government levels and by water users.
- Initiative 38. Create a contingent fund for adaptation to climate change.

Source: CONAGUA (2011), *Water Agenda 2030*, CONAGUA, Mexico.

The 2030 Water Agenda supports the adoption of lower cost solutions to water challenges. The Mexican water sector has traditionally been characterised by a development model based on the supply of new infrastructure – which is costly to build, maintain and operate. The 2030 Water Agenda endeavours to put more attention on demand management and on exploiting potential efficiency gains. For example, to achieve the goal of balanced basins, the 2030 Water Agenda projects that 82% of the "water gap"[6] will be closed by reductions in water demand and 18% by supply increase. The role of economic instruments on achieving demand reductions is unclear; however, as the reductions in water demand are expected to be achieved through investments in infrastructure (in particular on water-efficient irrigation systems) supported by subsidies and is linked neither to water pricing reforms nor to more efficient allocation of water resources.

The 2030 Water Agenda represents a step forward in terms of strategic financial planning. The 2030 Water Agenda is a new element in Mexico's national water planning system. It sits between the water policy (established in the National Water Law) and the water programmes (approved by every new presidential administration every six years) (CONAGUA, 2011b). The 2030 Water Agenda includes several features of a strategic financial planning exercise. First, as indicated above, it provides estimates of the financial cost of achieving its four strategic goals. Second, it adopts an efficiency approach to water planning – particularly as regards the theme of balancing water supply and demand, where the 2030 Water Agenda has ranked the types of measures that can be adopted according to the unit costs of water saved in order to select the most cost-effective ones. Third, the 2030 Water Agenda highlights the needs to rebalance the relative contribution of the ultimate sources of finance (users and tax payers in Mexico's case). The 2030 Water Agenda, however, fails to explore the full spectrum of economic instruments from a resource management perspective, and does not provide targets for how its overall

implementation will be financed. Policy objectives are not discussed *vis-à-vis* the total cost of the agenda.

Box 3.3. **Using the "water cost curve" in Mexico**

CONAGUA developed the "water cost curve", a tool used to identify technical measures to reduce water consumption. The defining feature of this tool is that it prioritises the technical measures according to the cost per cubic metre saved, thus showing how to reduce water demand across the economy at the lowest cost for society. The introduction of this traditional tool used in economic analysis in Mexico's water policy discussions has focused attention to cost-effectiveness, an area where there is much room for improvement. In the case of Mexico, cost curves have been designed at national level and in each of the 168 territorial units.

The "water cost curve" needs to be carefully used. Since it only identifies technical measures, there is a risk that it could be interpreted as a guide for programming public expenditures, however, this is not the case. First, this interpretation could be misleading, as it does not help to understand how the water saved will be used; if it is used to increase irrigated surfaces, this will not bridge the water gap. Second, it does not help to bridge the financing gap. The cost curves mask a number of split incentives, where the parties who finance the investment do not reap the benefit of their investment. Third, the government and public organisations like CONAGUA are expected to focus on choosing and implementing the policy instruments (such as water quotas, water pricing or agricultural subsidy reforms) that would induce water stakeholders to adopt the most cost-effective technical measures.

Overview of water sector finances

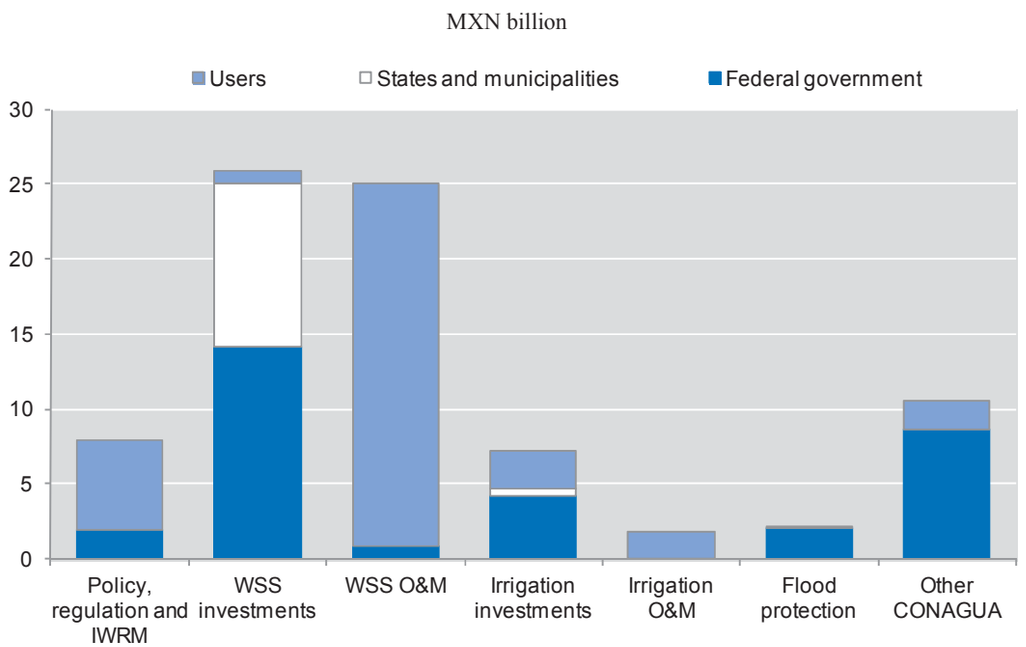
Water sector's budget

A complete budget of Mexico's water sector is not available. Figure 3.3 provides an estimate of Mexico's water sector expenditure by sub-sector and by funder. This budget is incomplete because it does not include estimates of private expenditures by land developers, households, industrial facilities or farmers beyond water tariffs paid to service providers (utilities, irrigation districts) – such as the economic contributions of households to community-managed water supply and sanitation services. It does not include either public water-related expenses included in other federal programmes (such as those executed by SAGARPA [Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food] or CONAFOR) or in non-water programmes at the state and municipal level, or the electricity subsidy for rural users that is mostly used for water pumping (see section on irrigation). A significant part of federal expenditures in the agriculture and rural development sector are water-harmful subsidies[7] – those expenditures are not included here either. Nevertheless, Mexico is starting to build a comprehensive view of its water sector finances – although the figures are not entirely reliable, the 2030 Water Agenda provides useful estimates of the financial needs over a 20-year period.

Mexico's annual water sector budget is growing, and it will likely exceed MXN 90 billion. Estimates offered by IMTA (2009) indicate that water sector expenditures approached MXN 40 billion per year in 2004-2006 (about 0.5% of GDP), MXN 48 billion in 2007 and MXN 60 billion in 2008 (IMTA, 2009). According to Figure 3.3, expenditures exceeded MXN 80 billion in 2009. When factoring the increases in funding for federal programmes, their leverage effect on state and municipal contributions and the increases in tariff revenue from water utilities, sector expenditures

will probably exceed MXN 90 billion in 2012. The increases in the last decade followed a long period of relative neglect, as water investments decreased by a third between 1980 and 2002 (Medel, 2010). The growth of the overall sector budget, even in real terms, must be put in the context of a growing economy and population, and it has been pointed out (Medel, 2010) that per capita water investments have actually decreased.

Figure 3.3. **Estimated water sector budget (2009)**



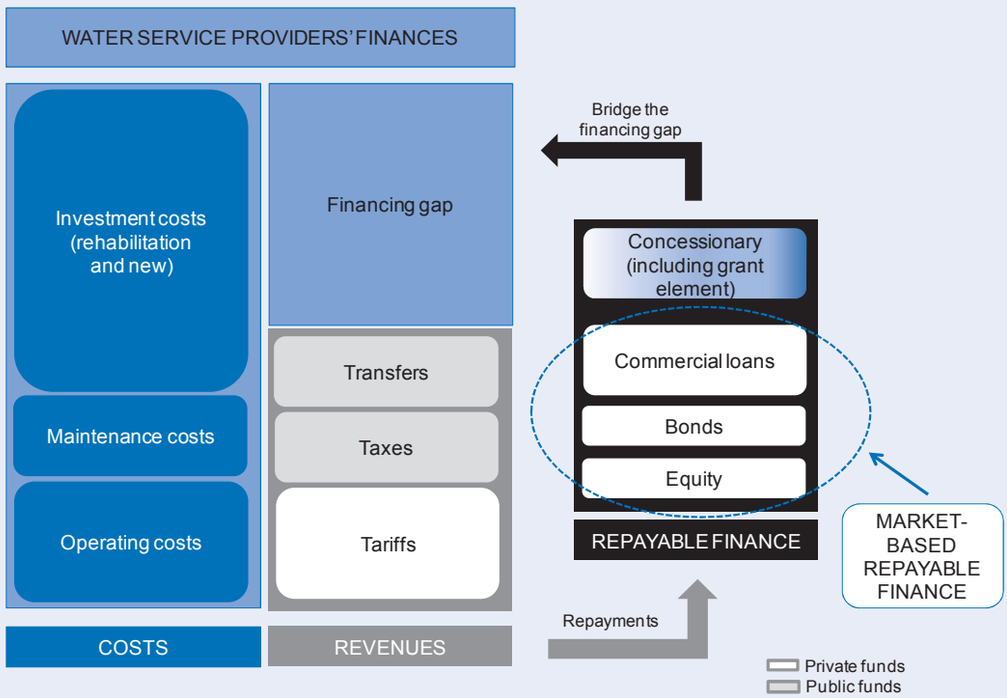
Notes: Federal expenses include only CONAGUA's expenses. Irrigation operation & maintenance expenses include only an estimation of the spending of farmers on irrigation services provided by irrigation districts. The estimates assume that revenues from water resource charges are used to pay for water policy and regulation and IWRM programmes. Other CONAGUA includes urban bulk water services and non-classified programmes. More recent data are available for some of the categories; extensive coverage could only guaranteed with 2009 data.

Sources: Elaborated based on data from CONAGUA (2011), *Estadísticas del Agua en México, Edición 2011*, CONAGUA, Mexico; CONAGUA (2011), *Situación del Subsector Agua Potable, Alcantarillado y Saneamiento, Edición 2011,* CONAGUA, Mexico; CONAGUA (2012), *Water Agenda 2030*, CONAGUA, Mexico; and Ibañez Mariño, E. (2010), "Financiamiento Sostenible de la Gestión del Agua", presentation delivered at the 5th Meeting of the Technical Support Panel of the Conference of Iberoamerican Water Directors, CONAGUA, 3 August.

Water spending in Mexico is dominated by the water supply and sanitation sub-sector. The water supply and sanitation sub-sector represents about 70% of Mexico's water sector expenses, while irrigation represents about 12%, and integrated water resources management (including policy, regulation and flood protection) about 15% (see Figure 3.3). The figure indicates that operation and maintenance (O&M) costs for water and sanitation services are essentially covered by users; however, it should be mentioned that O&M expenditures underestimate maintenance needs, leading to a decay of built infrastructures and increasing the financing gap.

Box 3.4. **Financing water: The 3Ts and the role of commercial finance**

The OECD distinguishes three ultimate sources of finance for the water sector (the 3Ts): tariffs and other user contributions, tax payers' contributions, and non-repayable transfers (grants, donations) from development co-operation partners or other actors. Commercial finance (bonds and loans) has to be repaid; therefore it does not provide additional sources of finance, although could be very useful to solve liquidity problems in the medium term.



Source: OECD (2009), *Managing Water For All: An OECD Perspective on Pricing and Financing*, OECD Publishing, Paris, doi: 10.1787/9789264059498-en.

The federal government dominates water financing in Mexico, but users pay for almost half of water expenditures. Tax payers finance about 55% of total water expenditure. Given the strong increases in federal budget for water supply and sanitation programmes, the federal government is currently financing close to 40% of all water expenditures that are currently tracked. State and municipal governments represent an additional 15% of water expenditures.[8] Water users finance over 45% of total water expenditures through water and sanitation tariffs (MXN 27 billion from households, commercial and industrial users), water resources charges (MXN 6 billion mostly industrial users), bulk water tariffs (MXN 2.2 billion mostly from urban water users) and investments, operation and maintenance of irrigation infrastructure (MXN 4.3 billion from agricultural users). The funding mix varies across sub-sectors, with public funding focusing on investments and user contributions on operation and maintenance costs. Official development assistance (ODA) represents well below 1% of total sector expenditures (see Box 3.5). The dependence of the sector on government funding means that the sector is very exposed to economic crises on public budgets (Medel, 2010).

Box 3.5. The role of development co-operation in financing the Mexican water sector

Over the years, the Mexican water sector has received significant support from external partners – mostly in the form of loans (with some grant components). Since 1961, the Mexican water sector has received over USD 7.3 billion from 79 loans: USD 4.3 billion from the World Bank, USD 2.2 billion from the Inter-American Development Bank (IDB) and USD 0.74 billion from the Japanese Bank for International Co-operation (JBIC). In terms of donations, it has received support, in particular from the North American Development Bank.

Currently, the main programmes with international co-operation support are:

- Program for Improving the Efficiency of Water Operators (*Proyecto de Mejora de Eficiencia de Empresas Abastecedoras de Agua* – PROME) – supported by a World Bank loan of USD 100 million (counterpart funds from state governments, municipalities and water operators to reach USD 62 million).
- Program for the Sustainability of Water Supply and Sanitation Services in Rural Communities (*Programa para la Construcción y Rehabilitación de Sistemas de Agua Potable y Saneamiento en Zonas Rurales* – PROSSAPYS) – supported by an IDB loan of USD 250 million (counterpart funds from state government and municipalities of USD 250 million).

Given Mexico's growing level of development and the increasing size of its water sector, the role of development partners in financing the Mexican water sector will be increasingly marginal. Indeed, the two programmes mentioned above represent annual disbursements by the two international financial institutions of about 1% of Mexico's water expenditures, and their grant component is much lower.

CONAGUA's budget

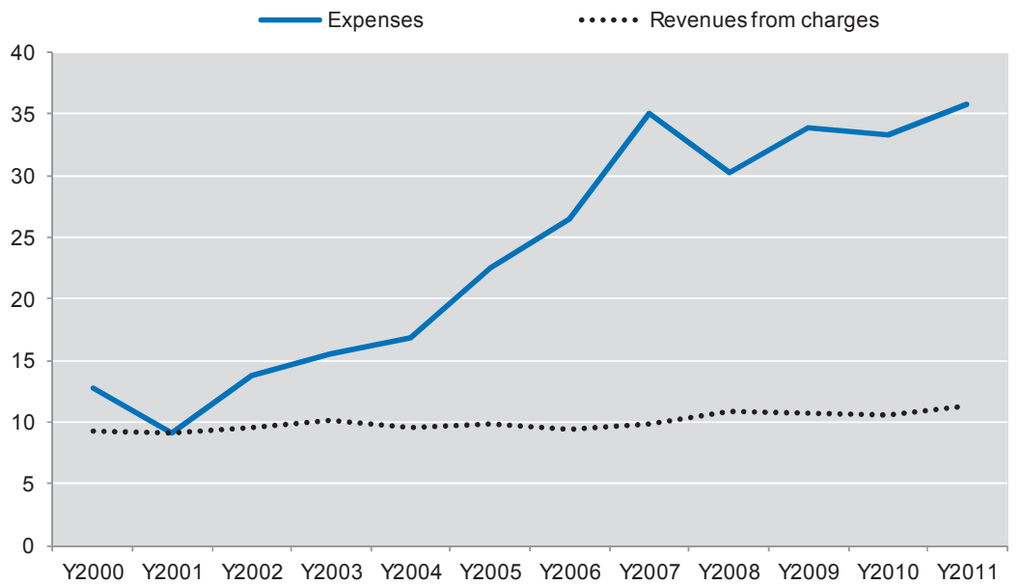
CONAGUA manages a large and growing budget, and it is the single biggest spender in the sector. In 2012, its budget reached MXN 38.8 billion, close to 45% of the sector's estimated total expenditures. CONAGUA's budget has experienced a significant increase in the last two presidential administrations: it almost tripled in real terms, between 2000-2009 (see Figure 3.4).

CONAGUA's expenditures can be broadly divided in four types:[9]

- expenses to pay for general administration and to carry out policy, regulation and supervision functions (18%);
- direct investments executed by CONAGUA, such as on irrigation infrastructure, water supply and sanitation infrastructure, and water monitoring (34%);
- expenses for water services delivered by CONAGUA, such as the Cutzamala water supply system or the national meteorological system (9%);
- financial transfers from CONAGUA to other institutions (subsidies), mostly to finance investments (38%). These subsidies are channelled through two types of programmes: those that are subject to rules of operation (which represent a budget of MXN 12.6 billion in 2012) and those that are not (MXN 2.2 billion in 2012).

Figure 3.4. **Evolution of CONAGUA's budget**

MXN billion, constant 2009 prices



Source: Elaborated based on data from CONAGUA (2011), *Estadísticas del Agua en México, Edición 2011*, CONAGUA, Mexico; and additional data for 2010 and 2011 provided by CONAGUA.

CONAGUA leverages significant additional resources. CONAGUA's influence in the water sector is even larger than its share of water expenditures, as its programmes leverage additional resources through cost-sharing agreements with states, municipalities and users (CONAGUA, 2010b). Traditionally, the Mexican federal government has financed the development of water infrastructure through programmes that require 25%-60% of counterpart funds (Medel, 2010). Counterpart funds can come from other federal programmes or funds, such as the regional fund (FONREGION), the states' investment fund (FIEF) or the Programme of infrastructure for Environmental Development (PIDA), as well as from direct user contributions (in the case of irrigation programmes).

Funds leveraged from states, municipalities and users through infrastructure investment programmes are increasing, in both absolute and relative terms (see Table 3.1). The amounts leveraged exceeded MXN 16.2 billion in 2010 and MXN 19.3 billion in 2011 (in constant 2009 prices) – this represents 49% and 54% of CONAGUA's budget in 2010 and 2011 respectively. Most of the funds are leveraged in the water supply and sanitation subsector (MXN 17.7 billion in 2010 and MXN 19.3 billion in 2011 in constant 2009 prices). However, in 2011, leverage rates in the irrigation subsector were higher. The additional resources leveraged by CONAGUA reached 93% of CONAGUA's support in the case of investments in water supply and sanitation and 155% for investments in irrigation.

CONAGUA spends relatively little on regulatory functions. The functional classification of CONAGUA's budget for 2012 (CONAGUA, 2012b) classifies 44% of CONAGUA's expenses as related to wastewater treatment and collection, 10% to water supply, 19% to irrigation, and 26% to water policy and administration. When excluding

the water management programme,[10] the functional categories of policy, regulation and supervision represent 1.15% of CONAGUA's budget: MXN 163 million for water administration, MXN 111 million for water inspection and MXN 41 million for water charges collection and control.[11] The budgetary allocation for updating the public registry of water rights (REPDA), a key element for managing both water resources and water resource charges is only MXN 2 million.

Table 3.1. **Investments leveraged by CONAGUA's funding (2010 and 2011)**

MXN billion in constant 2009 prices

	CONAGUA		States and municipalities		Users		Total	
	2010	2011	2010	2011	2010	2011	2010	2011
Investments in water supply and sanitation	15.1	17.1	8.3	10.3	5.3	5.6	28.7	33.1
Investments in irrigation infrastructure	2.6	2.2	0.41	0.42	2.9	3.0	5.9	5.6
Other CONAGUA spending	15.7	16.5						
Total CONAGUA spending	33.4	35.8						

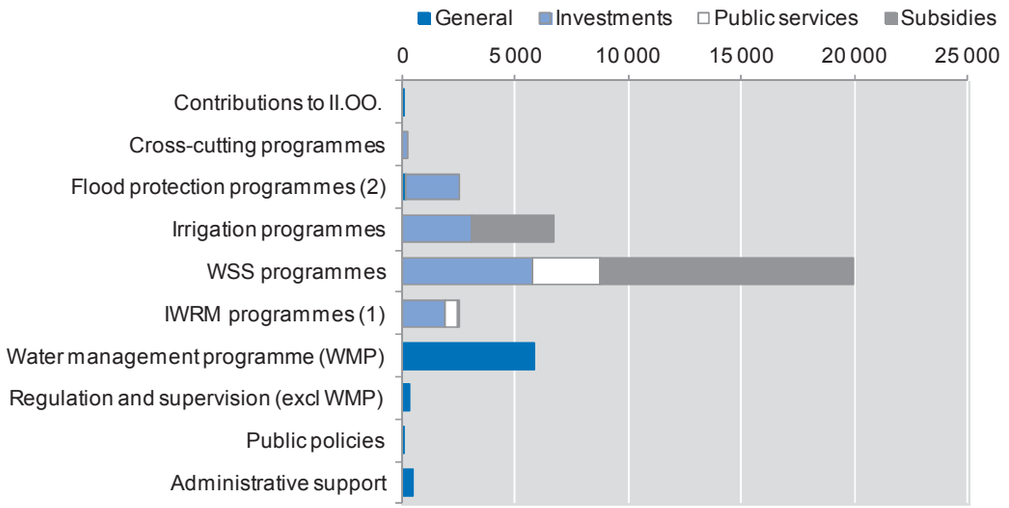
Source: Elaborated based on data from CONAGUA (National Water Information System – SINA).

CONAGUA collects significant resources through water charges, but it has no control over their allocation. As shown in Figure 3.4, the level of revenues from charges has been stable at about MXN 10 billion per year (in constant 2009 prices), despite the growing size of the Mexican economy. As the budget of CONAGUA has increased, the proportion of water charges in the budget has decreased (see Figure 3.5). Most of the total revenue from water charges corresponds to water abstraction – MXN 8 billion in 2009 (see Figure 3.6), of which MXN 2 billion were given back to water operators. The second largest revenue source is bulk water services charges – MXN 2 billion in 2009 (which is committed to pay for the expenses generated by the provision of the service). Operational rules are being used to increase the revenue from water charges: programmes aimed at irrigation districts include as a condition to receive support to have paid the bulk water supply bill, while programmes aimed at water supply and sanitation include as a condition to have paid water charges.[12] Revenues from water charges collected by CONAGUA go to the federal treasury to help finance the general federal budget.

Financial planning and efficiency of public spending

Planning documents do not identify the revenue sources for financing the policy objectives. Every new federal administration draws up a six-year National Development Plan as well as the corresponding sectoral programmes, including the National Water Program. Every year, CONAGUA draws up the Investment Program and Project Planning Document, which establishes the investment objectives, strategies and priorities for the development of the water sector in the medium term, according to the objectives and strategies defined in the six-year National Water Program. However, these documents focus on the use of federal budgetary resources and do not set targets across all sector actors for financing the policy objectives: they are public expenditure plans, rather than financial plans. At the local level, the Mexico City has included a financial plan in its 20-year water management plan (see Box 3.6).

Figure 3.5. **Functional allocation of CONAGUA's 2012 budget**



Notes: 1. Includes environmental programmes. 2. Includes the natural disaster programme.

Source: Based on data provided in CONAGUA (2012), "Clasificación del Presupuesto", CONAGUA website, *www.conagua.gob.mx/Resumen.aspx?n1=1&n2=56&n3=263&n4=181&n5=172*, accessed 27 June 2012.

Box 3.6. **Strategic financial planning for water management in Mexico City**

Mexico City faces a complex water agenda due to its geographical situation, socio-economic development and water management approach. It is located in a valley in the high plateau, at an altitude of more than 2 200 metres, over reclaimed land of what used to be Lake Texcoco. The city experiences rainfall highly concentrated in the summer months but does not have natural drainage outlet. Current water infrastructure has an average age of 40 years, as most of it was built between 1965 and 1985. Mexico City's water challenges include securing water supplies, groundwater-related land subsidence, flooding and water pollution. Providing safe drinking water to its 8.8 million inhabitants (out of 21 million in the metropolitan area) is also a challenge – only 71% have service of acceptable quality, while 15% only receive water for eight hours a day, 10% less than twice a week and 4% receive contaminated water.

To confront the challenge, the System of Waters of Mexico City (*Sistema de Aguas de la Ciudad de México* – SACMEX) developed in 2011 a strategic water management plan named "Special Water Program – Vision 20 Years". SACMEX is a public entity created by the city in 2003 (merging two previous organisations) to provide the services of drinking water supply, drainage, wastewater treatment and reuse. The Special Water Program provides a diagnosis, before setting a number of objectives (strategic, specific and related to internal efficiency), sub-programmes and actions for the period 2012-2031. The programme includes several numeric targets such as reducing water demand by 20% (6 m^3/s), rehabilitating 2% of the drinking water network every year, rehabilitating or substituting 5 235 kilometres of the drainage network, and rehabilitating and expanding 24 wastewater treatment plants while building 4 new ones.

SACMEX has estimated the financial needs of the Special Water Program at MXN 166 billion over the 20-year period – including MXN 127 billion for infrastructure, MXN 7 billion for operating the new infrastructure and MXN 32 billion for metropolitan projects. These estimates include a number of cost saving measures – such as reducing staff costs 2% per year, reducing other administrative costs by 1% per year, reducing by 37% the MXN 700 million annual electricity costs of pumping water from wells, reducing demand by 1% per year (through a combination of technical, pricing and educational measures).

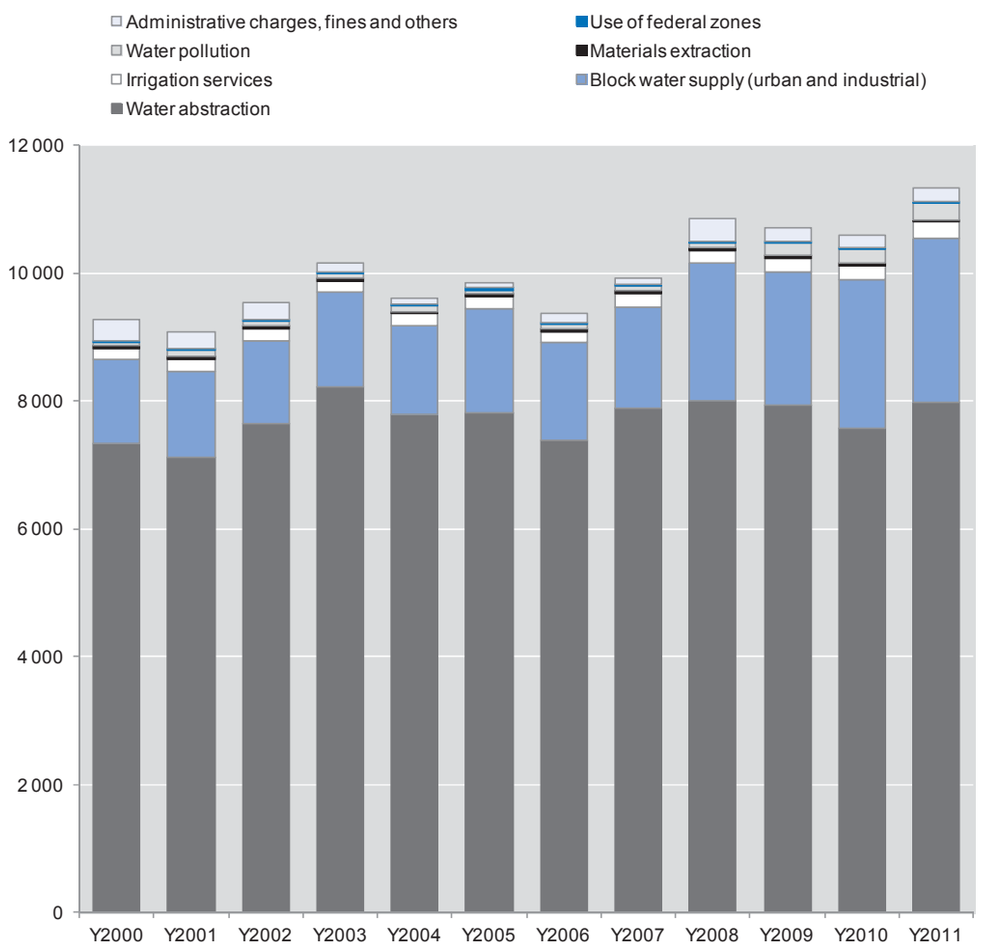
Box 3.6. **Strategic financial planning for water management in Mexico City** (*cont.*)

Remarkably, the programme includes a financing plan, with targets for increased financial contributions from users and from governments. It aims for increases in the average tariff of 5% per year in real terms in 2014-2025, increases in commercial efficiency from 83% to 97% in ten years, and the introduction of a sanitation surcharge of 15%. In terms of government contributions, the programme assumes a 20% increase in subsidies to the city's water system from the federal and city governments (from MXN 2.5 billion per year to MXN 3 billion) and stable contributions (in real terms) of Fideicomiso 1928 (a trust fund for regional water infrastructure) at the level of MXN 1.35 billion. In order to finance upfront investments, the programme expects that MXN 16.5 billion will be borrowed through 20-year loans at an interest rate of 8%.

Source: Adapted from Aguirre Diaz, R. (2011), "Programa Especial de Agua – Visión 20 Años", presentation.

Figure 3.6. **CONAGUA's revenues from charges (2000-2011)**

MXN million, constant 2009 prices



Source: Elaborated based on data from CONAGUA (2011), *Estadísticas del Agua en México, Edición 2011*, CONAGUA, Mexico; and additional data for 2010 and 2011 provided by CONAGUA.

There is no structured process to involve sector stakeholders in planning the allocation of public expenditures across sub-sectors. A key issue in any sector is how the allocation of financial resources within the sector takes place, and how to build consensus on such allocation (what should be financed first). The current planning and budgeting process in Mexico involves identification of the strategic objectives of national development, their incorporation as an investment programme or project, all the way to measurement of results through follow-up and evaluation (CONAGUA, 2008). CONAGUA has developed a number of internal systems to support investment decisions: the Water Infrastructure Project Information System, the Planning Budgeting System, the Internal Planning and Budgeting Process, and the Portfolio of Investment Programs and Projects. Criteria to prioritise investment projects include economic profitability, reduction of extreme poverty, regional development and concurrence with other investment programmes and projects (CONAGUA, 2008). However, the existing systems seem to support the selection of projects mostly within programmes and within sub-sectors and it is unclear to other stakeholders how the allocation across sub-sectors works.

There are multiple opportunities to increase the efficiency of public spending in the water sector in Mexico. There are several examples of actions taken to reduce costs and increase the efficiency of public spending that could be replicated – such as taking advantage of economies of scale in the provision of water supply and sanitation services (see the benefits from the creation of a inter-municipal companies in Colima) or adopting appropriate technologies (e.g. rainwater harvesting in Oaxaca). In a number of cases, water supply needs to be augmented because water is not used efficiently upstream; or water must be treated, where pollution could have been prevented. Other opportunities include improved co-ordination between authorities (to avoid federal investment in infrastructure, for which operation and maintenance financing is not secured by local resources), elaboration of multi-year budgets (to avoid the additional costs of re-starting works after they have been stopped for lack of budgetary resources), reductions of per capita water consumption in urban areas (including reduction of non-revenue water – which reaches 40% in Mexico City), reform of electricity subsidies (to reduce over-extraction of groundwater and thus reduce the increasing cost of extracting water from deeper areas).

Corruption, misallocation of funds and inappropriate administrative control over the use of public funds reduce the effectiveness and efficiency of public resources. In 2010, the Superior Auditor of Mexico (ASF – *Auditoría Superior de la Federación*) published a report that shed light on irregularities and illegal practices in the management of public financial resources and investment in the water sector (see Chapter 1). The report highlighted limitations in CONAGUA's capacity to document how states manage their resources. It also signalled irregularities in the use of federal programmes' funds such as the Urban Potable Water and Sewerage Program (APAZU – *Agua Potable, Alcantarillado y Saneamiento en Zonas Urbanas*).

The current institutional framework does not contribute to efficient public spending. Projects pile up in the Investment Program and Project Planning Document, whereas *ex ante* studies and assessment could diminish their cost, enhance the consistency of the portfolio of projects (see CONAGUA, 2008). The territorial allocation of resources by the different federal programmes does not systematically reflect basin priorities, resulting in sub-optimal allocation of resources. Potential synergies with investment in other sectors (such as agriculture or health) are seldom realised.

Relevant tools that are absent or under-used to increase the efficiency of public expenditures include: multi-year budgeting; information for the public on the allocation of financial resources; *ex ante* cost-benefit analysis of investment projects; *ex post* evaluations of the efficiency of investment programmes; and built-in incentives in the federal programmes to promote efficiency throughout the sector. The process of developing the 2030 Water Agenda identified 67 planning cells for priority action according to one or more of each of the four basic objectives. This constitutes an example of a planning tool for increasing the efficiency of spending. A challenge in the coming years will be to ensure that federal and state programming adhere to that prioritisation.

Mexico is making efforts to increase efficiency of public expenditures through the use of operational rules in water programmes.[13] In 2012, about 85% of CONAGUA's subsidy transfers (representing 32% of CONAGUA's total budget) will be disbursed through programmes that are subject to operational rules. In the case of water supply and sanitation programmes, conditions to receive support include the existence of a formal agreement between the state and federal governments for joint action, and to present an annual programme approved by the State Committee for Planning and Development (COPLADE) or the state-level organism in charge of water supply and sanitation planning. Subsidies for wastewater treatment activities must be first applied to ensure that supported wastewater treatment plants operate at a minimum of 90% before they can be applied to other investments. Project selection criteria favour investments located in marginalised communities (e.g. PROSSAPYS) and try to leverage federal funding to promote efficiency of water operators (e.g. APAZU). Irrigation programmes do not seem to take advantage of this leverage power to the same extent as water supply and sanitation ones. One challenge with the demand-driven programmes in Mexico seems to be that the pool of projects is sometimes too small, making the criteria for prioritising projects non-binding.

There is a disconnection between CONAGUA's revenues and expenses procedures. One department in CONAGUA is in charge of planning the use of the budgetary resources received from the Ministry of Finance (expenses). A different department in CONAGUA is in charge of managing the collection of the different water charges (revenue that ends up in the Ministry of Finance). As a result, there is no integrated planning of revenues and expenses that could lead, for instance, to spending more on improving water charge management in order to increase revenue. Another consequence is that the Ministry of Finance perceives economic instruments only as revenue-raising instruments without considering their behaviour-change function.

Preliminary synthesis

The institutional architecture described in this and the previous sections has its merits.

At the federal level, CONAGUA invests in water infrastructures and administers economic instruments and programmes for water management. It provides a platform to collect revenues from water-related charges and to transfer budgetary resources to local players. Its 13 river basin organisations implement federal policies at local level. This provides a capacity for oversight at the federal level, especially when financial transfers from CONAGUA are conditional (rules of operation attached to federal programmes; they cover 85% of CONAGUA's transfers to local authorities). Moreover, the central authorities control water-related revenues and expenditures, the federal Congress approves the rates of abstraction and pollution charges, and the Ministry of Finance sets the water budget.

Some level of decentralisation was meant to better adapt plans and investments to local conditions: *i)* some responsibilities for water infrastructures were devolved to states; *ii)* river basin councils were set up, initially financed by CONAGUA; their relationship with basin river organisations is unclear.

This architecture suffers from three weaknesses:

- It is not clear how water policies interact with initiatives taken in other areas, which have consequences in water use and availability. For instance, energy subsidies to farmers have an impact on groundwater management and water demand.
- It is not clear how basin priorities, which emerge from the work of river basin councils, and national programmes coincide. More generally, financial capabilities are not aligned with obligations. Misalignment can generate high costs and hinder the efficiency of public expenditures.
- The fiscal approach to water-related taxes, charges and expenditures facilitates the development of public expenditure plans, but prevents the development of strategic financial plans attached to water policies, be it at federal or basin level. The 2030 Water Agenda is one step in the right direction, pointing at financing needs. The next step should clarify how they can be covered.

Water resources management

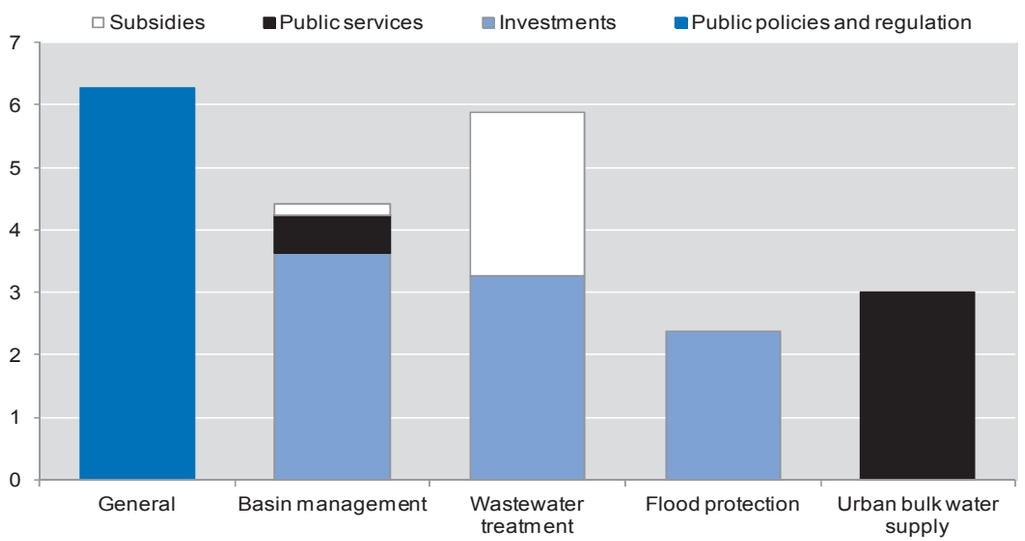
This section looks into the financial sustainability of water management policies. It claims that economic instruments can be very efficient and cost-effective instruments to promote productive uses of water and to allocate water where it is most needed (see OECD, 2012). Mexico is making use of several economic instruments to manage water; this section will review experience with abstraction and pollution charges, payment for ecosystems services, water markets and buy-back programmes. However, low charge rates and weak enforcement (e.g. illegal abstractions, under-reporting of consumption) prevent economic instruments from effectively contributing to water policies in Mexico. The following section will claim that these shortcomings are compounded by instruments developed in other areas (e.g. a subsidised electricity tariff; support programmes managed by the Ministry of Agriculture).

Sub-sector expenditures and financing structure

Most expenditure on water resources management is undertaken by CONAGUA. Expenditures on water resources management are difficult to disentangle from the ones on irrigation and on water supply and sanitation. For example, those related to bulk water supply or to wastewater treatment could be attributed to the water supply and sanitation sub-sector, while expenditures to buy back water rights from farmers in stressed aquifers could be attributed to the irrigation sub-sector. Depending on how water expenditures are classified, CONAGUA will spend around MXN 10-20 billion on water resources management (see Figure 3.7) in 2012. In addition, municipalities finance flood protection and CONAFOR contributes to watershed management.

Figure 3.7. **CONAGUA's budget for water resources management**

MXN billion



Note: All policy and regulation expenses have been attributed to IWRM. Expenses related to the national meteorological service are included under basin management. Expenses related to Mexico City's eastern and central emissaries are included under wastewater treatment.

Source: Elaborated based on data from CONAGUA (2012), "Clasificación del Presupuesto", CONAGUA website, *www.conagua.gob.mx/Resumen.aspx?n1=1&n2=56&n3=263&n4=181&n5=172*, accessed 27 June 2012.

Water users in Mexico contribute to financing WRM. They pay water resources charges[14] to compensate the state for the use of water in the order of MXN 8 billion (see Figure 3.7). This is equivalent to all expenditure on basin management and flood protection plus one third of all expenditure on policy and regulation. According to the User- and Polluter-Pays principles, users of retail water services should pay for the full cost of urban bulk water supply services and wastewater treatment. In Mexico, however, they only pay about two-thirds of the cost of urban bulk water supply (since CONAGUA collects MXN 2 billion to provide services on which it spends MXN 3 billion) and only half of the cost of wastewater treatment (following the share of user's contributions to the water supply and sanitation sub-sector).

Water abstraction charges

Water abstraction charges represent the main mechanism for water users' contribution to financing WRM. Water abstraction charges were introduced in Mexico in 1982 (OECD, 2003). Their level varies according to the type of user and the geographical location (see Tables 3.2 and 3.3). The main categories of users are general (which in practice corresponds with industry), agriculture, urban, hydropower, aquaculture and recreation (e.g. spas). Every municipality in Mexico is classified in one of nine "availability zones", which should reflect water scarcity. The charge rates and the classification of municipalities in "availability zones" are set in the National Duties Law, which is approved by Congress every year. Currently, there is an automatic rate increase system whereby the rates of water charges catch up with inflation once accumulated inflation exceeds 10% since the last revision of the charge rates.[15] The collection of water

abstraction charges is undertaken by CONAGUA. The revenue collected goes to the federal budget – except the quantities earmarked for certain programmes, such as the Program of Payments for Environmental Services (MXN 300 million) managed by CONAFOR, or CONAGUA's PRODDER (Program for Reimbursement of Duties). Revenues from water abstraction charges have remained stable in real terms at a level of around MXN 8 billion per year.

Table 3.2. **Water abstraction charges (2011)**

MXN/m^3

Availability zone	Agriculture users (above licensed volumes)	Urban water utilities (below 300 lcd)	Urban water utilities (above 300 lcd)	General regime (industrial users)	Aqua-culture	Recreation	Hydro power
1	0.1295			18.2894	0.0029863	0.0104031	0.0038446
2				14.631			
3				12.1924			
4				10.0589			
5				7.9248			
6				7.1623			
7		0.16872	0.33744	5.3909	0.0014706	0.0051252	
8		0.08426	0.16852	1.9153	0.0006915	0.0024128	
9		0.04194	0.08391	1.4354	0.0003284	0.0011473	

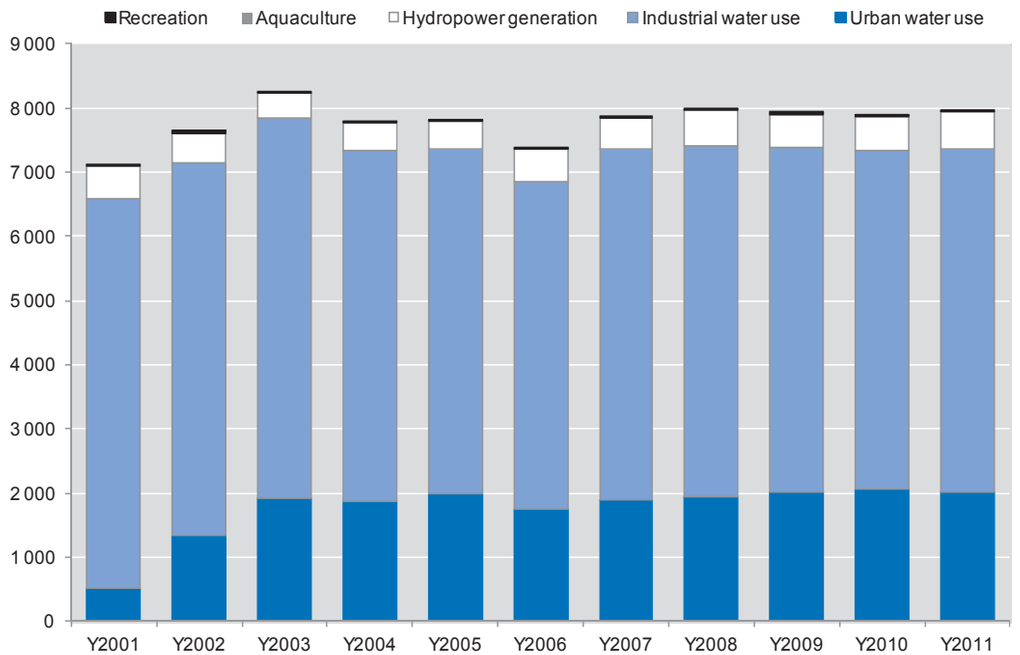
Sources: Elaborated based on data from CONAGUA (2011), *Estadísticas del Agua en México, Edición 2011*, CONAGUA, Mexico; and CONAGUA (2012), "Clasificación del Presupuesto", CONAGUA website, *www.conagua.gob.mx/Resumen.aspx?n1=1&n2=56&n3=263&n4=181&n5=172*, accessed 27 June 2012.

The contribution of users relies mostly on industrial users. Agricultural users are exempted from water abstraction rights for water quantities within their licensed quotas and the charge rate for quantities above their licensed quota is only between 0.7% and 8% of the general charge rate (depending on the availability zone); in 2011, revenues from agricultural users represented MXN 8 million or 0.1% of all water abstraction revenues. Water utilities pay preferential rates, at 2% to 10% of the general rate, and most of the proceeds are returned to them through the PRODDER programme.[16] As a result, industrial users represent close to 70% of water abstraction revenues, which increases to 90% if the PRODDER reimbursements are considered.

Some reductions of water abstraction charges contribute to specific policy objectives. For example, water users can deduct the cost of buying and installing metering equipment from their water abstraction payments. Those farmers that cede water from their allocated quotas to Mexico City or the municipalities of Mexico Valley see their water abstraction charges reduced by MXN 2.3886 per m^3 of water ceded (Article 224-A of the Federal Duties Law).

Figure 3.8. **Revenues from water abstraction charges (2001-2011)**

MXN million, constant 2009 prices



Source: Based on data provided by CONAGUA (2012), Response to the OECD Questionnaire, CONAGUA, Mexico.

Charges largely disconnected from policy objectives

The way abstraction charges are designed and implemented prevents them from contributing to several water policy objectives as they tend to create incentives that likely result in lower revenue collection. First, the revenue from water resource charges goes to the national treasury and does not affect CONAGUA's budget – hence there is little institutional incentive to fight with the Ministry of Finance for the financial resources necessary to increase revenue collection and to antagonise water users by increasing revenue collection efforts. Second, the billing of water resources charges is based on self-reported water use by users and CONAGUA has limited capacity to control water use – hence there is an incentive for users to under-report. Third, charges are defined at the national level and there is no link between the amount collected in a given basin and the amount spent on programmes in the same basin – therefore there is little social pressure from water stakeholders in a given basin upon water users that do not pay the charges.

Water abstraction charges could potentially generate substantial additional resources to finance WRM. There are two main options. First, increase payments by those currently obliged to pay. Revenue collection relies on self-reported abstraction by users, but the low capacity of CONAGUA to control both illegal water abstraction and under-reporting means that an unknown but potentially large quantity of water users is not paying the charge due. CONAGUA recognises the problem and it is making efforts to address it, by implementing an innovative metering programme (whereby a contractor installs and maintains the metres, while CONAGUA pays for the readings), or by introducing a provision in the 2011 reform of the Federal Duties Law to estimate abstraction levels on

the basis of electricity consumption. However, low enforcement capacity remains a key barrier; additional resources would be needed to monitor water abstraction. A second option would be to increase the payment rates, particularly for the agricultural sector. The agricultural sector in 2009 was licensed the use of 61.8 billion m^3. Thus, a water abstraction charge rate of MXN 0.1295 per m^3 (the current penalty rate for above quota abstraction, well below the general rate) could potentially generate MXN 8 billion per year.

In theory, water abstraction charges are also intended to affect behaviour, not just raise revenues. In Mexico, some features of abstraction charges pave the way. However, this orientation remains theoretical, as long as water abstraction is not metered. The structure of water abstraction rights includes two elements that could contribute to water efficiency. First, the charge rate varies across availability zones in order to induce higher efficiency where water is scarce. However, while charges are automatically adjusted by inflation,[17] they are not revised (e.g. every five years) in order to respond to changes in the status of water resources. Second, the charge rate for water utilities is reduced by half when consumption decreases below 300 litres per capita per day (lcd) in order to stimulate the adoption of water saving programmes. However, in the case of agriculture, abstraction charges can hardly contribute to enhance water efficiency as *i)* water abstraction is not metered; and *ii)* the penalty rate (which applies to water abstraction above the licensed quota) remains very low (less than 1% of the charge rate for industrial users, in the most water-scarce areas).

It follows that abstraction charges fail to effectively signal the scarcity of water in one particular territory. They can be used neither to stimulate water efficient uses nor to allocate water where it creates most value.

Box 3.7. **Use of groundwater charges in OECD countries**

Mexico is not an exception on setting a zero price for groundwater. Across the world, when water is taken from aquifers, most or all capital is privately provided by the farmers themselves or by small-scale collective organisations. In this situation, there are often no water prices or tariffs. In the EU, some countries have imposed water tariffs on groundwater, including France, the Netherlands, Denmark, and England and Wales. When groundwater has been used unsustainably by farmers, very few agencies have resorted to use tariffs as a deterrent for increased usage and most have established quotas, caps or zoning.

Source: Garrido, A. and J. Calatrava (2009), "Agricultural Water Pricing: EU and Mexico", background report for the 2010 OECD study *Sustainable Management of Water Resources in Agriculture*, OECD Publishing, Paris.

Water pollution charges

Water pollution charges contribute little to financing WRM in Mexico. Water pollution charges were introduced in 1991 and charge rates were established for some 120 different contaminants (physical, organic and inorganic substances) and for 3 types of water bodies (use for drinking water supply, irrigation, protection of aquatic life) to which effluent is discharged (OECD, 2003). Currently, the pollution charges are payable for discharges with contaminant concentrations in excess of effluent limits defined by the Law for Chemical Oxygen Demand (COD) and Total Suspended Solids (TSS), depending on the type of water body (see Table 3.3) (GoM, 2011a). Similarly to water abstraction

charges, the rates are approved by Congress every year in the Federal Duties Law and the same automatic rate increase system applies.

Table 3.3. **Water pollution charges**

	Type of water body					
	A		B		C	
	Maximum allowed concentrations (mg/l)					
Chemical oxygen demand	320	200	100			
Total suspended solids	150	75	40			
	Pollution charge rate (kg/m^3)					
	2008	2009-2011	2008	2009-2011	2008	2009-2011
Pollutant						
Chemical oxygen demand	0.2953	0.3137	0.3302	0.3508	0.3475	0.3691
Total suspended solids	0.5072	0.5388	0.5669	0.6022	0.5968	0.6340

Note: The Federal Duties Law provides a list of the water bodies that are classified as category A, B or C.

Source: Elaborated based on data from CONAGUA and the National Water Information System – SINA.

CONAGUA collects water pollution charges, based on self-reporting by water polluters, and the revenue goes to CONAGUA to finance pollution abatement and investment in wastewater treatment infrastructure. However, water polluters can ask CONAGUA to reimburse their charges to finance actions to reduce water pollution (whether changing productive processes or treating water discharges). In 2009, water pollution charges raised MXN 175.9 million, which represents less than 1.7% of the amount raised through water abstraction charges; this is less than 0.4% of the MXN 4.7 billion per year needed to be spent over the period 2011-2015 to clean water bodies, according to the 2030 Water Agenda. Water quality problems of Mexican water bodies indicate that the pollution charges are not very effective in terms of behaviour change and that a thorough reform may be needed.[18]

Other economic instruments

Mexico has put in place an array of economic instruments for water management. These instruments have sometimes developed without proper regulation. In particular, a variety of instruments aim to allocate water where it is most needed. It is unlikely that they have reached this objective.

Administrative charges and fines and penalties help to finance the related administrative costs. In 2009, CONAGUA collected MXN 203 million from administrative charges and fines. Administrative charges and fines represent about 3% of overall water regulation and supervision costs, which are budgeted at MXN 6.1 billion for 2012. They represent a much higher share of the more strictly related water administration and water inspection costs – which in 2009 amounted to MXN 163 million and MXN 111 million respectively. Fines' main role is to provide incentives to comply with legal obligation, but low enforcement efforts (due to lack of resources) and administrative and judicial complexities mean that the amounts recovered through fines as well as their impact are very low.

Mexico is a leader on payments for ecosystem services. Payments for ecosystem services (PES) programmes use economic incentives to affect land use in a way that provides watershed, biodiversity conservation, carbon sequestration and other valuable ecosystem services. The Mexican federal government has established two PES programmes involving forest management: one aimed to protect hydrological ecosystems (PSAH) and the other for carbon sequestration, biodiversity and agro-forestry systems (CABSA). In 2008, there were at least four payments for ecosystem services programmes in Mexico focusing on hydrological services, which paid USD 8.6 million to protect 1.51 million hectares (Stanton *et al.* 2010); PSAH is the largest one. It was launched in 2003 and has become one of the largest programmes for payments of watershed services in the world (Stanton *et al.* 2010). The design of PSAH has been improving over time to increase its cost-effectiveness, but there are concerns about its conservation impact (see Box 3.8).

Water trading is part of the set of economic instruments used to manage water resources. Trading or swapping irrigation water is common practice in Mexico (OECD, 2003). Water trading increased in the 1990s, partly due to the recognition by the 1992 National Water Law of the possibility of "transferring" water rights (Rubiños-Panta *et al.*, 2004). Most transfers of water rights take place within the agriculture sector (95%) and only a minority from the agricultural sector to the industrial (3%) or urban (2%) sectors (Rubiños-Panta *et al.*, 2004). Rules governing transfers (trades) within the agricultural sector are established for each irrigation district. Within an irrigation module (part of a district) water can be freely exchanged among farmers. For trading between modules, approval by CONAGUA is required as it is the bulk water supplier. Regulatory approval by CONAGUA is also required if water trading involves a change in the water use (e.g. from agriculture to industry). Most transfers are temporary and do not generate investments (Rubiños-Panta *et al.*, 2004). While a regulation of water transfers between different users (e.g. from industry to urban water utilities) has not yet been issued, several such transfers have been authorised.

Box 3.8. **The Hydrological Ecosystem Services Programme**

The Hydrological Ecosystem Services Programme (PSAH) is one of the major PES programmes in the world focusing on watershed services. The PSAH is funded mainly by earmarked revenues from the national water abstraction charge, ensuring that it has stable, long-term funding. Landowners/users are eligible for different payment levels, depending on the type of ecosystem and the deforestation risk index (see table below). Payments are made annually, and verification of forest cover through satellite image analysis or ground visits is conducted annually on approximately half of all enrolled properties. Areas where deforestation is detected are removed from the programme and payments are reduced proportionally. Since its introduction in 2003, the PSAH has been adjusted several times to improve its cost-effectiveness: by targeting areas with high biodiversity benefits, areas with high risk of loss (to ensure additionality), and areas with low opportunity costs.

From 2003-2007 the PSAH programme prevented an estimated 18 000 hectares from being deforested. Given that there were 1.8 million hectares enrolled in the programme, its conservation impact has been fairly low. This can be partly explained by the low weight given in the design of the programme to environmental criteria *vis-à-vis* social and administrative criteria (such as complementarities with other programmes) – environmental criteria represented 40% of the weight in 2006 and 29% in 2010.

Box 3.8. **The Hydrological Ecosystem Services Programme** (*cont.*)

The Hydrological Ecosystem Services Programme

PES eligibility	Payment region	Ecosystem type	Deforestation risk index	Eligible area (ha)	Payment/ha/year (MXN)
Hydrological	I	Cloud forest	Very high	58 520	1 100
	II	Cloud forest	High, moderate, low	1 558 111	700
	III	Coniferous forest Tropical dry forest Oak forest Pine-oak/oak-pine forest	Very high, high, moderate, low, very low	22 133 267	382
Biodiversity	IV	Tropical rainforest	Very high, high, moderate, low, very low	6 559 680	550
	V	Tropical dry forest Thorn forest	Very high, high	4 531 672	382
		Mangrove	Very high, high, moderate, low, very low		
	VI	Tropical dry forest Thorn forest	Moderate, low, very low	18 677 587	280
		Desert and semi-desert Natural grassland	Very high, high, moderate, low, very low		
			Total	53 518 836.95	

Source: Adapted from OECD (forthcoming), *Environmental Performance Review of Mexico,* OECD Publishing, Paris.

CONAGUA is promoting a market of water abstraction rights. Water users have the right to transfer their water concessions, either partially or completely. CONAGUA must authorise the transaction and register the changes in the REPDA (Public Registry of Water Rights – *Registro Público de Derechos de Agua*). Between 2001-2006, there were 10 819 requests for the transfers of water rights. Of these, 64% were concentrated in four river basin organisations: Lerma-Santiago-Pacific, Central Basins of the North, Rio Bravo and Baja California Peninsula, most of them for agricultural use. Two-thirds of water rights transfers are for groundwater, and they are more common in areas with over-exploited aquifers with strict extraction limits, since no new concessions can be granted there.

The development of water markets is impeded by the absence of an up-to-date census of water users, transparent information on water prices, and a system to control and follow the transfer of water rights. In addition, users lack of information on how to carry out a transfer of rights; they perceive the procedure as cumbersome. The existence of an informal market hampers the efficiency of the formal one.

CONAGUA is supporting the transfer of water rights through specialised offices known as water banks, which depend from the river basin organisations (see Box 3.9). Six water banks became operative in 2009 and seven in 2010. One option that has not been pursued is to force by law the disclosure of the price for the transfer of water rights. This would help to increase transparency and further develop the market, and it would

also help to inform the review of the water abstraction charges. Another option that has not been pursued is to use auctions to allocate water abstraction rights.

Box 3.9. **Water banks in Mexico**

Water Banks contribute to the regulation of existing informal practices, in order to create a regulated water rights market, in which the efficient assignation or resignation of the resource is promoted towards more productive uses. To accomplish this mandate, Water Banks work in three areas: demand and supply information, legal or technical information and procedures.

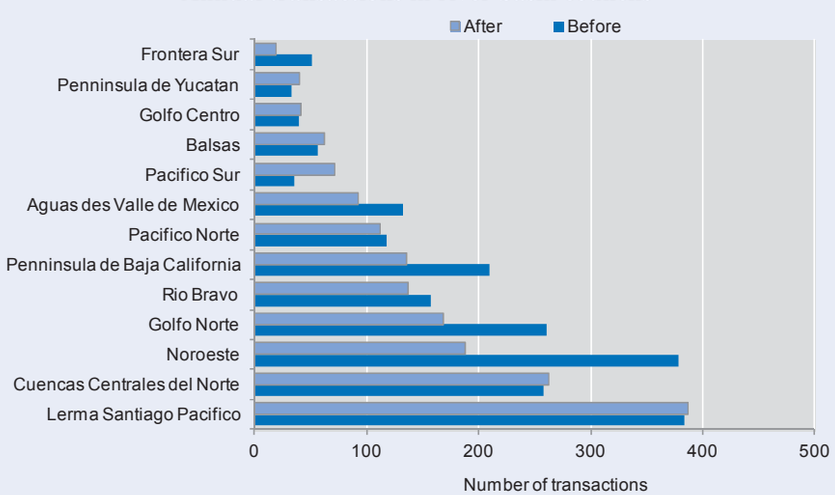
The first function of the Water Banks is to act as central market where suppliers of water rights can offer their rights and demanders can search for offers that fit their needs. To do this, water banks provide information on their web page on existing offers. Water Banks match supply and demand, and contact both parties. The transaction is finalised in the Bank's office. The Bank does not intervene in the price setting.

The second function is to provide users with reliable, accurate and timely information for decision making, this implies giving guidance regarding the particular technical characteristics and hydrological conditions of the region and information related to the requirements and procedure to transfer rights, as well as regarding the rights and obligations derived for each of the stakeholders involved. Finally, once users have decided to do the transaction and they have the proper information to do so, the bank has to attend the procedure to transfer rights in its three modalities, from start to finish.

The first Water Bank was established in December 2008 in the Central Basins of the North River Basin, and the second in June 2009, in the Lerma-Santiago-Pacific River Basin. These are the two regions with the most significant problems related to the availability of water, degree of water stress and over drafted aquifers. At the end of 2010, a total of 13 Water Banks had been established in Mexico, one for every river basin council.

The figure below shows the annual number of transactions registered before and after the implementation of a water bank, for every river basin council. In many cases, as opposed to what would be expected, transactions decrease. This might indicate that before the establishment of water banks, many transaction where accepted under irregular circumstances, and that the new process has lowered this possibility.

Annual transactions in river basin councils



Source: Elaborated based on data communicated by Gerencia de Regulación de Transmisión de Derechos, Bancos del Agua y Control de Información (GRTDBACI), CONAGUA, in October 2012.

Mexico is also introducing a mechanism to buy back water abstraction rights. Mexico's water scarcity problem is partly due to illegal abstraction – whether abstraction without license or abstraction above licensed levels. But even if only the legally licensed volumes were abstracted, there would still be a problem because over the years, the Mexican governments have licensed abstraction rights for significantly higher volumes than available in the river basins and aquifers. In order to address this issue, CONAGUA has put in place a specific programme (*Programa de Adecuación de Derechos de Agua*), the implementation guidelines of which were issued in August 2011. The programme is designed to buy water rights from farmers in those irrigation districts where the licensed water rights exceed 20% of water availability. The buy-back prices fixed by CONAGUA in the regulation are up to MXN 3/m^3 for surface water and MXN 6/m^3 for groundwater (GoM, 2011c). The efficiency of such a programme is undermined by the high level of theft. It may be more effective to enforce compliance of licensed volumes of abstraction.

The introduction of the "guarantee fee" is expected to enhance allocative efficiency. In 2009-2011, the total volume declared (and paid) under the general regime was only 33% of the volume granted. A water entitlement can expire if the total volume of water granted has not been used in two consecutive years without explanation.[19] Since 2011 the water title-holder can pay a guarantee fee (*cuota de garantía*) to avoid the expiration of the water entitlement. The aim of this mechanism is to encourage title-holders that do not intend to use the water to give back their titles. The rationale is that unused entitlements generate opportunity costs for society: water that is allocated but not used could be used in other activities and generate social benefits. The guarantee fee is also expected to provide incentives for reporting water use, and to generate better data on water use. Between August and December 2011, the guarantee fee generated MXN 12 million.

The irrigation support programmes managed by CONAGUA include incentives for freeing up water abstraction rights. For irrigation districts, the prioritisation of water-saving projects gives up to 30 points (out of 100) for water user associations that renounce in their concession title to a percentage of saved water equal to the project's federal support. For irrigation units in over-exploited aquifers, there is a prerequisite to commit to leave in the aquifer 50% of saved water, and the prioritisation of projects includes a similar clause to that for irrigation districts. The support provided has a limit by land area and type of action. For example, up to MXN 20 000/ha for rehabilitation, modernisation and technification works or up to 50 000/ha for on-demand irrigation actions, up to MXN 750 000/ha for low water consumption agriculture. It is unclear what the rationale for these levels of support is, and the expected volume of water that will be saved in exchange for the federal government support. Given that the experience so far seems to be of very limited success, one option would be to transform the prioritisation incentives into prerequisites for receiving federal support. An alternative option would be for the federal programme to pay for the volume that is saved under each action – this would provide incentives for farmers to select the most cost-effective actions and to reduce incentives for inflating the cost of the actions (currently, the cost of actions follow an official list of prices).

The issue of basin management financing

The financing of river basin councils remains an open question, but the key issue is how to finance basin plans. Originally, the river basin councils and their operational units were exclusively financed by federal resources through CONAGUA's budget. Increasingly, state governments as well as municipalities and users have been providing "counterpart funds". CONAGUA's vision is for the river basin councils to be financed

50% by federal funds and 50% by counterpart funds until the councils generate their own financial resources, so that the federal contribution can be reduced to 15% to 20% by 2015 and derived from a percentage of the water charges managed by CONAGUA (CONAGUA, 2010a). CONAGUA recommends that the councils define their own financial strategies to attract resources from users, local and international NGOs and foundations, and official development assistance. The relationship between river basin councils and river basin organisations is still evolving. If the basin councils were to become the governing bodies of the river basin organisations, their role would be to include projects in the basin plan, not to independently execute projects. In this case, the budget of the basin organisations should support the expenses of the basin councils, and the budget of the basin plan would finance the projects.

The current financing system undermines the adoption of an integrated approach to water management by basin. The National Water Law sets that integrated water resources management by river basin is the basis of the national water policy. The law also sets as a principle that water resources management will be carried out in a decentralised way, and will prioritise direct action and decisions by local actors and by river basin. Currently, most funds for river basin management come from federal programmes that target sub-sectoral problems without an integrated, basin-wide perspective. At this stage, 50% of the river basin councils have adopted regional water programmes as their guiding planning and management tool, but the programmes are mainly project portfolios and do not meet the common standards of river basin plans (see Box 2.8 and 2.9 in Chapter 2). However, overall there is little evidence of to suggest that the river basin plans are guiding project funding of projects – a partial exception can be found in Baja California Sur, where the regional hydrological programme has been adopted as the state basin plan. At the same time, the basin institutions (basin organisations and river basin councils) have very limited opportunities to raise funds at basin level. As a consequence, water financing does not follow a basin approach. Box 3.10 presents some remarkable exceptions. One way out of this problem is to increase the financial autonomy of basin institutions. Water resource charges could be defined and managed at the basin level, and the revenues generated could stay in the basin to fund the basin plan.

This option has pros and cons. On the one hand, it can secure funding for basin priorities and align financing capacities with policy making at basin level. On the other hand, it may be an incentive to ringfence revenues for water policies and to keep raising additional finance; this could lead to suboptimal allocation of fiscal revenues. Therefore, this option can only be considered if revenues are clearly attached to precise policy objectives, and if the option is recurrently reviewed.

Some progress is taking place at local level. Some COTAS, basin commissions, basin committees and clean beach committees have been successful in attracting financial resources from different government institutions to address local problems around integrated management programmes. The creation of basin committees and their corresponding operational units has allowed the formulation of integrated basin management programmes that have been used to attract resources for their implementation. Examples include the Basin Committee of Zanatanenco River (created in 2002), which has been able to attract MXN 30 million, and the COTAS of Arista Valley (created in 2000), which has been able to attract investments of MXN 50 million for actions listed in the Arista Valley Aquifer Management Plan from the San Luis Potosí state government, the municipal and federal governments, and users (in the framework of CONAGUA's federalised programmes).

Box 3.10. Towards a basin approach to water financing in Lerma-Chapala

The Lerma-Chapala Basin Council was established in 1993 after a consultative council created in 1989. Since 1989, the construction of 100 wastewater treatment plants with resources from state governments and the federal government has been agreed within the basin council. In 2004, the Lerma-Chapala Basin Council approved the creation of the Patzcuaro Lake Basin Commission, and CONAGUA and the Michoacán government agreed to pool funds to create its Operational Unit. The commission has started to discuss the programming of federal and state resources needed to address the basin's problems and how resources from CONAGUA and the State Water Commission are executed in the basin. This represents a rare success in terms of the openness of federal and state governments to discuss these topics with representatives of water users and civil society.

Source: Based on CONAGUA (2010), *Los Consejos de Cuenca – Presente y Futuro*, Gerencia de Consejos de Cuenca, CONAGUA, Mexico.

Irrigation

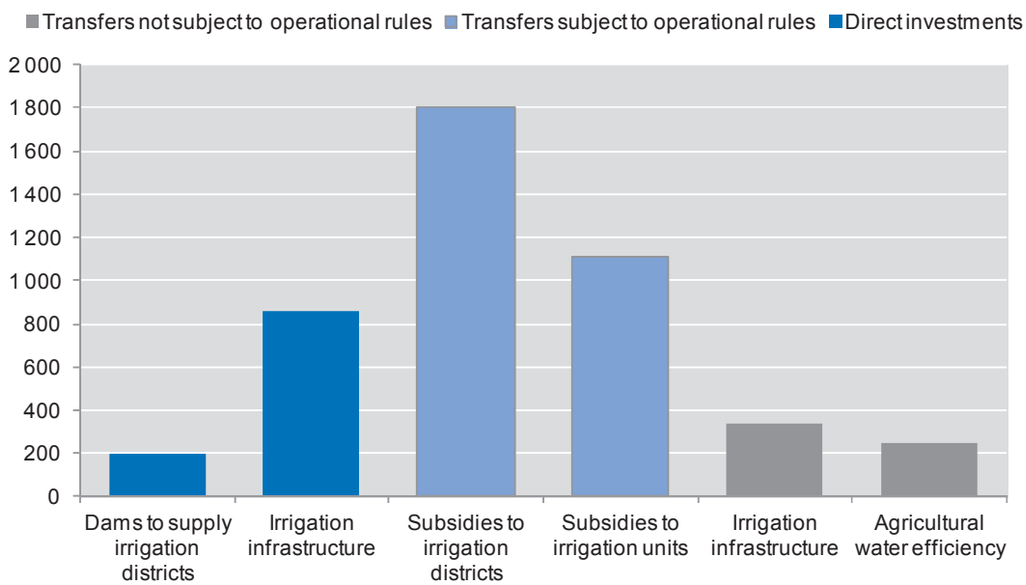
Sub-sector expenditures and financing structure

Mexico has an important irrigation sub-sector. Agriculture accounts for 8.4% of GDP and employs 23% of the working population in Mexico. Irrigated land accounts for 30% of total agricultural land, contributes 50% of agricultural production by value, and 70% of Mexico's agricultural exports. The irrigation sub-sector comprises about 6.5 million hectares of which 1.3 million are "technified" (i.e. they have multi-gates, drop irrigation, sprinklers). Irrigated agriculture is divided into two types: irrigation districts and irrigation units.[20] Mexico has 85 irrigation districts[21] mostly supplied by surface irrigation works developed by public agencies and (in most cases, after the reforms implemented in the 1990s) managed by water users associations. Mexico also has 40 000 irrigation units, supplied by surface, groundwater or a combination thereof, that in many cases include some minor works developed by public agencies but directly managed by the farmers.

Financial self-sufficiency of irrigation districts was greatly increased after the irrigation transfer reforms of the 1990s. In 1990, after experiencing serious problems with water delivery and charge collection, and as part of a wider set of economic reforms, Mexico began a programme of establishing water user associations (WUAs) and turning over management and tradable water rights to them, with a focus on larger schemes and farms.[22] By the end of 1997, 400 WUAs were operational, each controlling an average irrigated area of 7 600 hectares. One key target was financial self-sufficiency. Water charges went up in most districts (up to 500% in some cases), charge collection rates increased significantly (above 90% in most cases as farmers had to pay in advance to receive the water), and the financial system became more transparent. As a result, financial self-sufficiency increased from around 50% before the transfer to 120% in the post-transfer period, and many WUA made significant investments to repair or modernise their infrastructure, using bank loans. The main impact of the transfer was the considerable improvement in maintenance, especially at the lower system levels, as well as improvements in water use efficiency. Mexico is one of the most advanced OECD countries in the performance of collective irrigation institutions (Garrido and Calatrava, 2009) and cost recovery for operation and maintenance of irrigation systems is generally better in Mexico than in countries with similar levels of income (World Bank, 2009).

Figure 3.9. **Public support for irrigation through CONAGUA's programmes (2012 budget)**

MXN million



Source: Elaborated based on data from CONAGUA (2012), "Clasificación del Presupuesto", CONAGUA website, *www.conagua.gob.mx/Resumen.aspx?n1=1&n2=56&n3=263&n4=181&n5=172,* accessed 27 June 2012.

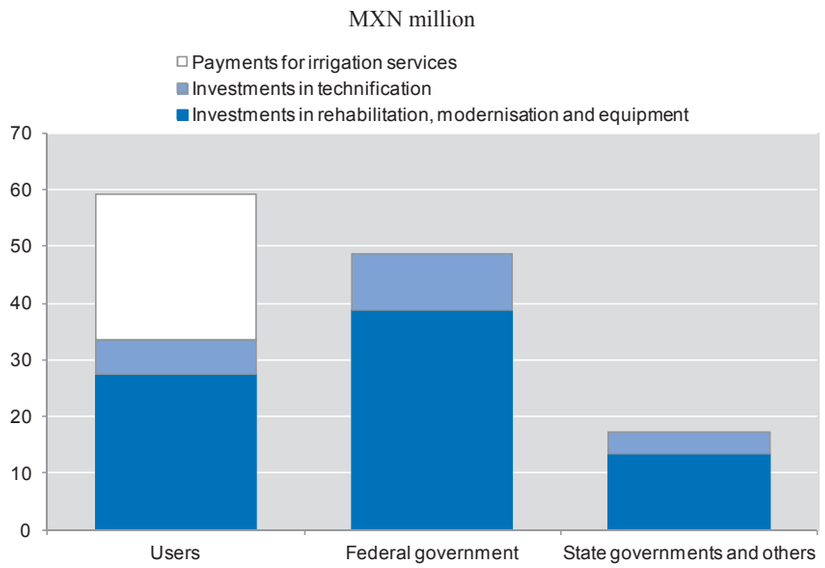
Nevertheless, the public sector continues to provide significant financial support for irrigation infrastructure. CONAGUA's 2012 budget for irrigation-related programmes exceeds MXN 4.5 billion, of which MXN 1 billion is provided through direct investments in dams and irrigation infrastructure and MXN 3.5 billion is provided through financial transfers (see Figure 3.10). Of the MXN 3.5 billion provided through transfers, MXN 2.9 billion correspond to programmes subject to rules of operation that require counterpart funds from users. The federal subsidy generally amounts to up to 50% of irrigation infrastructure investments, reaching 100% for technical capacity development in irrigation units. State government and municipalities also provide financial support for irrigation (see Figure 3.11).

Pricing of agricultural water

There is scope for reforming agricultural water pricing in order to provide stronger incentives for reducing water use. As discussed earlier, agricultural water users are exempted from paying water abstraction charges and even the "penalty" rate paid for above-quota abstractions is significantly lower that the general rate. This means that agricultural water users do not have a direct incentive to reduce water abstraction and that irrigation districts do not have an incentive to control water demand by individual farmers. Retail irrigation charges, although theoretically based on the volume of water used, are normally calculated per hectare because of the lack of water measuring devices (World Bank, 2009). In irrigation districts that use surface water, CONAGUA strictly measures the water extracted from the dams and reservoirs and delivered to the irrigation users associations (IUA). Accordingly, while there are some exceptions, consumption from these irrigation districts is monitored. The situation differs for irrigation units that

use groundwater (two-thirds of the 40 000 units): the water authority does not have enough personnel to control the volumes extracted or the drilling and exploitation of illegal wells.

Figure 3.10. **Financing of expenses of 39 irrigation modules (2011)**



Source: Elaborated based on data from CONAGUA (2011) available in the document "Avance de la Presentacion de los Estados Financieros 2011 de las ACU y SRL de los Distritos de Riego", CONAGUA,*/www.conagua.gob.mx/CONAGUA07/Contenido/Documentos/FORM-EDOS-FIN2011ACUySRLDISTRITO.pdf* (accessed 20 June 2012).

One key consideration to be taken into account, however, is the affordability impact of increases in agricultural water prices in terms of the competitiveness of the Mexican agriculture and the income of the poorest farmers. While this argument is often used to defend the *status quo*, no studies seem to be available on this key issue.

Bulk water supply tariffs do not fully cover the cost of service provision. CONAGUA provides bulk water supply services to the irrigation districts through the operation and maintenance of federal infrastructure. The cost of providing bulk water services is expected to be recovered through bulk water tariffs. The federal government, through the Ministry of Finance, sets the public tariff rates, while CONAGUA is in charge of administering, collecting and controlling the payments. Each irrigation district charges members an area-based retail tariff for water supply. The revenues collected are earmarked for the Reimbursement of Payments for Bulk Water Supply in Irrigation Districts and used for maintenance and conservation activities. In 2009, CONAGUA collected MXN 225 million for the provision of irrigation services.

The efficiency of public spending for irrigation

There is scope for scrutinising irrigation investments more closely. Given that annual public expenditures in irrigation programmes exceed MXN 4.5 billion, any potential increase in their effectiveness and efficiency is worth exploring. For example, investments in rehabilitation and modernisation of existing irrigations systems for growing low-value crops are not economically justified in water-scarce areas, except for

very low cost systems, such as existing large surface irrigation systems with large sunk costs and relatively low O&M costs (IMTA, 2009). All irrigation programmes and projects should undergo cost-benefit analysis to ensure that public expenditures are not wasted.

Box 3.11. **Water and agriculture in OECD countries: Cost recovery**

Rates of cost recovery, mainly operation and maintenance costs, for irrigation water delivered to farmers are increasing across most OECD countries, due to a combination of changes in public preferences regarding water allocation among competing uses (including environmental needs), greater budget scrutiny by national and sub-national government, high energy prices, and increasing awareness and impact of climate variability and climate change with the implications for rainfall and the availability of water resources.

The possibilities of using water markets and pricing as policy tools to achieve environmental objectives in agriculture seem limited. In addressing these issues, a different mix of policies may be appropriate, such as the use of well-targeted payment where farmers provide a clearly defined and verifiable public good or service, such as wetland conservation areas. Regulatory and planning instruments might be most applicable in the case of addressing sustainable use of groundwater resources, although these policy instruments are also essential for setting the management frameworks for surface water. A few countries, however, are using water markets to meet environmental objectives, such as purchasing water entitlements to rebalance water consumption and environmental needs, and public sector water purchases to supplement water supplies to wetlands.

Source: OECD (2009), *Managing Water for All: An OECD Perspective on Pricing and Financing*, OECD Publishing, Paris, doi: 10.1787/9789264059498-en.

Irrigation investments do not always follow priority policy goals. CONAGUA's irrigation support programmes do not include among their objectives to save water for reallocation to other uses. Rather, they focus on increasing water efficiency in farms.[23] Still, in 15 of the most overexploited aquifers, only 25% of farms have technified irrigation (i.e. drip-irrigation) while 41% use the most wasteful irrigation technique: earth-lined canals (INEGI [National Institute of Statistics and Geography – *Instituto Nacional de Estadística y Geografía*] data cited in Rivero Cob and García Romero, 2011). While there are at least four federal programmes from SAGARPA and CONAGUA to support technification (with a combined budget of over MXN 9 billion in 2010), 50% of the farmers who wish to invest in technification have not been able to do so, mostly due to lack of own resources to comply with the counterpart fund requirements (Rivero Cob and García Romero, 2011). Public support for irrigation could be re-oriented, asking farmers to take on more of the costs of infrastructure rehabilitation and focusing subsidies on promoting technification, but designing them to ensure that water is effectively freed up for alternative, more valuable uses.

Policy incoherence works against achieving water policy goals. Certain major agriculture and rural development programmes counteract the goals for the management of water and other natural resources – for example, the electricity subsidy for farmers to pump groundwater (*Tarifa 9*), which has led to overexploitation of many aquifers in water-scarce regions, and the *Ingreso Objetivo* programme, which encourages farmers to produce low-value crops and even water-intensive crops (fodder) using scarce water resources. There is considerable scope to replace programmes such as *Ingreso Objetivo* with income support programmes that include environmental cross-compliance conditions, or with targeted environmentally friendly PES programmes, which would

reduce distortions and provide income support to small farmers, while also providing valuable national and global externalities (World Bank, 2009).

Reforming electricity tariffs for agricultural use should be a major priority. Mexico has in place a costly electricity subsidy that promotes an unsustainable use of scarce groundwater resources. Electricity used in agriculture (which is mainly used for pumping groundwater from wells) benefits from a preferential tariff known as *Tarifa 9*. The actual cost of generating and transmitting water in Mexico is estimated to be MXN 1.44/kWh but farmers pay on average MXN 0.33/kWh, i.e. only 23% of the actual cost (World Bank, 2009).[24] In 2006, *Tarifa 9* resulted in a fiscal cost of MXN 8 billion (World Bank, 2009) – this is more than all federal irrigation expenditure. The majority of *Tarifa 9* beneficiaries are well-off farmers – poor farmers typically do not pump groundwater but use water wheels (*norias*) or surface water instead (World Bank, 2009). Options to reform the *Tarifa 9* include decoupling the financial support from the level of electricity consumption and distributing the subsidy instead on the basis of historical consumption, plot size, per farmer, or a combination of those criteria. It has been estimated that eliminating the electricity subsidy would reduce overexploitation of groundwater resources by about 20% in water-scarce areas (IMTA, 2009). Mexico has already implemented a research project (which intended to study the impacts of different combinations of subsidy reform and enforcement efforts), but the political economy has prevented a nationwide rollout of any reform so far. A variety of accompanying measures could be explored (e.g. such as voluntary agreements to forsake the subsidy or recycling parts of the revenue from the tariff to support transition to water efficient practices).

There is a large scope for re-allocating federal expenditures in the agriculture and rural development sector to achieve national water objectives. Public expenditures should generally focus on the provision of public goods. In 2006, federal expenditures in the agriculture and rural development sector reached MXN 153 billion, a substantial increase from 2000 (World Bank, 2009). This expenditure was split roughly by half between public good-type expenditure and private good-type expenditure (see Table 3.4). SAGARPA's programmes represent the majority of ARD productive expenditures, but less than 10% is for public-good type expenditure (World Bank, 2009). The same year, federal irrigation expenditures reached MXN 7.1 billion (or 5% of total ARD expenditures), of which more than half could be classified as private goods. One of the main recommendations of the recent World Bank review of public expenditures in the ARD sector was to substantially increase the allocation of federal public resources to public goods such as irrigation improvement and management, drainage and weather information.

Table 3.4. **Federal irrigation expenditures (as share of federal ARD expenditures)**

	Federal expenditures in the ARD sector	Federal expenditures in the irrigation sub-sector	Share
Public-type	MXN 69 billion	MXN 3.3 billion	4.7%
Private-type	MXN 74 billion	MXN 3.8 billion	5.1%
Total	MXN 143 billion	MXN 7.1 billion	5.0%

Source: Elaborated based on data from World Bank (2009), "Mexico Agriculture and Rural Development Public Expenditure Review", Report No. 51 902-MX, World Bank, Washington, D.C.

Box 3.12. Water and Agriculture Subsidy Reform: The EU experience

Across the EU, many crops with high water requirements were supported by the Common Agricultural Policy (CAP). For example, until 2003 corn was entitled to a direct subsidy of EUR 54/ton. Since the CAP direct subsidies were defined to deliver equivalent levels of income support to all cereal, oilseeds and protein crops, they favoured crops such as corn, rice, cotton and tobacco that demand much more water than oilseeds crops such as sunflower or colza. In France, from 1973-1988, agricultural water use grew by 43% and most of this increase was used in corn production. In 1993 this trend was reinforced by the CAP reform that replaced production subsidies by direct payments per hectare that gave higher compensation to irrigated land than to non-irrigated land.

Starting in 2006, the EU replaced most direct aid with a single farm payment that is not linked to production. Beneficiaries have been obliged to accomplish certain environmental and food safety requirements (cross-compliance) that are almost identical for irrigated and rain-fed farms. The European Commission recognised, within the launching of the "CAP's Health Check", that a new CAP should achieve climate change and water management objectives by means of cross-compliance, and proposed that compliance rules should be changed to include among other requirements standards on protection of water against pollution and run-off (the new standard "establishment of buffer strips along water courses") and where use of water for irrigation be subject to compliance with authorisation.

These agricultural policy reforms have had marked impacts in irrigated agriculture. For example, in Spain, especially in the regions where fruits and vegetables were less important in terms of value and acreage, more irrigated land has been allocated to vineyards, olive trees and citrus, and less irrigated land has been allocated to water-consuming crops such as corn, sugar beet, cotton and tobacco.

Source: Adapted from Garrido, A. and J. Calatrava (2009), "Agricultural Water Pricing: EU and Mexico", background report for the 2010 OECD study *Sustainable Management of Water Resources in Agriculture*, OECD Publishing, Paris.

Water supply and sanitation services

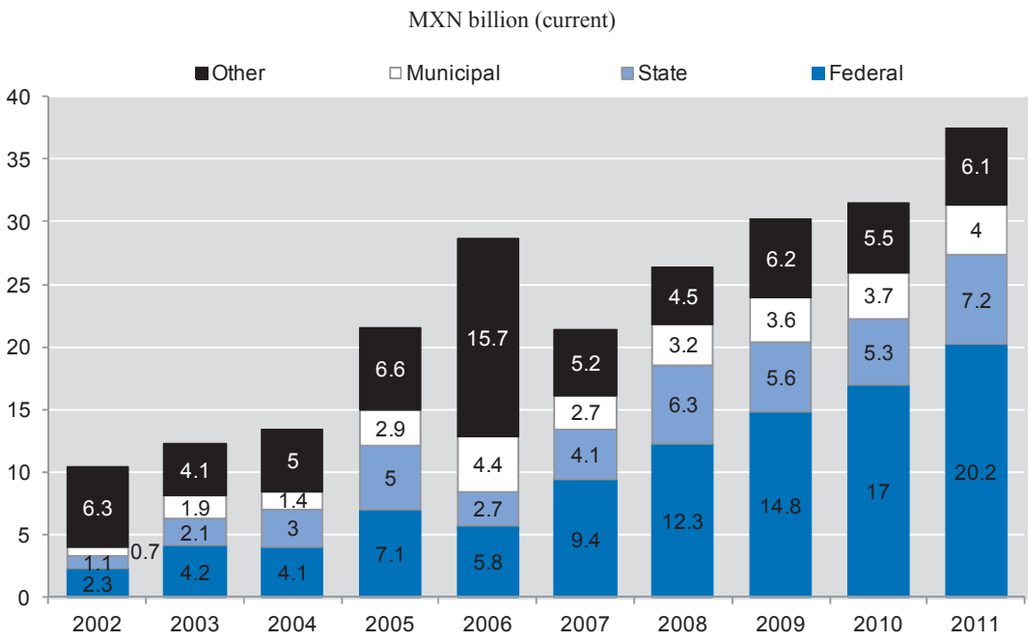
Sub-sector expenditures and financing structure

Progress in the water supply and sanitation sub-sector towards national goals has relied on significant increases in federal subsidies. Mexico has made great progress towards providing water supply and sanitation and has already exceeded the 2015 MDG targets. From 2002-2010, federal support for water and sanitation services infrastructure increased seven-fold, driving total investment for the sub-sector to over MXN 35 billion in 2011 (see Figure 3.12).

Most water service providers remain financially unsustainable. In 2006, average supply costs were estimated at MXN 6/m^3, whereas the average billing was MXN 2.7/m^3 (CONAGUA, 2008). It is difficult to track progress, as the information base is not stable. In 2007, out of a survey of 34 water utilities, half of water utilities in Mexico did not cover their operational costs, and when considering investment costs, most water utilities are not financially sustainable (CONAGUA, 2008). In 2008, out of 69 municipalities, only 8 had a positive operating margin (total revenues exceeded operating expenditures). In 2010, the situation seemed to have been reversed as 17 out of 21 utilities reported average revenues above cost of production (CONAGUA, 2011c).[25] FitchRatings (2011) analyses the recent financial evolution of 14 water utilities and concludes that despite efforts to increase efficiency (e.g. reducing staff costs per connection), the situation has

deteriorated due to the economic crisis, with tariff increases being delayed, bill collection efforts reduced and energy costs increased.[2526] The lack of financial sustainability impedes access to local capital markets (see Box 3.11). Experience from other countries indicates that reforms in sector organisation (e.g. inter-municipal co-operation or setting up regional operators) may help access financial markets and reduce the cost of borrowing capital (see Box 3.12). In any case, stable revenue flows from tariffs are considered a requisite for financial sustainability.

Figure 3.11. **Investments in water and sanitation services infrastructure by source**



Note: Total investments in the sub-sector, including CONAGUA, SEDESOL, CDI, BANOBRAS, state organisms, private initiatives, EPA contributions and loans.

Source: Elaborated based on data from CONAGUA (National Water Information System – SINA).

Indeed, increasing cost recovery levels in the water and sanitation services sub-sector is key to achieve financial sustainability across the water sector. The water supply and sanitation sub-sector currently represents about 70% of the total water sector expenditures, and it absorbs above 50% of CONAGUA's budget, used mostly for wastewater treatment. The water and sanitation services sub-sector contributes 18% of the revenue generated from water charges administered by CONAGUA – this contribution represents less than 6% of CONAGUA's expenditures. Increased contributions from WSS users would free up substantial public resources to pay for aspects of water management that are more difficult to finance from users and beneficiaries – such as water governance and water resources management expenditures.

Box 3.13. **Bond financing in the Mexican water and sanitation services sub-sector**

Mexico has a well-developed sub-national bond market, but this has not been a significant source of direct financing for the water sector. Water utilities have not been able to borrow on commercial terms, given the inability of most water utilities to recover costs. Instead, the bond issuance is often a source of general funding for local governments, which in turn use the proceeds to subsidise water investments.

One exception is the city of Tlatenalpa, in the state of Mexico. In 2003, the city completed a local-currency bond transaction that was the first in the Mexico water sector that did not use federal transfers as collateral and instead relied mostly on fees to cover the financing costs. Thanks to this bond funding, the city funded a new water treatment plant and related water leakage reduction investments. The independent trust, which issued the bonds, is supported mostly by tariff revenue, with a municipal guarantee and private-sector guarantees provided by the International Finance Corporation and Dexia.

Mexico is pursuing a number of other innovative sub-national financing options that could have implications for financing water infrastructure. In 2009, the state of Quintana Roo completed a USD 370 million pooled bond initiative (the first of its kind in Mexico) which combined the issuing of general obligation bonds by several municipalities to fund infrastructure, including water infrastructure. The pooling allowed the participating municipalities to achieve higher liquidity and lower borrowing rates than they could by issuing bonds on their own.

Source: Based on information from CONAGUA (2010), "Financing Water Resources Management in Mexico", Water Economics and Financing OECD Meeting, March.

Box 3.14. **Sector reforms and access to financial markets in Portugal**

One of the aims of the water and sanitation sector reform in Portugal has been to guarantee the capacity of water companies to self-finance operations and investments. Water management is delegated to local authorities, which ensure service provision through local (municipal or inter-municipal) water companies. While water companies generate funds for operation and maintenance through tariffs, they also need to tap the financial markets to raise funds for investments.

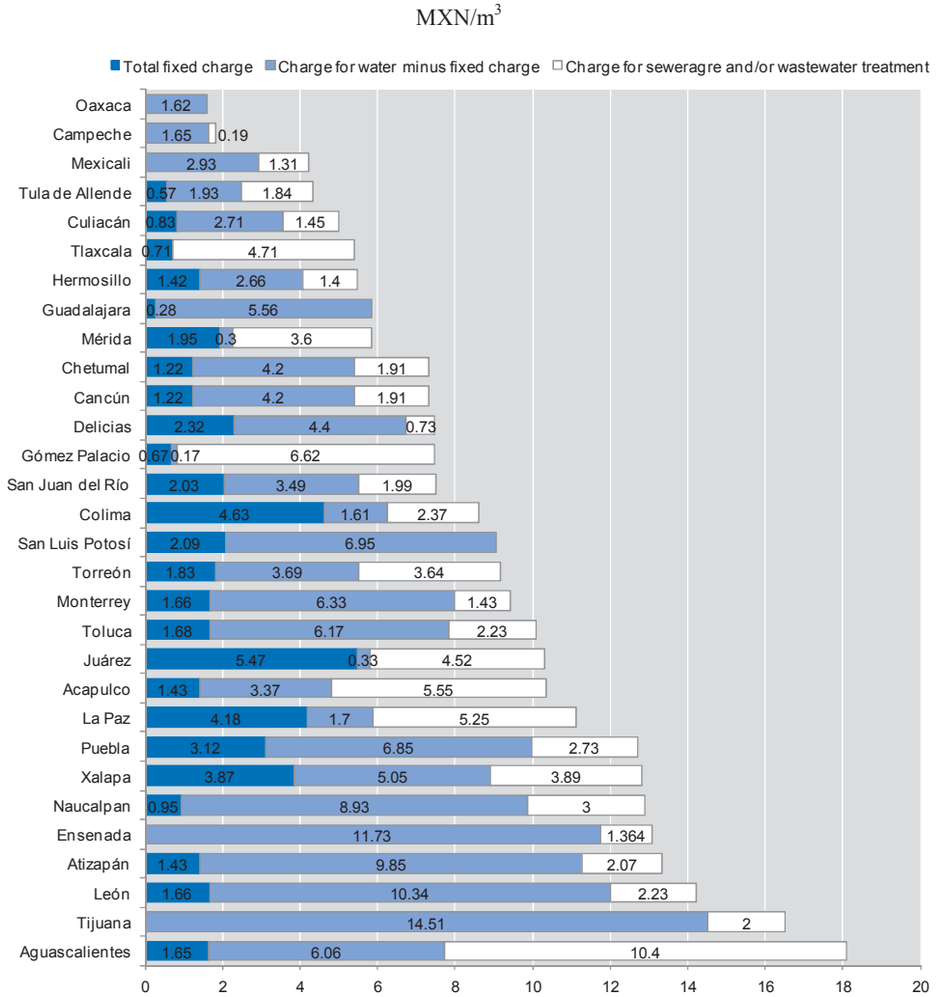
Aguas de Portugal – a national holding company that fully owns the Lisbon water company and partly owns several other local companies acts as the main interlocutor with the financial markets. It takes long-term loans from international lending institutions (mostly with the European Investment Bank – EIB) and channels the funds to the local companies through a variety of schemes including loans, guarantees, equity and other structured financing schemes. This scheme helps to achieve financial economies of scale due to risk pooling and mutualisation – the difference between the financial cost of those loans and the prevalent interest rates for comparable bonds in the Portuguese market is 1.51%, which represents substantial savings. The scheme also allows channelling resources from the financial markets in a centralised way without the need to centralise management.

Source: Adapted from Massarutto A., L. Anwandter and E. Linares (2012), "Financial Economies of Scale in the Water Sector", research report, IEFE, Bocconi University, *www.iefe.unibocconi.it*.

Tariffs for water supply and sanitation

Water tariffs vary widely across cities and users. Tariff structures mostly include a fixed charge, a volumetric charge (usually divided in increasing blocks) and surcharge for sewerage and wastewater treatment (see Figure 3.13). More importantly, tariff levels vary by almost an order of magnitude. In 2011, among 31 cities, the tariff for 30 m^3/month varied by a full order of magnitude from MXN 1.8/m^3 in Campeche to 17.3 in Morelia (CONAGUA, 2011c). The tariff was below MXN 6 for 12 cities, while it was above MXN 12 for 6 cities, with a median of MXN 8.8/m^3. This variation can reflect different levels of costs. It most probably reflects differences in efforts made to recover operation and maintenance costs from water users. This derives from the fact that regulatory functions for setting and approving tariffs are scattered across multiple actors (see other chapters in this report). There are also significant variations among types of users within the same city. In most cities, industrial and commercial users pay significantly more for water services than domestic users – in Mexicali, an extreme case, almost six times as much.

Figure 3.12. **Water and sanitation tariffs for domestic use in main Mexican cities (2010)**



Note: Assumes a consumption of 30 m^3.

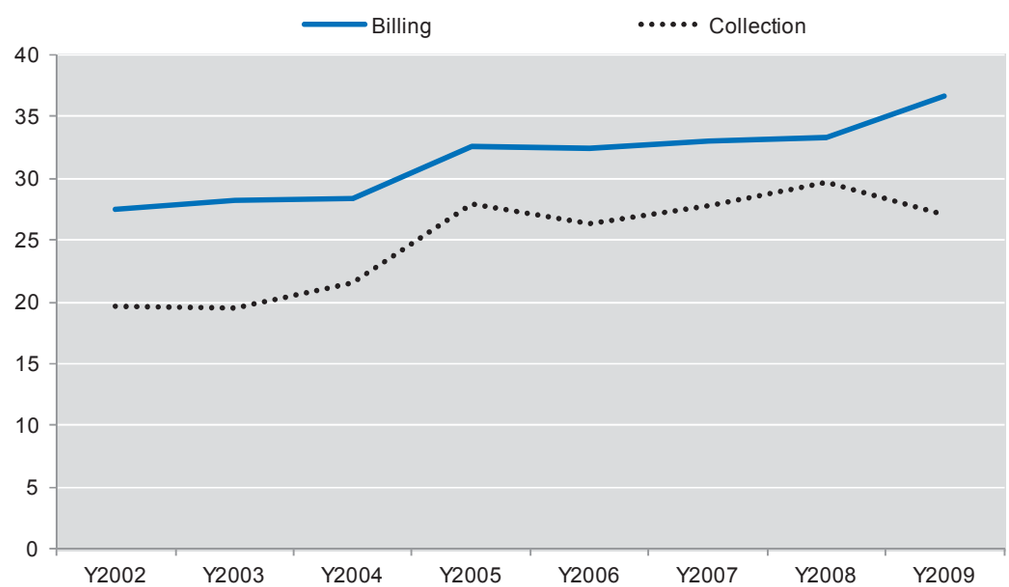
Source: Elaborated based on data from CONAGUA (National Water Information System).

Water tariffs have been increasing. In many cities, tariffs are increasing above inflation rates. In 2006-2007, in a sample of 32 cities, water tariffs increased above inflation (3.8%) in 22 cities – in 4 cities the increase was below inflation, in 5 cities there was no increase and in 1 city there was a decrease (CONAGUA, 2008). In 2009 and 2010, in a sample of 31 cities, water tariffs increased above inflation (4%) in 21 cities. In two cities the increase was below inflation and in eight cities there was no increase (CONAGUA, 2011c). Water providers are increasingly including sewerage and wastewater treatment services in the tariffs – ranging from 3% to 40% of the drinking water tariff.

Water service providers are succeeding in increasing billing as well as collection of water bills. In real terms, billing for water and sanitation services increased by 33% between 2002-2009. Over the same period, collection of water and sanitation bills increased by 37%, from MXN 27.5 billion to MXN 36.6 billion. The bill collection rate reached a peak of 89% in 2008 (see Figure 3.14). As an example, CIAPACOV – a multi-municipal service provider in Colima – has increased commercial efficiency from 40% to 72% without social conflict thanks to a programme on "friendly bill collection" that combined making it possible to pay the water bill in newsstands, assigning different payment periods to different service areas and improving the quality of client services.

Figure 3.13. **Billing and collection of water supply and sanitation tariffs**

MXN billion (constant 2009 prices)



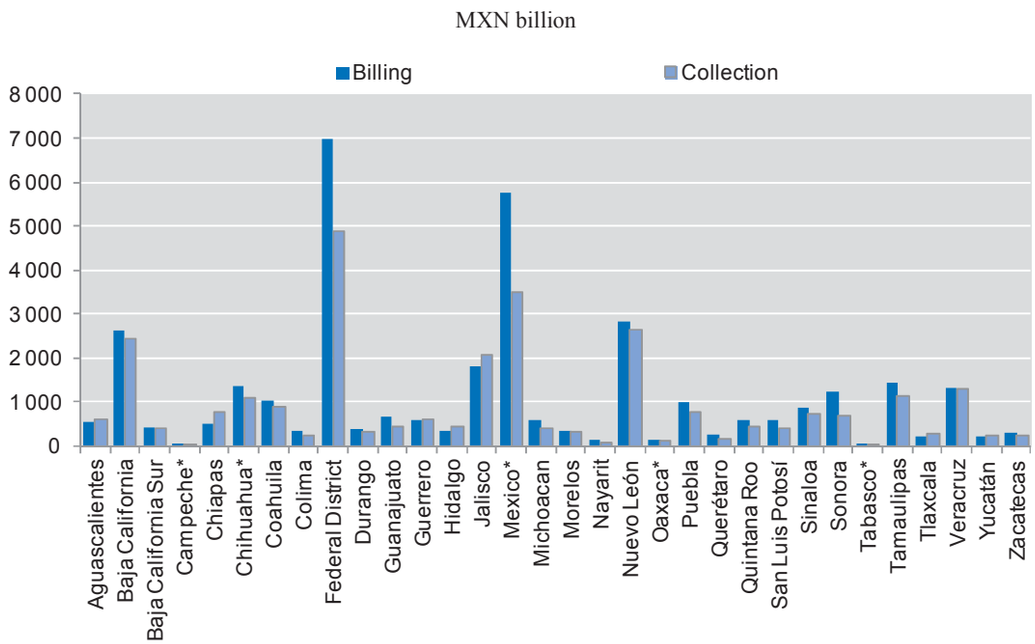
Source: Elaborated based on data from CONAGUA (2011), *Estadísticas del Agua en México, Edición 2011*, CONAGUA, Mexico.

The municipal financing framework provides incentives for increasing revenue collection from water services. A large part of federal transfers to municipalities is determined by a formula established in the Fiscal Co-ordination Law that sets each municipality's share of the General Participation Fund. The formula makes the share of the fund partly contingent on the revenues generated by the municipality – including both

local taxes and charges for municipal services, in particular water. The formula thus provides an incentive to increase revenues from water tariffs. It would seem, however, that the formula also provides incentives for over-reporting revenues and for including under the concept of "water" services that could be billed separately, such as "sewage collection and treatment".

Further reforming the level and implementation of water tariffs could generate substantial additional resources. The different levels of water tariffs across cities (Figure 3.13) suggest that there is scope for increasing tariffs and the derived revenue in many municipalities. But there is also scope for increasing revenue (as well as the incentive effects of water pricing) from enhancing billing and collection of water tariffs. In 2010, water operators collected 81% of the MXN 35.5 billion billed to their clients (CONAGUA, 2011c), down from a peak of 89% in 2008. This means that MXN 6.7 billion were not collected. In ten Mexican states, water operators collect 95% or above of the amounts billed (see Figure 3.15). If water operators in the other 22 states were to increase collection rates to 95%, the total amount collected in 2010 would have been MXN 34.8 billion, which represents an additional MXN 6 billion. However, policy decisions on water tariff reform should take into account their affordability, in particular the impact on the discretionary spending of the poorest households (measured as the share of the water and sanitation bill on total household expenditures) in order to inform tariff design and a possible programme of targeted social measures. It is remarkable that CONAGUA's otherwise very comprehensive annual report of the water and sanitation sub-sector does not discuss the issue of affordability.

Figure 3.14. **Billing and collection of water and sanitation services tariffs by state (2010)**



Note: * indicates 2009 data.

Source: Elaborated based on data from CONAGUA (2011), *Situación del Subsector Agua Potable, Alcantarillado y Saneamiento, Edición 2011*, CONAGUA, Mexico.

Increasing water tariffs would also contribute to reducing financial needs. Water tariffs (in combination with other instruments) can help to substantially reduce per capita water consumption over the long term. By containing water demand in served households, financial requirements for water treatment (e.g. chemicals, electricity) and water distribution (e.g. electricity for pumping) can be reduced.

Additional funds could be raised by charging public institutions for water services. Most water service providers do not charge for the water provided to the buildings that belong to federal, state and municipal governments. This tradition originates in Article 115 of the Constitution, which mentions that the goods belonging to the public domain are exempted from paying municipal services. Several service providers (Culiacán, Monterrey) have successfully challenged in court the interpretation that Article 115 applies to water and sanitation services, and ANEAS (National Association of Service Providers) is encouraging its associates to charge public institutions for those services.

Other water pricing instruments

The system of water abstraction charges provides an incentive for water operators to invest in reducing per capita consumption. It sets differential charge rates for operators which supply more than 300 litres per capita per day (lcd); in 2011, the rate for operators exceeding 300 lcd was twice as high the base rate. This effort would be even more effective if macro-metering was sufficiently widespread to discourage underreporting. Since many water operators have traditionally failed to pay water abstraction charges, in 2002, CONAGUA launched the Program for Reimbursement of Duties (PRODDER – *Programa de Devolución de Derechos*) to encourage water utilities to pay water abstraction charges. Since 2003 PRODDER has reimbursed to water utilities between MXN 1.4 to 1.9 billion per year. By 2006, PRODDER had allowed CONAGUA to triple revenue collection from water utilities (CONAGUA, 2008).

CONAGUA also charges tariffs for bulk water supply services. CONAGUA provides bulk water services to cities in the Mexico Valley through the Cutzamala system and through the Wells of Mexico Valley system. It also provides bulk water services in Michoacan state through the Lázaro Cárdenas aqueduct. The revenues from the Cutzamala and PAI systems are earmarked to Trust Fund 1928 for operation and investment. The revenues from the Lázaro Cárdenas aqueduct go to the federal budget. CONAGUA also provides bulk water services to industrial facilities in Michoacan state through the Lázaro Cárdenas aqueduct and in Veracruz state through the Uxpanapa-La Cangrejera aqueduct. The revenues go to the federal budget.

Table 3.5. **Urban and industrial bulk water tariffs**

MXN/m^3

	2007	2008	2009	2010	2011
Cutzamala	4.2141	4.3194	4.5906	4.8123	4.9937
Wells of Mexico Valley	3.5909	3.6806	3.9117	4.1006	4.2552
Lázaro Cárdenas (urban)	0.0201	0.0210	0.0222	0.0231	0.0239
Lázaro Cárdenas (industrial)	0.3412	0.3564	0.3783	0.3944	0.4077
Uxpanapa-La Cangrejera (aqueduct)	0.6939	0.7265	0.7713	0.7991	08311
Uxpanapa- La Cangrejera (pumping plant PB-3)	0.8550	1.0077	1.0698	1.1084	1.1528

Source: Elaborated based on data from CONAGUA (National Water Information System).

The efficiency of public expenditures for water supply and sanitation.

Mexico is making efforts to increase efficiency in the WSS sub-sector. There are concerns about the effectiveness and efficiency of public expenditures. For example, among a sample of 80 utilities, unaccounted-for water due to physical losses amounts to 37% of the total water produced (CONAGUA, 2010b) and many wastewater treatment plants are not operational. According to CONAGUA (2010c), the average global efficiency of utilities in 2006 was 32.6%, a percentage that increased to 42.3% in 2010, based on data of 80 utilities in cities with more than 20 000 inhabitants. This means that, out of 1 000 litres produced, only 423 are paid for; the rest is lost through the network, not billed for, or billed but not paid for.

Several water supply and sanitation programmes are designed to increase the effectiveness and efficiency of expenditures and the financial sustainability of operators. In 2005, the PATME[26] programme was specifically launched to increase the efficiency of water operators. The APAZU programme emphasises increasing physical and commercial efficiency of water utilities (e.g. it prioritises operators that undertake billing and collection actions as well as water leak reduction). The PROTAR (Wastewater Treatment Program) programme prioritises wastewater treatment works that belong to inter-municipal systems and does not provide support for rehabilitating a work before five years. Investments to increase efficiency increased (in constant 2008 prices) from 2002-2008 from MXN 1.5 billion to MXN 4.0 billion (CONAGUA, 2011c). However, this only represents an increase from 11.5% to 13.6% of the total sub-sector investments. In addition, in 2009 CONAGUA launched a programme (*Fondo Concursable para el Tratamiento de Aguas Residuales*) to partly subsidise wastewater treatment provided by municipalities using output-based principles – the programme pays annually between MXN 0.30/m^3 to 0.50/m^3 treated (according to the pollutant content of the effluent discharged).

Box 3.15. **Increasing the operational efficiency of water infrastructure in Brazil**

Water infrastructure is not always well utilised and managed. This is particularly true of wastewater infrastructure. In many cases wastewater plants are built with national subsidies but they fail to treat wastewater – either because the sewage is not delivered to the wastewater treatment plant or because municipalities that own them decide that they cannot afford to operate them. In different aspects of water management, Brazil has introduced innovative incentive-based approaches to achieve cost reductions that rely on paying for proven results rather than for physical works. The River Basin Clean-Up Program (PRODES) has provided incentives for increasing the operational efficiency of wastewater treatment infrastructure. Private actors build and operate the wastewater treatment plants and they are paid a fee for each cubic metre of wastewater treated.

Source: Adapted from OECD (2011), "Financing Water Resources Management", ENV/EPOC/WPWBE(2011)4, OECD, Paris.

There is scope for improving the allocation of expenditures to follow public policy objectives. In December 2010, the national coverage of drinking water and sanitation reached 91.3% and 89.9% respectively. However, in rural areas the rates of coverage reached only 76.1% and 61.6% respectively. Given that the national averages in 1990 were 78.4% for drinking water and 61.5% for sanitation (CONAGUA, 2008), rural areas are essentially 30 years behind the national average. Some programmes attempt to close this gap through programme design. For example, PROSSAPYS provides higher levels of

subsidies to marginalised communities. However, addressing this challenge will require budgetary re-allocation across programmes – from urban to rural.

Conclusions and recommendations

This section synthesises some of the main assessments and sketches recommendations to put water policies in Mexico on a more sustainable economic and financial basis.

Main assessments

The current status of water institutions in Mexico hinders the economic efficiency and financial sustainability of the sector.

The architecture of water institutions in Mexico has ambivalent consequences, from an economic and financial perspective. It essentially suffers from three weaknesses:

- Initiatives taken in other areas, which have consequences on water use and availability, clearly contradict water policies. For instance, energy subsidies to farmers and the *Ingreso Objetivo* programme have detrimental impacts on groundwater management and water demand.
- Financial capabilities are not aligned with obligations. Misalignment can generate high costs and hinder the efficiency of public expenditures. This is particularly the case when basin priorities and national programmes do not coincide.
- The sector is full with public expenditures plans, but lacks strategic financial plans attached to water policies, be it at federal or basin level. The 2030 Water Agenda is one step in the right direction, but its own limitations impede implementation.

There are issues about the cost-effectiveness of water policies and investments.

They are illustrated by the following facts:

- Some infrastructures built in the 1980s have decayed and even stopped operating because (human and financial) resources to operate and maintain them have been lacking. This confirms that investments have to be backed by a robust strategic financial plan (not a public expenditure plan) and secured stream of revenues; experience shows that revenues from users are the most stable ones, over the long term.
- Some infrastructures are built to address challenges that could have been avoided or addressed at a lower cost. For instance, reservoirs are built to augment supply when water could have been saved; plants are built to treat water, the pollution of which could have been avoided; concrete infrastructures are built where green ones could have provided a lower cost option; closing unlicensed wells is usually more effective than mitigating the consequences of illegal water use.
- While levels of investment in water infrastructures have been high, water services (in particular sanitation) remain poor in large parts of the country, in particular in rural areas; water users remain vulnerable to water-related risks. Moreover, technification does not contribute to save water if water efficiency gains are compensated by the extension of irrigated surfaces.

- Buy-back programmes in Mexico reflect the cost of the action taken. They would be more cost-efficient if based on the volume of water saved, leaving farmers the choice of the appropriate technique.

Economic instruments in place to manage water resources are not designed to maximise contribution to water policies.

Mexico is making use of several economic instruments to manage water: abstraction and pollution charges, payment for ecosystems services, water markets and buy-back programmes. However, there is room to improve their design and implantation so that they contribute to water policy objectives. For instance:

- low abstraction charges and lax enforcement (e.g. illegal abstractions, under-reporting of consumption) prevent them from being effective instruments for water policies;
- low pollution charges cannot change the behaviour of polluters;
- when imperfectly designed, water markets can lead to over-abstraction and payment for ecosystem services schemes fail to contribute to conservation;
- a subsidised electricity tariff contradicts water policy objectives.

The contribution of users to total water sector expenditures remains low (about 45%). The reliance of water policies and water services on public funding puts the financial sustainability of water policies in Mexico at risk, as competition to access scarce budgetary resources gets fiercer.

Selected recommendations

Improve the institutional organisation of water policies

Several institutional measures may be considered. First, the respective roles of federal, state and river basin councils should be clarified. In this report, the chapters on governance and river basin organisations suggest some ways forward. Second, plans for water-related infrastructures or services should be backed by financial plans, which state will pay for what and when. Third, mechanisms to enhance intergovernmental co-ordination need to be strengthened. Economic instruments can play a role in this direction. Finally, co-ordination between national expenditures and basin priorities should be strengthened; this can be done by strengthening the role of basin authorities in spending decisions and/or by making a more systematic use of rules of operation, to improve the performance of sub-sectors (see Chapter 4). Another option might be to give basin authorities some autonomy to raise and allocate funds for priority investment. But this can only be considered if policy objectives are well defined and recurrently reviewed; otherwise, there is a risk that such autonomy leads to ring fencing a budget for water policies, suboptimal allocation of fiscal resources, and incentives for fundraising.

Enhance cost effectiveness of water policies

Fixing the institutional architecture of water policies can enhance the efficiency of water policies. This would make sure investment plans better reflect basin priorities. It would also make sure that public expenditures in other areas (agriculture, energy, etc.) are better aligned with water policy objectives. Strategic financial plans for water services can make low-cost options (such as green infrastructures or community management)

attractive. The next section explores how economic instruments can be used to enhance the cost-effectiveness of water investment and to save budgetary resources.

Make a better use of economic instruments for water management

The reform of economic instruments for water management relies on several actions:

- improve collection rates of water-related taxes and charges; best practices in the country can be used as benchmarks;
- adjust the rates and the structure of charges and tariffs so that they reflect water policy objectives. Other objectives, such as social or economic ones, are better addressed by other means (e.g. targeted social support to address affordability issues);
- identify and assess water-harmful subsidies, with a view to phase them out. The reform of *Tarifa 9* is a priority, and some pilot programmes at local level are paving the way forward;
- strengthen the institutional, knowledge and database on which economic instruments rely. For instance, tariffs reforms only deliver expected results where water is metered, which is seldom the case for irrigation in Mexico; water markets only operate efficiently where water rights are appropriately defined;
- allocate more resources to monitoring of water uses; at present, they only account for less than 1% of CONAGUA's budget.

International experience of countries faced with similar challenges indicates that the right accompanying measures can overcome the political barriers to reform. For instance, parts of the additional revenues from higher charges can be recycled to support investment in water efficient farming practices, for a transition period. In an unstable context, irrigators give a price to secured water entitlements. In most cases, noted improvements in service delivery are essential to sustain social support for such reforms.

Raise revenues from the beneficiaries of water services

Prices for water services need to reflect at least the operation and maintenance cost of providing those services. They need to be aligned with policy priorities (regarding, for instance, investment, or demand management) and backed by strong regulation (for instance, on the quality of the service). Although politically difficult, such reforms are facilitated by a robust analysis of the social impacts of water tariffs. Targeted social measures are more effective and less costly than cheap water to address affordability issues.

The Mexican National Water Law includes the concept of a Water Financing System. The creation of such a system has been pending since 2004. Should this initiative be revived, it would be an opportunity to set the framework conditions to enhance the cost-effectiveness of water policies in Mexico and to ensure that initiatives in other sectors do not contradict and add costs to water policies. The concept would aim to make the best of public budgets and to enhance the financial contribution of water users. It would rely on well-designed and targeted accompanying measures to facilitate transition.

Notes

1. Available for consultation on the Federal Commission on Regulatory Improvement's (COFEMER) website.

2. In the Mexican legal system, services provided by the government have the character of "fiscal credits", which are officially named "rights" (*derechos*). "Rights" have to be set by the legislative power, according to Article 73, fraction VII of the Mexican Constitution, and any attempt by the executive to modify them can be seen as unconstitutional, leading to possible suits in the judiciary. In 2002, the Supreme Court established that drinking water services are not "products" that can be charged by the utilities, but "rights" against service provision by government institutions, and therefore utilities are not entitled to approve tariffs, only state congresses can. There is some flexibility, though, as the state of Jalisco reported that the capacity to set tariffs had been taken away from Congress and given to citizen boards.

3. With the constitutional amendment to Article 115, municipalities were indirectly made responsible for setting tariffs, even if that was never clearly stated in any regulation. Overall, there is not a single model on how tariffs are set, but a heterogeneous situation across the territory. In the state of Aguascalientes, for instance, three different mechanisms are found in three different municipalities: in the municipality of Aguascalientes, the Council (utilities' board) is in charge of setting tariffs; in the municipality of Cosío, the state Congress does it; and in the municipality of Jesus María, the state executive is in charge of this task.

4. Initiative 26 of the 2030 Water Agenda tries to address this contradiction.

5. Here the concept of "financing gap" considers the cost of the measures identified to achieve the water policy objectives when compared with the historic revenues of the sector. Note that the size of the "financing gap" depends on the types of measures identified to achieve the water policy objectives. For example, if the objective of "balanced water supply and demand" can be achieved by reducing water demand with the incentives provided by economic instruments rather than by building new water storage infrastructure, the cost of achieving the policy objective, and thus the "financing gap", would be reduced.

6. The "water gap" is one key concept of the 2030 Water Agenda. The concept may be misleading because it suggests that there is an absolute level of "water needs", while in reality those "water needs" vary with technical progress and the adoption of different policies.

7. Federal expenditures in the agricultural and rural sector totalled MXN 143 billion in 2009.

8. State government subsidies account for around 10% of sector investments (CONAGUA, 2010b).

9. Data in the remainder of this paragraph have been calculated based on CONAGUA (2012b).

10. The Water Management Program is a programme classified under the heading "Regulation and Supervision" and allocated MXN 5.8 billion in 2012. It is defined as "a cross-cutting programme to improve water management through the development of technical, administrative and financial capacities".

11. CONAGUA has 150 inspectors to control 475 000 registered users and many more illegal actors.

12. This condition does not apply to localities beyond 2 500 inhabitants or to the Clean Water Program.

13. These are rules established every year by the Mexican federal government to guide the execution of federal programmes through regulatory mechanisms that govern access, evaluation and accountability of programme funds, and their main purpose is to ensure that the use of public resources in water infrastructure development programmes is undertaken with efficiency, effectiveness and transparency. In the case of the Water Program, operational rules also aim to increase conservation, efficiency and sustainability in the use of water resources, strengthen organisations, businesses and associations responsible for water management and for water supply and sanitation services in urban and rural areas (CONAGUA, 2008).

14. The term "water resources charges" is used here to refer to water abstraction charges and water pollution charges. The term water charges will be used to include also charges for bulk water supply. The term "water tariffs" will be used to refer to charges for retail water supply services only.

15. Accordingly, in the last ten years the charge rates were increased in 2002, 2003, 2004, 2007 and 2009.

16. Since many water operators have traditionally failed to pay water abstraction charges, in 2002, CONAGUA launched the Program for Reimbursement of Duties (PRODDER – *Programa de Devolución de Derechos*) to encourage water utilities to pay water abstraction charges and to invest in water infrastructure. Utilities that pay water abstraction charges and invest in water supply and sanitation infrastructure are "reimbursed" the water abstraction charges. See section on the water supply and sanitation sub-sector.

17. The adjustment is not made every year. It is made when the accumulated inflation reaches 10%.

18. Initiative 7 of the 2030 Water Agenda proposes to increase the rates of water pollution charges.

19. The National Water Law provides the justified reasons for not having used the water rights: a *force majeure* situation, an administrative or judicial resolution that prevents the user from using all the volume granted, a temporary transfer of water rights to the water authority under special circumstances, having executed water efficiency investments or being in the process of executing investments for water use.

20. In contrast to irrigation districts, whose members are organised in formal water user associations, fully recognised by the government, irrigation units typically operate on the basis of informal arrangements without legal identity and have been historically neglected by the government. This reduces their participation in water management institutions, such as COTAS, or the application for government funding.

21. Given their size, many irrigation districts are subdivided in smaller areas called irrigation modules.

22. This paragraph combines information from Zekri and Easter (2003) and Kloezen *et al.* (1997) cited in Easter and Liu (2005).

23. Starting in 2003, CONAGUA launched a special investment programme intended to save significant amounts of water in irrigation districts where irrigations rights exceeded the hydrological capability of the basin. The programme proved to be very successful in irrigation districts 05 and 90 (in the Conchos river basin). IMTA reported that bulk water had been saved by 23% and 15% respectively; productivity increased by 105% in irrigation district n°05. It is being replicated in irrigation districts 025 (in lower Bravo River basin) and 04 (in the Salado River basin). The investments are directed to improve water efficiency and introducing water saving irrigation systems.

24. The subsidy implies that farmers pay on average 29% of the electricity they consume, whereas industrial users pay 94% and urban domestic users 43% (World Bank, 2009).

25. However, an important self-selection bias among the reporting utilities is very likely – with only the most advanced reporting.

26. This sample is not representative, as it includes only utilities for which credit ratings have been developed, most likely the more advanced ones.

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Annex 3.A1
Water resources charges in OECD countries

Table 3A1.1. **Abstraction charges in selected OECD countries (2011)**

Country	Levied by:	Tax name	Specific tax base	Tax rate	
Belgium/Flanders	Regional administrations	Groundwater tax	Quantity of used groundwater; varies per user type	0.0603	EUR per m³ groundwater (min. rate for 2011)
Belgium/Wallonia			Quantity of used groundwater		
Canada	Province	Water Abstraction Permit Fees	Varies per user type and per type of use		
Czech Republic		Charge for withdrawal of groundwater	Underground water abstraction for drinking water supply	0.0813	EUR/m³
			Underground water abstractions for other purposes	0.122	EUR/m³
Denmark		Water charges	Water consumption	0.9734	EUR/m³ on average (2003)
Estonia		Water abstraction charge	Groundwater (distinction by aquifer) and surface water		
France	Basin	Charge on water abstraction	Water abstraction		
	City	Charge on water consumption	Consumption of public potable water		
Germany	*Land*	Water abstraction charge	For groundwater, surface water; per type of use		
Greece		Charge on irrigation water	Irrigation water		
Hungary		Charge on water abstraction	Water abstractions; varies by water source and region		Effective rate up to EUR 0.04/m³
Israel		Water extraction levy	For different uses; per season		
Italy	Regions	Charge on water services	Water services – domestic use		
Japan	Local government	Charge on abstraction of water from rivers	Quantity of river water abstracted		
Korea	Municipalities	Water use charge	Per river	0.1037-0.1102	EUR/m³
Mexico	Treasury	Charge on water use	Per user type, source and location		

Table 3A1.1. **Abstraction charges in selected OECD countries (2011)** (*cont.*)

Country	Levied by:	Tax name	Specific tax base	Tax rate	
Netherlands		Tax on groundwater extraction	Extracted groundwater	0.1826	EUR/m³
		Tax on tap water	Tap water delivered to a consumer	0.147	EUR/m³
Poland		Charge on groundwater abstraction	Per type of use	0.015-0.0255	EUR/m³
		Charge on surface water abstraction	Per type of use	0.009-0.0128	EUR/m³
Slovenia		Payment for water rights	Per type of use		
		Water abstraction charge	Per type of use		
Spain	Province	Charge on water	Per type of use		
United Kingdom		Abstraction charges	Water resources	0.005	EUR/m³ on average

Note: The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Source: OECD/EEA database on instruments used for environmental policy and natural resources management.

Table 3.A1.2. **Features of pollution charges in selected OECD countries**

Country	Levied by:	Tax name	Specific tax base		Tax rate
Australia	State	Water effluent charge	Volume, pollution content (17 types of pollutants)	0.0015	EUR/kg assessable load
Belgium/Flanders		Wastewater charge	Volume and pollution content	0.8968	EUR/m³ drinking water
Belgium/Wallonia		Wastewater charge	Per type of use and reuse (for manure spreading)		
Canada	Province	Charge on discharge	Volume and pollution content	70.7074	EUR/tonne
Czech Republic		Fee for discharge of wastewater into groundwater	Pollution content	14.2285	EUR/year (1 equivalent citizen due to the capacity of the sewerage plant)
		Fee for discharge of wastewater into surface water	Emissions of organic substances	0.6504	EUR/kg
Denmark		Charge on sewage discharge	Water consumption	2.1989	EUR/m³ on average
		Duty on wastewater	Nitrate, phosphate or organic content in wastewater	2.6816	EUR/kg
Estonia		Sewage charge	Industry, households	0.9-4.33	EUR/m³
		Water pollution charge	Per substance	11 731	EUR/tonne
Finland		Wastewater user charges	Water consumption or wastewater volume/quality (larger sources) + fixed components	2.28	EUR/m³ (in total) on average in February 2011
France	Basin	Wastewater user charge	Water consumption		Varies by municipality
	Basin	Water effluent charge	Volume of pollutants discharged by industries		Varies by water agency
Germany	*Land*	Wastewater charge	Pollution load (noxiousness)	35	EUR/unit of noxiousness
Greece		Wastewater charge	Municipal and industrial wastewater		NULL
Hungary		Wastewater charge	Industry, households	0.11-3.43	EUR/m³
		Water load charge	Per substance	156.7417	EUR/kg
Italy		Charge on water services	Water services – sewer		Monthly fixed amount defined by municipalities
Japan		Wastewater user charge	Municipal multi-purpose septic tanks		Varies by municipality
Korea		Sewage treatment fee	Municipal wastewater		National average was EUR 0.18/tonne in 2010
		Water effluent charge	Per substance (18 types of pollutants)	64.8223	EUR/kg
Mexico		Water effluent charge	Quantity of wastewater in excess of permissible contents of COD and TSS		Varies with the carrying capacity of the recipient body

Table 3.A1.2. **Features of pollution charges in selected OECD countries** (*cont.*)

Country	Levied by:	Tax name	Specific tax base		Tax rate
Netherlands		Municipal sewerage charge	Discharge of household wastewater		Rates are locally determined per household, differentiated according to the number of members
		Tax on the pollution of surface waters	BOD, COD and heavy metals, for large polluters	31.76	EUR/pollution unit
Norway		User charges on wastewater treatment	Fee reflects the actual cost of wastewater treatment and must be calculated on the basis of the principle of full cost recovery		Varies between municipalities
Poland	Region	Water effluent charge	Based on temperature, pollution load	0.15	EUR/1 000 m^3
Slovak Republic		Charge for discharging of wastewater	Pollution content	4.3206	EUR/kmol
Slovenia		Wastewater collection and treatment charge	Consumption of water		Varies between municipalities
		Wastewater pollution tax	Unit of pollution	26.4125	EUR/unit of pollution
Spain	Basin	Tax on wastewater treatment	Pollution content and location		EUR 0.0167*(diameter² + 225N) per household per 2 months; N number of dwellings or commercial activities
Sweden	Municipality	Wastewater user charge	Wastewater and drinking water		Varies by municipality; full cost charging
		Water pollution fee	Oil spill		18-51 basic amounts + 0.04-0.12 basic amounts per 1 000 litres above 101 000 litres, depending on the size of the ship
Turkey		Charge on water pollution	Registration of water pollution control charge		
		Wastewater user charge	Municipal and industrial wastewater volumes		Varies by municipality
United States	State	Wastewater user charge	Water consumption, or discharge toxicity (larger sources)	11.4556	EUR/month for households on average (1994)
	State	Annual waste discharge license fees		11.7	EUR/million litres

Source: OECD/EEA database on instruments used for environmental policy and natural resources management.

Chapter 4

Institutionalising regulatory functions in the water and sanitation service sector

Regulatory responsibilities for water supply and sanitation are scattered across different levels of government and various legal instruments. In addition, the sector suffers from high turnover of local officials and managers, as well as important local political interferences, which affect the performance of service providers. This chapter aims to clarify attributions of regulatory functions in Mexico's water service sector and discusses how to improve the delivery of key regulatory functions, tools and incentives to better achieve policy outcomes.

Introduction

This chapter defines and analyses the allocation of regulatory functions for water and sanitation services across levels of Mexican government and discusses options for reforms based on good practices in Mexico and other countries. Ensuring the quality and consistency of regulation in water and sanitation services is key for promoting efficient, financially sustainable, environmentally friendly and equitable service delivery.[1] Conversely, bad regulation and regulatory failures can have dramatic impacts, spark vicious circles of under investment or favour expensive technological or infrastructure options to the expense of better water demand management or more environmentally friendly innovations. A good regulatory environment is fundamental to achieve the objectives set in the 2030 Water Agenda in relation to water and sanitation service provision. It underpins a number of the Water Agenda's initiatives and is the particular focus of Initiative 13, which aims to "Strengthen the capacities and attributions of the CONAGUA and its state water commissions in order to promote, supervise and regulate drinking water and sanitation services".

This chapter builds on previous OECD work on the framework conditions for private sector participation in infrastructure as well as on the body of recommendations and good practices developed by the OECD in relation to regulatory policy. The assessment of Mexico against the "Checklist for Public Action" has highlighted both the importance and the shortcomings of the current regulatory framework for water and sanitation services as an important bottleneck to PSP in the water sector (see OECD, 2012c). This work was a door opener for the current policy dialogue, and in particular it was instrumental in triggering additional discussions on the allocation and discharging of regulatory functions for water and sanitation services in the Mexican context. The main lessons learnt from this previous policy dialogue are highlighted in Box 4.1.

Box 4.1. **Strengthening the regulatory framework for private sector participation**

The assessment of Mexico against the "OECD Checklist for Public Action" recognises the fact that the general legal framework for PSP is in place in Mexico. However, it points to the fact that the regulatory framework, in particular economic regulation of water and sanitation service provision, is at a very early stage of development. It furthermore identifies the need to further clarify the allocation of regulatory responsibilities across levels of government as a major step to help governments draw the benefits of PSP.

Past involvement of the private sector in the provision of drinking water and sanitation services has underlined the value of supporting the development of regulatory functions outside of the contracts – within CONAGUA or a specific regulatory body, and state-level dedicated regulatory entities – including the mechanisms for PSP involvement, monitoring of private operator performance, as well as the establishment of clear dispute resolution mechanisms.

Two areas of particular regulatory relevance are explored in this seminal work: tariff regulation as a corner stone of financial sustainability in the water sector and the monitoring of performance in service provision.

Box 4.1. **Strengthening the regulatory framework for private sector participation** (*cont.*)

The work argues that to strengthen the financial sustainability of utilities, there is room for tariff increases in some places. In most cases, however, a phased approach involving greater bill collection would help put utility balance sheets on a firmer footing and build consumer trust as a prerequisite to tariff increase. It also shows that much remains to be developed in terms of water services tariff setting. In particular, more information and analysis on the social perception of price increase would help to design better-targeted pricing policies. There is also a need to share practices across local governments and raise awareness in state congresses on issues pertaining to tariffs to support more consistent approaches to price setting.

In relation to strengthening monitoring of performance, the work recommends that policy makers support the development of an information base on the state of sub-national infrastructure and assets and on the performance of utilities; integrate the various existing performance indicators that monitor utilities; and consider public disclosure of the information as an incentive for good performers and capacity-building mechanisms for lagging municipalities/operators.

Source: OECD (2012), "Framework Conditions for Private Sector Participation in Water Infrastructure in Mexico", OECD, Paris.

This chapter is structured around three sections. It diagnoses institutions and regulatory functions in water and sanitation services and discusses options for reforms. Governments can resort to a number of institutional arrangements and instruments to ensure that the design, content and implementation of regulation are adequate and commensurate to their water policy objectives. This chapter aims to clarify attributions of regulatory functions in Mexico's water service sector and discusses how the delivery of key regulatory functions, tools and incentives can be improved to better achieve policy outcomes. In particular, in light of current discussions in the country on developing a specific law for water and sanitation services, it discusses the features of a high-quality regulatory framework for water and sanitation services that cuts across different levels of government, the establishment of an independent regulatory agency for water and sanitation services, and the ways and means of strengthening utilities. Where adequate, the chapter provides relevant examples of international experiences.

Diagnosis of institutions and regulatory functions in water and sanitation services in Mexico

Overview of the main water and sanitation services facts in Mexico

The Water National Program's (2007-2012) main objectives are to increase water and sanitation services coverage in Mexico and to strengthen the technical and financial capacity of water utilities to foster more sustainable water management (CONAGUA, 2009b). Its second objective is "to increase access to and quality of drinking water, sewerage and sanitation services". The 2030 Water Agenda acknowledges that 91.3% of the population has access to drinking water services and 89.9% has sanitation coverage.[2] Given the current coverage and population growth, efforts are needed to extend access to drinking water services to a further 36.8 million inhabitants and to extend sanitation coverage to a further 40.5 million people (CONAGUA, 2011a). The 2030 Water Agenda also identifies the lack of infrastructure for wastewater treatment as the main problem for water quality. Improving this situation

and increasing the share of wastewater collected and treated (of the 89.9% of wastewater collected in 2010 only 43.4% was treated) will require investments by 2030 in the range of USD 9.5 billion.

There is a body of literature, including OECD (2012c), highlighting the water and sanitation service provision and regulation bottlenecks that may be impeding the achievement of such goals.

Box 4.2. **Summary of key features of the water and sanitation services sector impacting the provision and regulation of water services**

1. In the absence of an overarching regulatory framework for water and sanitation services at the federal level, regulatory responsibilities for WSS are scattered across different levels of government and various legal instruments.
2. By the Constitution, WSS is the primary responsibility of municipalities with various levels of capacity and resources: this generates important heterogeneity across the territory in terms of tariffs, technical and operational characteristics, state involvement and type of service provider.
3. Municipalities change government every 3 years, and water service providers change general directors every 18 months on average. This high turnover of local officials and managers has several consequences, including discouraging long-term planning and impeding capacity building.
4. Important local political interferences, in particular in terms of tariff setting, affect the performance of service providers.
5. Water tariffs are not set according to technical criteria or with a view to covering real costs: water service providers are highly subsidised, and in most cases tariffs do not cover operational costs.
6. Despite some improvement, water service providers are mostly characterised by weak financial structures and high dependency on government resources. This can be explained by a variety of reasons, including weak bill collection, low tariff levels, revenue mismanagement and high turnover of managers.

There is no overarching authority or legislative framework that sets clear rules of the game for water operators. CONAGUA has tried to fill this gap since its inception in 1989, publishing the first water and sanitation services guidelines (CONAGUA, 1989). However, compliance with the guidance, recommendations and rules set is low.

The sector lacks important long-term planning capacity across government levels to guide implementation of agenda targets. Despite the high-level targets set in the 2030 Water Agenda, uncertainty remains on what measures to adopt and how to sequence them to achieve universal coverage. The 2030 Water Agenda initiatives linked to universal coverage acknowledge that profound institutional changes are needed to make reform happen.

The decentralisation trend is far from complete in Mexico. The tension between decentralisation-centralisation remains important, with key development-enabling responsibilities remaining in the hands of federal institutions, such as allocation of funding for investments in the sector, rehabilitation of water systems, capacity building activities, etc. A number of municipalities and utilities are not capable of making operations financially viable and therefore rely heavily on federal funding.

Not all water operators have adequate financial, commercial and technical resources to provide high-quality water and sanitation services in an efficient manner. While a trend towards corporatisation can be observed, particularly in big metropolitan areas, Mexico's disparities (urban *versus* rural or north *versus* south) play an important role in the capacity of these institutions. For example, only 637 of the 2 356 water providers in the country are located in cities with more than 20 000 inhabitants. Almost three-quarters of the utilities are located in small rural communities and areas where resources and capacities are scarce. In 2010, more than 24 million Mexicans lived in communities with less than 2 500 inhabitants, with more than 6 million people without access to drinking water and 9.6 million without a sewage system (CONAGUA, 2010).[3] The design of proper incentives and capacity-building activities must take into account the existing heterogeneity of Mexican utilities.

In practice, according to CONAGUA (Esparza, 2010), many municipalities in Mexico, mainly in rural areas and small cities but also in some important cities, have yet to establish a proper water provider able to provide quality and efficient services. According to CONAGUA, the sector faces a serious financial sustainability crisis.

Apart from a few localities, generally the seats of government of some municipalities, which have managed to develop their corresponding water utilities with relatively efficient operative and economic models that have allowed them to increase the coverage of services as the population has grown, the rest of the localities have disarticulated water utilities, without autonomy of technical or financial operation and with strong pressure from the population they are obliged to serve. Their income is barely sufficient to cover basic operating costs, carry out a few corrective maintenance actions and minor works, and they often struggle to pay the electricity bills. (CONAGUA, 2011e)

Improvements in the quality and efficiency of water utility services are being realised, and the trend should continue resulting in stronger financial structures and less dependency on government resources. A report by FitchRatings on water service providers in Mexico assessing the credit and financial risk of 14 big water utilities (operating in cities above 100 000 inhabitants: 8 decentralised institutions at the municipal level and 6 operating at the state level) shows a relative deterioration in their financial situation, particularly in 2009 and 2010, compared to previous years, due to high operational costs (among which the electricity cost is a substantial share) and important short-term liabilities.

Similarly, despite some improvements in the evolution of utility efficiency, much remains to be done. According to CONAGUA (Esparza, 2010), the average global efficiency of utilities in 2006 was 32.6%, a percentage that increased to 44.1% in 2011, based on data of 80 utilities in cities with more than 20 000 inhabitants. CONAGUA reports that payment is received for only 423 of 1 000 litres produced. Accountability is also an issue with a non-accountability rate of on average 43.2% of the total water produced (85% corresponds to physical losses and 15% to illegal connections).

An important deficit in transparency and high levels of politicisation surround the water and sanitation services sector in Mexico. Long-standing traditions of clientelism at the municipal level prevail in the way utility company decision-level staff is appointed (Barkin, 2005; Pineda, 2008). Despite some progress in the decision making and financial transparency of utilities, resistance remains high because utilities are an important revenue source for municipalities and political interference continues to be the norm.

Legal and institutional framework for water and water and sanitation services in Mexico

In 1983, Article 115 of the Mexican Constitution established that municipalities are responsible for providing public services in "drinking water, drainage, sewerage and water treatment and its disposal".[4] This amendment officially restored what had been a long tradition in Mexico: municipalities and other forms of collective organisations, such as local drinking water boards (*juntas de agua potable*), were responsible for service provision.[5] The Constitution did not, however, outline detailed allocation of regulatory responsibilities – which involve the three levels of government – and a coherent legal framework for water and sanitation services does not yet exist.

In September 1983, after the constitutional amendment, some general basic procedures were introduced to devolve the construction and administration of water systems to the states, a first concrete step in the decentralisation process. After 1988, in a new attempt to decentralise water and sanitation services, the federal government promoted the creation of specialised institutions in their operation, with administrative autonomy and financial self-sufficiency (Pineda, 2002) to ensure water and sanitation services provision. In 1989, CONAGUA published the first guidelines for water and sanitation services (CONAGUA, 1989) based on five main principles (Pineda, 2008) that still remain of relevance today:

1. Strengthen the autonomy of utilities and their administrative capacities and provide them with legal and financial autonomy.
2. Increase citizens' participation in the administrative boards of utilities.
3. Ensure the reinvestment of fees in the service.
4. Promote decision making on tariffs by the directive board of utilities and not by the state Congress.
5. Promote the corporatisation of utilities and professionalisation of staff as a means to reduce inefficiency and improve capacities for water and sanitation services.

The implementation of these measures was uneven because the various state laws that were adopted or amended did not always formalise these suggestions and traditional practices prevailed. In many cases, the institutional framework does not differentiate between the service provision and regulatory functions for water and sanitation services. Consequently, in some state municipalities there are both service providers and regulators; in others, utilities have been created for service provision but their legal form does not guarantee their ability to operate autonomously.

The 1992 National Law on Water opened up the possibility for private sector participation in water service provision. Since then, urban and rural water services in Mexico are delivered through a wide variety of administrative structures in different parts of the country. Although the most common organisational form is the provision of water services through a municipal department, most people in urban Mexico are served by semi-autonomous (public sector) organisations that have been granted some degree of independence *vis-a-vis* the municipal or state department (Barkin and Klooster, 2006). This move has contributed to providing greater stability and financial sustainability for water service providers and has put them on a firmer footing to access commercial sources of finance.

While several states issued water and sanitation services laws (see Table 4.1), the decentralisation process initiated by the constitutional amendment has remained patchy. Proper financial, human and technical resources to ensure that municipalities could comply with their new role did not accompany the devolution of competences. The extent to which municipalities have been able to comply with this obligation has depended greatly on the allocation of responsibilities as defined by the state's capacity and laws.

Table 4.1. **Examples of Mexican states and allocation of water and sanitation services provision and regulatory functions**

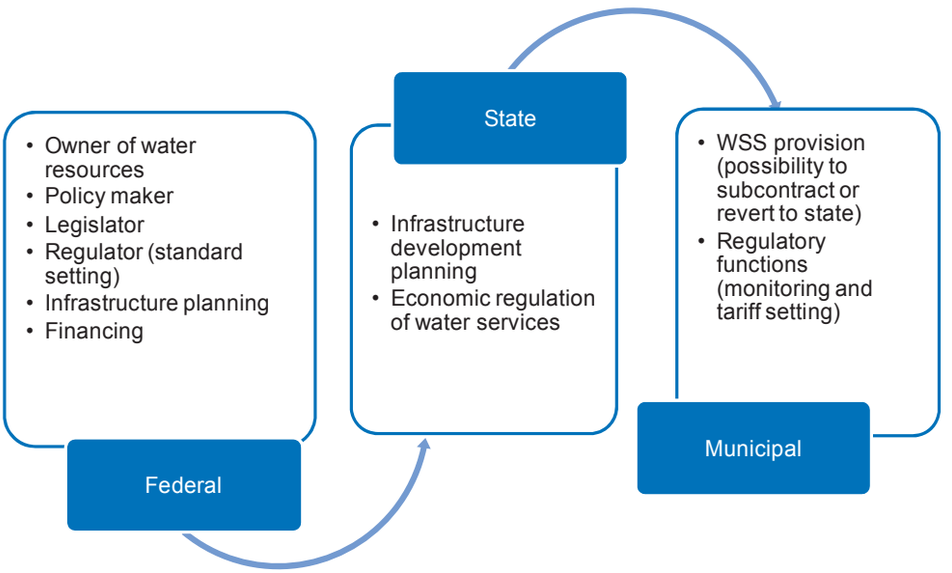
State WSS laws	Who is in charge of WSS provision?	Who is in charge of regulatory functions, such as tariff setting?
Campeche – State Law on Drinking Water and Sewage (1992)	Article 3: Service provision by municipalities or collaboration of the state through: I. Municipal utilities II. Inter-municipal utilities III. State Drinking Water and Sewage Commission, or IV. Private sector with a concession or service provision contract	Article 85: The governing board of the municipal utility or inter-municipal utility or the state Drinking Water and Sewage Commission will approve the fees and tariffs of each one of their WSS systems
Coahuila – Law on the Services of Drinking Water, Drainage and Sewage in the Municipalities of the State of Coahuila (1993, last amendment in 2006)	Article 4: WSS provision is the responsibility of: I. The decentralised organisms of the municipal public administration, which will be called Water and Sanitation Systems II. The para-municipal entities established in agreement with the Municipal Code of Coahuila, or III. Particulars that have obtained the service concession in terms of the law	Article 71: WSS will be charged to users based on fees and tariffs established by the Municipal Water and Sanitation System
Guerrero – Law on the State System of Drinking Water, Sewage and Sanitation of the State of Guerrero (1994)	Article 2: WSS is the responsibility of municipalities through the organisation and operations of WSS operators, and with collaboration of the state. Service provision will be done by: – WSS Commission of the state of Guerrero – Municipal providers	Article 43: The State WSS Commission and utilities will formulate the WSS tariffs Article 45: The administration boards of the State WSS Commission and utilities will approve tariffs of the respective WSS system
Hidalgo – State Law on Water and Sewage (1999)	Article 3, XVIII: Service provider: Whoever provides WSS, namely municipalities, municipal utilities, inter-municipal utilities, concessionaries or the State Water and Sewage Commission	Article 134: Service provider will present the fees and tariffs, based on the formula previously established and considering what the state law mentions to the Governing Board, and they will be approved by the state Congress
Jalisco – Law on Water for the State of Jalisco and its Municipalities(2000)	Article 37*:* The provision of WSS is the responsibility of decentralised municipal or inter-municipal operators	Article 40: Municipal or inter-municipal operators are in charge of setting tariffs and applying quotes
Michoacán – Law on Drinking Water, Sanitation and Wastewater Treatment (last update in 2002)	Article 3: WSS can be provided through: *i)* municipal operators and local assemblies; *ii*) inter-municipal operators; *iii)* state bodies through contracts or agreements with municipal governments; *iv)* individuals through concessions or contracts	Article 74: Tariffs and quotes are approved by municipal government based on proposals made by the service operators Article 82: Municipal and inter-municipal operators, and in some cases the committee, are in charge of overseeing the provision of WSS

Table 4.1. **Examples of Mexican states and allocation of water and sanitation services provision and regulatory functions** (*cont.*)

State WSS laws	Who is in charge of WSS provision?	Who is in charge of regulatory functions, such as tariff setting?
Morelos – State Law on Drinking Water (1995)	Article 2: WSS will be the responsibility of municipalities or the state in the following way: I. Directly, or through the appropriate institution or through: II. Municipal operating organisms III. Inter-municipal operating organisms IV. The state executive, through the institution in charge of WSS or environment or any other institution with those responsibilities V. Organised groups of users of the social sector, through concession VI. Particulars that have a concession or any type of agreement contained in this law	Article 93: The state Congress will approve the fees and tariffs proposed by the municipalities Article 94: Municipalities, once proposals have been submitted by the water utilities and previous approval by the governing body (*cabildo*), will present the fees and tariffs to the state Congress. Proposals should be based on technical, administrative and socio-economic analysis without detriment to the financial situation of utilities, water drinking system or municipality
Nayarit – Law on Water and Sanitation for the State of Nayarit (1995)	Article 3: WSS provision is the responsibility of municipal operators, inter-municipal operators, the state water commissions or individuals with concession or contract	Article 85: Tariffs are set by the operators' governing boards or the State Water Commission Article 95: Operators and the State Water Commission are responsible for overseeing the performance of WSS provision Article 115: Infractions are sanctioned by the operators and the State Water Commission
Nuevo Leon – Law on Water and Sanitation for the state of Nueva Leon (1997, last update in 2007)	Article 9: Municipal responsibilities in water and sanitation include the provision of WSS and the construction, operation and maintenance of water infrastructure	Article 40: Water tariffs are proposed by operators and approved by state or municipal legislations depending on the area Article 47: Operators are in charge of supervising the performance of service Article 58: Infractions stated in this law are sanctioned by the operators
Puebla – Law on Water and Sanitation (1992)	Article 5: Municipalities, in collaboration with the state if needed, through their administrative bodies in a direct way or through decentralised or deconcentrated bodies are responsible for the provision of WSS	Article 75: The state Congress will approve contributions and products resulting from service provision, including updates in fees, taxes and tariffs by the state commission and operators

As a consequence of the unfinished decentralisation process, a fragmented, decentralised institutional set-up where functions and responsibilities sometimes overlap characterise the water and sanitation services sector in Mexico. Gaps are in part filled through *ad hoc* arrangements and self-regulatory solutions, and a strong politicisation reduces efficiency and effectiveness. Figure 4.1 synthesises the allocation of water and sanitation services responsibilities. A more comprehensive institutional mapping is detailed below and in Chapter 1.

Figure 4.1. **Water and sanitation services: A three-tier allocation of responsibilities**



Federal level

While by Constitution, water and sanitation services are the responsibility of sub-national levels, the 2004 National Water Law (Article 9) gives **CONAGUA** two direct responsibilities in relation to water and sanitation services:

- To promote and support urban and rural services for drinking water, sewage, sanitation, re-circulation and re-use, in co-ordination with the states and through them with the municipalities. However, this should not interfere with the state and municipal core responsibilities, in particular in service provision.
- To promote and support the development of drinking water and sewage systems; sanitation, water treatment and water re-use systems; irrigation and drainage systems and flood protection.

CONAGUA's main objectives in relation to water and sanitation services are to: *i)* strengthen the technical development and financial sustainability of utilities through the implementation of programmes and actions aimed at increasing their efficiency and improving service delivery; *ii)* treat wastewater and encourage re-use; *iii)* increase water and sanitation services coverage in the country, rural areas and urban communities; and *iv)* improve the quality of drinking water provided to the population.[6] According to the internal rules of CONAGUA (SEMARNAT, 2006), the institution acts as a superior, technical, normative and consultative body of the federation to discharge functions in relation to works, systems and services of drinking water, sewage, sanitation, re-use of treated wastewater and actions to protect the population against flooding through a General Sub-Directorate for Drinking Water, Drainage and Sanitation.

SEMARNAT establishes, with other institutions (mainly CONAGUA) and state and municipal authorities, the Mexican official norms in relation to wastewater discharges, and supervises their enforcement in co-ordination with other institutions and state and municipal authorities. With the Ministry of Finance, it also defines criteria for allocating resources and incentives for a sustainable exploitation of natural resources.

The Ministry of Health is responsible for establishing technical norms and quality standards for water treatment for human use and consumption; establishing the health criteria that will provide direction for quality standards in relation to wastewater discharge, water treatment and use of wastewater; promoting and supporting basic sanitation; and advising on engineering criteria for sanitation works. In addition, the Ministry of Health, together with state governments, supervises and certifies the quality of water for human use and consumption. Lastly, while SEMARNAT is responsible for formulating and conducting environmental sanitation policy, in matters related to human health it does so in co-ordination with the Ministry of Health.

The **Ministry of Finance** (SHCP – *Secretaría de Hacienda y Crédito Público*) defines the budget that is allocated to the water sector and funds water and sanitation services programmes.

The **Ministry of Social Development** (SEDESOL – *Secretaría de Desarrollo Social*) provides support to rural communities in developing water supply, sewerage and sanitation infrastructure.

The **National Infrastructure Fund** (FONADIN – *Fondo Nacional de Infraestructura*) is the co-ordination vehicle for funding and developing infrastructure in various sectors, including water. The fund provides financing for planning, design, construction and transfer water and sanitation projects that demonstrate positive social impact, reasonable profitability and include compulsory private sector participation.

State and municipal level

State governments (*gobiernos estatales*) have responsibilities for planning, regulating, developing water infrastructure, and in some cases, providing water and sanitation in co-operation with or on behalf of municipalities. State governments can formulate their own development plans, similar to the national development plans, and carry out the objectives of those plans through state-level planning and development ministries. Box 4.3 synthesises selected examples of states' institutional arrangements for water and sanitation services; excerpts of the state laws are available in Annex 4.A1. The box highlights the key role that state water commissions play in co-ordinating water policy and managing water and sanitation services at the state level.

State water commissions and/or state water and sanitation services commissions (*Comisiones Estatales del Agua* or *Comisiones Estatales de Agua Potable y Saneamiento*) are autonomous entities, usually formed under the authority of the Secretariat of State for Public Works, which co-ordinate action between municipalities and the federal government to improve water management and water and sanitation service provision. They do so with federal authorities through promoting the allocation of permits or concessions, as well as defining, together with municipalities and the federal government, the financing of infrastructure in the water and sanitation services sector and the allocation of federal programme funds for water and sanitation services infrastructure.[7] Their terms of reference differ from one state to another, but all bear some responsibility and authority for human resources management. Among their responsibilities are the provision of water and sanitation services, technical assistance to municipalities, and the supervision of service providers' performance and of operating systems for water distribution (see Annex 4.A2 for a list of state water and sanitation commissions).

Box 4.3. **Examples of water and sanitation service responsibilities at state level**

The Water and Sanitation Law of the **state of Veracruz**, published in April 1992, envisages the creation of a State Water and Sanitation Commission as a decentralised body with legal entity and its own assets, in charge of preparing a State Water and Sanitation Plan; implementing the State Program of Works to develop water and sanitation infrastructure; administering and operating WSS in all municipalities where the creation of a local provider is not possible; promoting the development and administrative, economic and technical self-sufficiency of all local WSS commissions; promoting wastewater treatment in the state; supporting local water and sanitation providers in the formulation and update of tariffs; keeping the state's WSS system up-to-date; negotiating the allocation of resources for WSS, etc.

The Drinking Water and Sewage Law of the **state of Quintana Roo** published in April 1996 created the State Drinking Water and Sewage Commission as a decentralised public body with mixed state and municipal representation. It was given the following responsibilities: build, rehabilitate, operate and improve the WSS systems; provide WSS; charge fees and tariffs for WSS; conduct yearly studies to determine tariffs for WSS; oversee the functioning of utilities, etc.

The Law on Drinking Water and Sanitation of the **state of Nuevo Leon**, published in 1997 and last amended in 2007, establishes the competences of the state in WSS (through the State Water Commission or the state service operators). Among them, the state is responsible for establishing the operating bases for the co-ordination of provision of WSS, as well as the strategies, programmes and policies to optimise water use and distribution; for participating in the co-ordination with the federal and municipal authorities to plan, programme, design, build and control WSS systems; for providing WSS services in the municipalities that so request; for establishing concessions to the private sector for WSS; and for overseeing the performance of service provision.

The Law for Drinking Water and Sanitation of the **state of Oaxaca**, published in February 1993, establishes the responsibilities of the state in WSS: to co-ordinate the "State System of Drinking Water and Sewage" and to conduct an integral programming and administration of the system; to establish the policies, strategies, objectives, programmes and technical norms for the optimal use of water and its distribution and use among the various state communities; to co-ordinate with the federal level and municipalities the planning, programming, design, construction, control and evaluation of works to create WSS systems and use and treatment of wastewater; to support, when municipalities so request, in WSS provision; and to supervise that WSS provision is efficient and adequate.

The Law on Water for the **state of Jalisco**, published in 2000, establishes the State Water Commission as a decentralised body of the state's executive government with its own legal personality, assets and administrative power. The State Water Commission is by law in charge of the co-ordination and planning of water uses. Its responsibilities include: *i)* formulating, administrating and strengthening the State Water System; *ii)* proposing technical norms, criteria and guidelines for the provision of public WSS; *iii)* supervising and validating projects and works in public and private WSS; *iv)* promoting programmes for the efficient use of water; and *v)* promoting social participation in the provision of public WSS.

The Decree for the Creation of the State Water Commission in **Queretaro** states that the commission will serve as co-ordinator and contributor to federal, state and municipal authorities in all activities related to planning, studies, projects, construction and operation of systems using water and benefiting the population of Queretaro. Through this commission, the state must co-ordinate with the competent authorities on all water works and infrastructures and negotiate with federal and municipal authorities on agreements for the construction, rehabilitation, extension and improvement of drinking water systems.

Sources: Based on data from the Water Supply and Sanitation Laws of the following States:
Veracruz, Quintana Roo, Nuevo León and Oaxaca.

State congresses (*Congresos de los Estados*) are responsible for approving the tariffs charged by water and sanitation providers.

Municipalities are responsible for providing water and sanitation services and may also have regulatory responsibilities as shown in Box 4.4. They can provide the service directly (for example, through providers that are part of the municipal government or legally separate entities that are wholly owned by the municipality) or through delegation to others (for example, to private operators through concession contracts or to utilities owned and operated by the state government).

Box 4.4. **Examples of municipal responsibilities in the field of water and sanitation services**

Some state WSS laws include a clear reference to the WSS responsibilities of municipalities. Chapter II, Article 36, of the **state of Sonora's** Water Law establishes responsibilities for municipal authorities in the field of WSS:

- service provision of drinking water, drainage, sewage, water treatment and water disposal;
- establish, preferably in co-ordination with the state government, the policies, guidelines and technical specifications regarding the construction, expansion, rehabilitation, administration, operation, conservation, improvement and maintenance of drinking water, drainage, sewage, water treatment and water disposal systems;
- establish, preferably within the framework of the State Water System, the policies, guidelines, criteria and specifications for determining and updating tariffs that are based on cost recovery of investments, as well as drinking water, drainage, sewage, water treatment and water disposal services charges based on financial self-sufficiency criteria;
- systematise and evaluate performance indicators in relation to service provision of drinking water, drainage, sewage, water treatment and disposal, and formulate and submit recommendations to the State Sub-system on Water Information and Statistics.

Article 6 of the **state of Oaxaca de Juarez's** Law for Drinking Water and Sanitation was published in February 1993 and establishes responsibilities for municipalities in WSS, including:

- provide water and sanitation services in their territory through municipal operators, through organisms constituted by two or more municipalities by co-ordination and association, through a state operator, or through concessions with the private sector;
- participate in co-ordination with the federal and the state level to set-up policies, guidance and technical specification for the construction, expansion, rehabilitation, administration, operation, conservation, improvement and maintenance of WSS;
- plan and programme WSS provision in the terms of the law;
- construct the infrastructure for WSS either on their own or by a third party in compliance with the state Law on Public Works.

The 2001 Law for the Creation of the Direct Administration for Drinking Water and Sanitation Works and Services in the **city of Oaxaca de Juarez** aims to establish a deconcentrated body of the state executive power dependent on the Secretary of Urban Development, Communications and Public Works named "ADOSAPACO", as operator for the city and metropolitan area of Oaxaca. According to Article 5, ADOPASACO is in charge of:

Box 4.4. **Examples of municipal responsibilities in the field of water and sanitation services** (*cont.*)

- planning, programme, study, project, budget, construction, supervision, expansion and operation of systems for potabilisation, supply and distribution of water, and systems for sanitation, wastewater treatment and reuse, and stormwater management;
- provision of WSS for the city of Oaxaca de Juarez and its metropolitan area;
- management of the registry of users;
- setting tariffs;
- bill collection;
- management of reserve funds for the rehabilitation and maintenance of WSS networks;
- monitoring of the application of this law;
- organisation of users' participation;
- necessary contracts or concessions with public or private actors to carry out its objectives.

Its governance structure will consist of an executive director, a consultative council and delegates from various state departments.

Source: Based on data from the Water Law of the state of Sonora and the Water and Sanitation Law of the state of Oaxaca.

Water service providers (*prestadores de servicios*) are responsible for providing water services in Mexico. These para-municipal organisations are a diverse group with varying technical, commercial, financial and administrative competencies. In the Mexican administration, water utilities are "public decentralised organisms", which in theory gives them autonomy from municipal authorities, but not complete independence. In a very limited number of cases, the private sector is involved. This is the case in Aguascalientes and Cancun, where private operators are providing water and sanitation services under concession contracts. In Saltillo, water and sanitation services are the responsibility of a quasi-public (public/private) company.

The **National Association of Water and Sanitation Companies** (ANEAS – *Asociación Nacional de Empresas de Agua y Saneamiento de México*) is the national association that gathers most of the water service providers. Its main objective is to support increases in efficiency of the water service provision and the levels of professionalisation and autonomy. Despite its national character, ANEAS does not have a federal role but represents institutions at lower levels of government.

Regulatory functions in the water and sanitation services sector

Regulation is a key issue in monopolistic sectors, which is typically the case for water. In the water sector competitive pressures are limited, contracts are incomplete, the partnership is multi-stakeholder (with distinct incentives and requirements across stakeholders) and the relationships are long term and adaptable to changes. Appropriate regulation is imperative in the water sector given the need to preserve the well-being of users and environmental sustainability, from water extraction to wastewater discharge (OECD, 2009b).

Regulatory functions in water and sanitation services can be of a different nature, some purely economic, some environmental and others embracing social issues, such as equity, affordability, universal coverage. Regulatory functions do not necessarily have to be in the hands of a single institution responsible for all of them. However, they need to be clearly spelled out and allocated to avoid overlap and incoherence. Table 4.2 provides a list of regulatory functions for water and sanitation services and their (*ad hoc* and *de facto*) attribution in Mexico. This section reviews how these functions are discharged in the case of Mexico and some of the gaps.

Table 4.2. **Regulatory functions and their attribution in Mexico**

Regulatory function	Responsible authority	Legal or policy document
Tariff regulation	States and municipalities	Article 115 of the Constitution; state revenue laws (*Ley de Ingresos Estatales*); states' water laws
Quality standards for drinking water	Ministry of Health (SALUD)	NOM-127-SSA1-1994; NOM-179-SSA1-1998; NOM-230-SSA1-2002
Quality standards for wastewater treatment	SEMARNAT	NOM-001-SEMARNAT-1996; NOM-002-SEMARNAT-1996
Standards for wastewater discharges	SEMARNAT	NOM-001-SEMARNAT-1996; NOM-002-SEMARNAT-1996
Information and data gathering	Service providers, states and CONAGUA	Law on Transparency and Access to Public Information (*Ley Federal de Transparencia y Acceso a la Información Pública Gubernamental*); National Water Law
Monitoring of service delivery performance	States, CONAGUA	No legal framework. An indicator of efficiency is included in the National Water Program (*Programa Nacional Hídrico*) 2007-2012, and further developed in a technical norm (NMX-AA-148-SCFI-2008), but it is not compulsory
Incentives for efficient use of water and investment	CONAGUA, states	Through federal programmes; National Water Law; Budget Law (*Ley Federal de Presupuesto y Responsabilidad Hacendaria*). Through specific state regulation (e.g. Queretaro State Regulation for the Efficient Use of Water)
Supervision of contracts with the private sector	Regulation by contracts (municipalities are usually the contracting authorities). A dispute resolution mechanism sits with the Ministry of the Public Administration (SFP)	Law for Acquisitions and Litigations (*Ley de Adquisiciones, Arrendamientos y Servicios del Sector Público*); Public Works and Related Services Law (*Ley de Obra Pública y Servicios Relacionados con las Mismas*); PPP Law (*Ley de Asociaciones Público-Privadas*)
Social regulation: access to services	CONAGUA, municipalities	National Water Law; Article 115 of the Constitution; states' water laws
Customer engagement	Basin councils (*Consejos de Cuenca*), basin commissions (*Comisiones de Cuenca*), groundwater technical commissions (*Comités de Cuenca*, *Comités Técnicos de Aguas Subterráneas*)	National Water Law; states' water laws
Consumer dispute resolution	Service providers	Article 115 of the Constitution (implicit)

Source: Based on CONAGUA's answers to the OECD questionnaire.

Quality standards

In Mexico, quality standards are established through technical norms (*normas técnicas*), issued and inspected by various institutions. In the case of the quality of drinking water, the Ministry of Health has the main responsibility, conducting inspections at the local level to ensure compliance. The quality standards for wastewater treatment and discharges are mainly in the hands of SEMARNAT. The Mexican norms affecting the water sector address the quality of water but not the standard of service. They include:

- NOM-001-ECOL-1996 limits the maximum pollutants that can be discharged in national waters.
- NOM-002-ECOL-1996 establishes what can be discharged into urban drainage systems.
- NOM-003-ECOL-1997 establishes the limits of pollutants contained in treated wastewater for reuse.
- NOM-127-SSA1-1994 establishes a baseline for environmental health and standards for water for human use and consumption.

Implementers of technical norms are mainly the utilities, which have to comply with them. Utilities also play a role in inspection of water quality, either for drinking water or wastewater treatment, in a context where the resources of responsible ministries to deploy officials and control quality standards countrywide are limited. Some state laws explicitly urge utilities to have their own inspectors to verify their own activities. Some utilities have developed the infrastructure and skills to ensure the quality of drinking water and wastewater. The utility in the state of Nuevo Leon, *Servicios de Agua y Drenaje de Monterrey*, has established a Central Laboratory of Water Quality (*Laboratorio Central de Calidad de Aguas*) in charge of monitoring the quality of water, undertaking 300 000 analyses per year.[8] The utility in the state of Yucatan, *Junta de Agua Potable y Alcantarillado de Yucatán*, has a Laboratory of Quality Control (*Laboratorio de Control de Calidad*), where samples are tested daily to ensure the quality of drinking water for the city of Merida. In both cases, the Ministry of Health certifies the results. Many utilities, however, lack the capacity to ensure reliable information on quality standards, and some of them are also not comfortable with information disclosure.

Despite the existence of norms, enforcement of quality standards presents important gaps in Mexico. In particular regarding the number of parameters tested. In most cases, only one parameter (the residual chlorine content) is measured, and on less frequent occasions the density of faecal coliforms is tested (CONAGUA, 2011e). The number of parameters tested is only one of the 46 criteria set out in the technical norms for drinking water quality; the other criteria on local capacities and information are from utilities.

The lack of a third-party certification institution has been identified as an important gap in water and sanitation services. Independent water quality evaluations can help to ensure proper standards in wastewater treatment. In Chile, the quality of water distributed to water utilities is one of the main supervisory responsibilities of the water and sanitation services regulator, the *Superintendencia de Servicios Sanitarios* (SISS). In 2000, the SISS established an agreement with the National Institute of Normatisation, by which certification of laboratories was approved to conduct analysis of drinking water and wastewater. The SISS only accepts analyses by certified laboratories obtained by the water utilities.

Tariff regulation

In Mexico, despite efforts to provide guidance on how to set tariffs (see federal initiative to set norm NMX-AA-147-SCFI-2008), no model exists. There is a need for capacity building in this area, in particular to advise on the technicalities of setting tariffs as well as on political processes. Situations vary highly across the territory, and tariffs differ widely across cities (see Chapter 3 on economic efficiency and financial sustainability). In the state of Aguascalientes, for instance, three different mechanisms coexist in three different municipalities: in the municipality of Aguascalientes the council (utilities' board) is in charge of setting tariffs, in Cosío, the state Congress holds this responsibility, and in Jesus María, the state executive is in charge of this task.[9] Additional examples are presented in Annex 4.A3.

With the constitutional amendment to Article 115, sub-national governments (and in particular municipalities) were given the responsibility to set tariffs, even if that was never clearly stated in any subsequent regulation. Over the years, the issuing of state laws on water and state laws on water and sanitation services with tariff provisions made explicit the possible mechanisms for tariff setting (see Box 4.5).

The 2030 Water Agenda calls for tariffs to be defined according to technical criteria, disassociating them from political aspects (CONAGUA, 2011a). To support a more technical approach to tariff setting and regulation, CONAGUA has developed a tariff methodology for voluntary use by utilities and municipalities. The Mexican Norm NMX-AA-147-SCFI-2008 establishes guidance on the methodology to evaluate the tariffs for drinking water, drainage and sewerage services.[10] This technical norm was prepared in co-ordination with and through discussions with stakeholders, among them ANEAS, industry and relevant institutions. However, implementation of the norm has been rather slow because of a lack of federal power to impose a change in behaviour and limited incentives at sub-national level to adopt it.

In addition, in the Mexican legal system, services provided by the government are like "fiscal credits", which are officially named "rights" (*derechos*). In this context, according to Article 73, fraction VII of the Mexican Constitution, "rights" have to be set by the legislative power.[11] Setting "rights" for water is considered to be a prerogative of the legislative, and any attempt by the executive to modify water rights can be seen as unconstitutional, leading to possible suits in the judiciary.[12] In November 2002, the highest justice court established that drinking water services are not "products" that can be charged by the utilities, but "rights" against service provision by government institutions. Therefore, utilities are not entitled to approve tariffs; only state congresses hold this power (Pineda, 2008).[13] However, discussions in congresses are more political than technical in nature, leading to a high degree of politicisation of debates and impeding the implementation of the cost-recovery principle.

Incentives for an efficient use of resources and spending

Due to the low operating margins of water utilities, subsidies are a main vehicle for funding operating expenses and investments in water infrastructure (CONAGUA *et al.*, 2010). The federal government sells bulk water at a subsidised rate in order to support its objective of universal water service coverage. It also directly transfers federal funds to sub-national levels through various federal water programmes. Table 4.3 shows the amount of federal transfers for water and sanitation services in 2011 and some of the institutions involved in the process.

Box 4.5. Experiences with state laws on water and sanitation services and tariff setting

In the 1990s, a number of Mexican states passed laws on WSS in order to frame the provision of services and clarify the roles of various actors participating in the sector.

In the state of **Nuevo Leon**, the 1997 Law on Drinking Water and Sanitation, amended in 2007, created the State Water Commission, whose establishment is still pending. Concerning tariffs, Chapter X of the law states that:

- In urban areas where services are provided by autonomous water operators, tariffs should be approved by the state through the executive based on a proposal by the Water Board and according to the state Law on Financial Administration.
- In municipalities where there are autonomous utilities, approval would be done by the municipality, based on a proposal made by the *Junta de Gobierno* (which is the directive body of the municipality).
- In cases of municipalities where private operators provide the service, tariffs should be approved by the municipality.
- In cases of inter-municipal bodies, municipalities should establish their own agreements.

The **state of Michoacan's** Law on Drinking Water, Sewage and Sanitation of 1994 (last amended in 2002) awards municipalities the responsibility for analysing and approving tariffs for WSS services based on information provided by the utilities. Chapter III of the law provides the following: the municipality, based on a proposal made by the water utility, approves tariffs and fees of WSS rights according to real costs of the service and complying with certain requirements such as the type of service (domestic, commercial, industrial or public), progressivity of water supply in cubic metres, additional fees for connections, etc.

The 1995 **state of Nayarit** Law on Drinking Water and Sewage establishes that utilities have to prepare analytical reports to help set adequate tariffs, taking into consideration opinions made by the utility's consultative council. Utilities are also responsible for approving tariffs through their governing board (*Junta de Gobierno*), which are composed of the mayor, the *sindico*, representatives from the State Commission on Drinking Water and Sanitation, the state government, CONAGUA and the president and vice-president of the utility's consultative council.

In the **state of Quintana Roo**, the state Law on Drinking Water and Sanitation introduced in 1992 created the State Commission for Drinking Water and Sanitation whose directive board is responsible for approving tariffs and fees. The state of Quintana Roo is also the only state thus far with a specific law related to the fees and tariffs of water and sanitation services (published in 2008 and last updated in 2009).

Sources: State of Nueva León Drinking Water and Sanitation Law, State of Michoacán Drinking Water, Sanitation and Salubrity Law, State of Nayarit Drinking Water and Sanitation Law, State of Quintana Roo Drinking Water and Sanitation Law.

CONAGUA is the primary institution responsible for managing incentives through federal programmes for an efficient use of resources and spending. This is part of its role to disburse funds for water resource management, specifically for developing infrastructure. The federal resources allocated by CONAGUA through federal programmes are subject to criteria, such as objectivity, equity or transparency, clearly defining the target population, particular group or specific region that will benefit from those resources. Federal investments are implemented in two ways (CONAGUA, 2011e):

Table 4.3. **Investments reported by programmes and agencies, according to the sector of origin of the resources (2011)**

MXN millions

	Federal	State	Municipal	Credit/private/others	Total
CONAGUA investments	17 514	6 572	3 191	1 319	28 597
APAZU	*6 122*	*3 561*	*1 325*	*272*	*11 279*
Valley of Mexico[1]	*4 675*	*0*	*0*	*0*	*4 675*
PRODER	*1 691*	*0*	*1 691*	*0*	*3 381*
PROTAR	*1 592*	*410*	*154*	*157*	*2 313*
Clean Water	*58*	*51*	*0*	*0*	*109*
PROSSAPYS[2]	*2 155*	*716*	*0*	*0*	*2 871*
PROMAGUA	*1 222*	*1 834*	*22*	*891*	*3 969*
Other agencies	2 684	616	784	4 795	8 878
SEDESOL	1 946	371	666	44	*3 028*
CONAVI	0	0	0	4 751	*4 751*
CDI	737	244	118	0	*1 100*
Total	20 198	7 188	6 975	6 114	37 475

Notes: 1. Data from the 1928 Trust Fund, with contributions from the government of Mexico City (Federal District) and on behalf of the state of Mexico. 2. The state investment includes the municipal resources.

Source: Elaborated based on data from CONAGUA (2012), *Situacion del Subsector Agua Potable, Alcantarillado y Saneamiento*, 2012 edition, CONAGUA.

- those executed by state and municipal levels of government, where resources transferred are combined with federal government funds and two other layers, based on co-operation agreements and specific execution and technical annexes;
- those directly executed by CONAGUA at the central level or through the river basin organisations or local representations.

Several programmes exist in Mexico to allocate those funds, including PROMAGUA, APAZU and PROSSAPYS. They are described in detail in Annex 4A.4. These various federal programmes are administered based on rules of operation that are published in the *Official Gazette* by the Ministry of the Environment or following specific guidelines.[14] The current version is from December 2011, and revisions during a certain year are common; the last changes date from January 2012. CONAGUA has tried to refocus these rules on incentives and subsidies, to better address efficiency and quality dimensions of service provision and not only infrastructure development. For instance, funding from PROTAR is disbursed to utilities that prove that they follow the norm on the quality of wastewater treatment. The rules of operation also envisage that each state participating in the programmes establishes a body in charge of controlling and monitoring the rules of operation. This body is called the Commission of Regulation and Follow-up (CORESE – *Comisión de Regulación y Seguimiento*), composed of government officials from municipalities and state institutions as well as members of the local branches of CONAGUA.

A number of evaluations (CONEVAL and SEMARNAT, 2012a; 2012b; 2012c) show that the federal programmes have significantly contributed to improve water and sanitation services in the country, in terms of expanding water and sanitation services coverage in rural and urban localities and promoting the efficiency of water utilities.

However, criticisms point to the important delays in the use of funds related to the lack of proper planning at the utility, municipal or state level, delays in signatures of paperwork, and delays in project execution (CONAGUA and Instituto de Ingenieria, 2008). Because of this, some operators see subsidies as a factor undermining the financial sustainability of water utilities.

Beyond a necessary improvement in implementation delays, other areas require attention, such as more transparency on financial resource allocation, better data collection to refine gaps and establish better objectives, and clearer identification of target groups. In addition, the real impact of the programmes has not been measured because most evaluations only make a qualitative analysis of goals and objectives without considering the value-for-money principle that should guide the allocation of resources. Fully capitalising on the synergies with other federal programmes is also necessary to avoid duplication and overlap. Finally, while the culture of efficiency and quality of service provision has clearly been mainstreamed at the federal level, it has not yet fully trickled down to sub-national levels of government. Municipal water officials often lack incentives to undertake the required planning, investments and revenue collection for more efficient service provision.

Social obligations

Responsibility for the social obligations of ensuring accessibility, equity and warranty for service provision is left to the municipalities; there is no federal regulation dealing with these issues. There are general policy objectives, such as the objective of universal access to water and sanitation services set in the 2030 Water Agenda and the recent constitutional reform that elevates access to water to a human right, but implementation is left to municipalities. CONAGUA, through the use of federal programmes and revision of the rules of operation, provides economic incentives and support to achieve some of these policy goals. Achieving the social goals, however, is not easy in the Mexican context, characterised by an unfinished decentralisation process and low capacity at sub-national levels of government.

Participation of users and consumers

Participation of users and consumers in water and sanitation services is heterogeneous and non-systematic in Mexico owing to the limited official mechanisms to channel their demands. CONAGUA has developed a norm with the objective "to provide general guidance to interested parties to evaluate and improve the service for users" (Secretaría de Economía, 2008a). The norm includes a description of the main components of service provision to users, the main goals of service provision in relation to users' expectations, guidance on how to meet users' needs and expectations, evaluation criteria for service provision that meets users' expectations, and examples of performance indicators that could be used to evaluate users' satisfaction with service provision. The implementation and use of this norm, however, is limited, as it is left to the discretion of utilities.

PROFECO, the government institution in charge of consumers' welfare does not appear to be an efficient channel for consumers' complaints in water and sanitation services. Its website actually provides some references to complaints in other services, such as electricity, telecommunications, etc., but no information on complaints related to water and sanitation services.

In the framework of certain federal programmes, CONAGUA promotes the establishment of social audits (*contraloría social*) as a way to ensure public participation in the supervision of allocation and use of public financial resources (CONAGUA, 2011h). Beneficiaries participate in the evaluation of progress, in the allocation of resources and in the identification of priorities. These social audits have to co-operate with state institutions in charge of control or oversight of federal programmes, and some might establish technical committees to undertake their tasks.

CONAGUA encourages consumer representation in the Council of Utilities. To ensure representation, they make it a condition to receive support from certain federal programmes. The APAZU programme's "Rules of Operation", for instance, stipulate that water utilities complying with three requirements including "having an administrative board where at least 30% of the members are citizens" obtain 15 additional points (SEMARNAT, 2012).

In some cases, this trend has also been replicated at the state level. For example, the 2006 Sonora State Water Law requires that each municipal water provider establish an advisory group (*consejo consultivo*) with members from public and private organisations whose specific membership and responsibilities are detailed within the law. Since then, municipalities such as Navojoa and Obregón have established new municipal advisory councils and the state capital (Hermosillo) already has a well-functioning municipal advisory council. Other states that require municipal councils include Jalisco, Michoacán, Mexico and San Luis Potosi.[15] Nevertheless, it remains to be seen whether local participation mechanisms will move beyond formal requirements and lead to substantial changes through informed participation of users.

It is likely that the requirement for participation and related transparency and accountability aspects will become more rooted expectations over time, similar to areas like the US-Mexico border where public participation processes are more entrenched. However, effective participation will require better and more informed organisations of consumers. For the time being, Mexico lacks a strong, organised system of consumers' associations that advocate consumer needs, complaints and demands into structured demands.

Handling consumer complaints and disputes

Water service providers are responsible for handling consumer complaints and disputes. The Mexican norm NMX-AA-148-SCFI-2008 encourages utilities to provide an institutional mechanism to resolve conflicts Secretaría de Economía, 2008a). It recommends that service providers establish a consumer relations department that provides assistance to users in filing complaints.

State water and sanitation service laws envisage the possibility that citizens make use of administrative recourses about administrative acts or resolutions taken by water utilities or water and sanitation services authorities. In some states, such as Quintana Roo, affected parties can complain to the state Water and Sanitation Services Commission. The general director is responsible for solving the issues raised. In states that already have a state Law on Administrative Procedures, such as in Morelos, the law provides for the possibility to register complaints against an administrative act.

Administrative recourse in the case of unusual charges or service suspension is rather ineffective as the existing mechanisms leave ample discretion to authorities to solve the cases. Water utilities tend to avoid service suspension as the National Law on Health

(Article 121) establishes that "people that are in charge of providing drinking water services cannot withdraw service provision in occupied houses, unless specified by the law" (Honorable Congress of the Union, Chamber of Deputies, 1984). The Federal Consumer's Attorney (PROFECO) might serve as a mediator between consumers and service providers; it can also give the service provider a report (*dictamen*) that specifies the compensations to the consumer. In case an amicable solution cannot be found, the consumer can refer to the report in court.

It is possible to bring cases to court in the Mexican judicial context, but it is time-consuming and costly. The use of injunctions (*juicios de amparo*) may lead to suspension of a decision if a regulation is considered to affect and cause irreparable damage to individuals or companies. There is neither clear evidence on the role of *amparos* in water and sanitation services, nor on the extent to which citizens and companies benefit from them. However, it is an issue of concern that has an impact on the effectiveness of regulation in other economic sectors.

Collection of information

Generally, information on water and sanitation services is fragmented across different entities (which sometimes request the same information) and lacks reliability, owing both to the infancy of the information system and capacity challenges at the municipal and service provider level. As Barkin (2005) points out, "political patronage, obsolete administrative procedures, poorly trained personnel, aging and poorly designed infrastructures, and lack of resources have created a virtually impenetrable web of secrecy and lack of information that makes it impossible to undertake effective diagnoses". Service providers are required to provide information, but not uncommonly they are reluctant to do so, in some cases because of limited technical capacities, but in others for fear of being monitored.

Despite this challenging situation, many actors contribute information gathering in the water and sanitation services sector. CONAGUA takes the lead among the government institutions, constituting databases for water and sanitation services that are essential to better understand and monitor the sector. IMTA also helps to gather information on water and sanitation services, and academia supports efforts to make information more transparent, accessible and accurate. Two examples of this trend are presented in Box 4.6.

Performance monitoring of service provision

Performance monitoring is essential for those developing and implementing water policy, as it can provide baselines for gauging improvements and making comparisons across service providers. It can inform policy makers, those providing investment funds and customers regarding the cost effectiveness of different water utilities. Performance-based contracts between municipalities and water utilities can help clarify roles and responsibilities through time-bound performance targets against which the performance of the operator is measured. If designed properly, performance-based contracts can help lay the basis for the long-term sustainability of utilities, increasing their efficiency and creating conditions where investment capital can be attracted.

Box 4.6. **Building databases on water and sanitation services in Mexico: National Tariffs System and the Information System on Drinking Water and Sanitation (SIAPS)**

Two examples of current databases in Mexico show the potential of information collection and data gathering related to WSS, and the synergies that official and non-official institutions could play in using that information for better policy design and implementation.

The **National Tariffs System** (*Sistema Nacional de Tarifas*) is an on-line system, created and maintained by CONAGUA, providing information on tariffs set by utilities in some 250 cities in Mexico. It contains information since 2006, including tariff files for the main Mexican cities with general information on tariff setting, tariff levels and supporting documents such as the state or municipal laws containing the tariff setting provision.

The **Information System on Drinking Water and Sanitation** (SIAPS – *Sistema de Información de Agua Potable y Saneamiento*) is a technological platform developed by academics from the College of Mexico (COLMEX – *Colegio de Mexico*) that offers a geographical information system as a tool for decision making and improvement of water management. The objectives of the SIAPS in the short run are to cartographically present information on water that is dispersed in various governmental institutions, analyse data based on requests made by different users, develop functions to manage data and results useful for users, and make the SIAPS an interactive tool. In the medium to long term, it is expected that SIAPS will integrate environmental dimensions based on a river basin perspective. The system should allow detailed analysis of water management, particularly in relation to conflicts on water and WSS. The system could also help to prepare efficiency indicators, and it could become an information tool for users, municipalities and civil society organisations as a co-ordinated approach to water issues and identification of solutions.

Source: Elaborated based on data from *www.conagua.mx/tarifas/*, *http://siaps.colmex.mx.*

The lack of systematic information on utilities´ performance in Mexico has been identified as an important gap (Consejo Consultivo del Agua, 2011). However, the progress in this area is worth noting: in 2008, two Mexican norms providing utilities with a methodology to evaluate their performance were introduced (Secretaría de Economía, 2008a and 2008b). These (voluntary) norms intend to provide guidance on efficiency in water and sanitation services provision, including on good practices that could be adopted by water utilities. In particular, the norms discuss the following:

- common terminology and definitions;
- definition of water services in terms of users' expectations;
- main guidelines (operation and maintenance) for water utilities;
- objective proposals, evaluation criteria and performance indicators to evaluate water and sanitation services.

In 2009, CONAGUA also published two manuals related to improving physical, water and energy efficiency in water and sanitation services, as well as to build sewage systems (CONAGUA 2009b; 2009c). The purpose of these manuals is to contribute to achieve the goals of the National Water Plan (2007-2012), to support the work of water utilities and increase water and sanitation services coverage in the country. The manuals provide a series of tools and information on how utilities can increase efficiency in their operation systems.

CONAGUA has also established the Follow-up Program of Performance Indicators to Comply with the Global Efficiency Target (*Programa de Seguimiento de Indicadores de Gestión para Cumplimiento de Meta de Eficiencia Global*). The programme requests 80 utilities in cities across the country with more than 20 000 inhabitants and various degrees of efficiency to provide their performance indicators on a yearly basis. The target established in the National Water Program (2007-2012) is to improve the indicators by 8% at the end of 2012. CONAGUA has developed 11 core performance indicators that serve to certify the performance of operators in providing water services (listed in Annex 4.A5). The indicators are described in guidelines with a comprehensive explanation of how they should be calculated and the targets that utilities should aim to reach. CONAGUA has also developed an electronic format to help utilities to self-assess their performance.

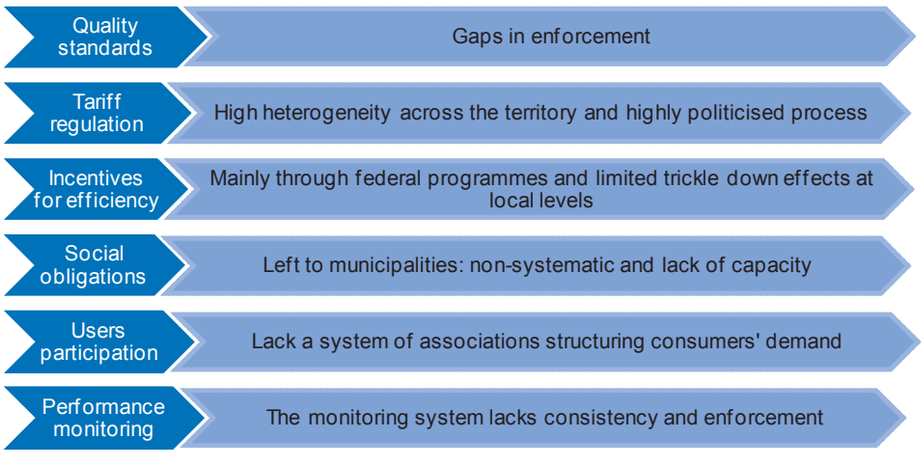
In addition, a number of diagnoses of utilities have been conducted as part of PROMAGUA. In the case of PROME and PRODDER, simplified analyses of the performance of the operating bodies are needed to access the resources. Some external institutions have also conducted studies related to utilities' performance and are developing performance indicators. The Water Consultative Council, for instance, published two studies in 2010 and 2011 comparing the performance of utilities in various Mexican cities (Consejo Consultivo del Agua, 2011).[16] The 2011 study included variables and indicators in five areas: quality (drinking water coverage and sanitation coverage), efficiency (service continuity, productivity, metering, physical and commercial efficiency), financing (ratio earnings/operating costs), environment (wastewater treatment) and institutionalisation (see Annex 4.A5 for more details).

IMTA has also developed a set of performance and management indicators to measure the impact of public policies on service delivery. IMTA's project covers 140 utilities across Mexico since 2002, mainly in terms of efficiency improvement, information accuracy and deterioration of infrastructure. IMTA has developed a definition and formulas for each of the indicators. The utilities are approached directly to participate in the project and fill out a standardised template. A list of the performance indicators monitored by IMTA is presented in Annex 4.A5. All information on the IMTA Program of Performance Indicators of Water Utilities is available online (*www.pigoo.gob.mx*).

The National Association of Water and Sanitation Companies, ANEAS, also plays a role in gathering industry input for the development of key indicators to benchmark utility performance. In 2010, ANEAS established SIGO (*Sistema de Información y Gestión para Organismos Operadores*), a platform for Information and Performance Management of Water Operators, aimed at harmonising information on performance indicators to improve planning, measure performance and monitor progress of water utilities/operators.[17]

While several institutions collect different monitoring indicators, it is unclear whether there is any consistency in data collection methodologies used. Systematising and strengthening the consistency of data collection, as well as building a consensus around the methodology for computing the key performance indicators would help strengthen the credibility of the monitoring exercise and incentivise greater engagement of service providers.

Figure 4.2. **Synthesis of regulatory functions and gaps**



Next steps for the water and sanitation services sector in Mexico: Options for reform

The diagnosis put forward in Chapter 3 highlights both generic gaps in the regulatory framework for water and sanitation services and specific gaps in relation to each regulatory function. This chapter identifies the possibilities that Mexico could explore in rethinking the organisation of water and sanitation services and provides some illustrations through relevant international experiences. It does not advocate any particular solution, but points out the benefits and challenges that alternative avenues for consolidating the regulatory framework for water and sanitation services may generate. It focuses on the two pillars that positively influence the regulatory framework: *i)* the legislative, institutional and other conditions for a high-quality regulatory water and sanitation services framework; and *ii)* the measures and actions needed to support autonomous, efficient and financially sustainable water providers.

Ensuring a high-quality regulatory framework for water and sanitation services in Mexico

International experience shows that economic regulation of water and sanitation services can have various solutions and be embodied in a wide variety of institutional arrangements and legal instruments depending on the particular characteristics of the country under consideration. But while Mexico defines the most adequate solution for the water and sanitation services, it is worth noting the importance of an overarching federal legislative framework for water and sanitation services that specifies clearly the allocation of responsibilities across levels of government.

Getting the overarching framework right

In the last few years there has been growing discussion about the need to set up a legal and institutional framework for water and sanitation services that clearly defines the allocation of responsibilities across the institutions involved and ensures that regulatory functions are properly and efficiently discharged and aligned with policy objectives. Several attempts have been made to discuss this issue.[18] The recent constitutional amendment to Article 4 that integrates the right to water provides an opportunity to revise the legal framework for water and sanitation services and has therefore revived this

debate. A draft law that would cover issues related to water and sanitation services is under discussion. This law could provide several opportunities:

- clarify the allocation of responsibilities, including regulatory, on water and sanitation services across levels of government (who does what at what level, with which instruments);
- provide an overarching framework that supports overall consistency of regulation across the territory, fills the existing gaps and promotes exchange of practices;
- foster good regulatory policy principles in the water sector.

Clarify the allocation of responsibilities

Mexico shares the characteristics of other federal countries where responsibilities for water and sanitation services are decentralised to sub-national levels of government. While there is not one federal legislative model for water and sanitation services, important lessons can be learnt from the international experience in managing a multi-level regulatory framework for water and sanitation services. Historically, Australians have had access to reliable, affordable, high-quality water supplies. Opportunities for further national reform have been identified through a number of recent review processes; however, opinions on the extent of the gains to be made vary. Further structural reform may deliver efficiency gains, including through economics of scope in less populated areas. Reviews of the water reform agenda have shown the variation in delivering reform across jurisdictions, such as different approaches to pricing reforms, accountability arrangements and industry incentives. Based on these reviews, the Australia National Water Commission and the Productivity Commission advocated that jurisdictions adopt a much clearer definition of the roles and responsibilities of institutions in the urban water sector, and, in particular, a clear delineation between decisions best taken by elected representatives (those regarding "public interest" considerations), utilities (commercial and operating decisions), regulatory agencies and consumers. Box 4.7 provides the example of the allocation of regulatory and other responsibilities for water and sanitation services in Australia, including those of the Council of Australian Governments (COAG), the main co-ordinating body across levels of government.

In Mexico, there are examples of recent laws that allocate clearly the responsibilities across levels of government and that could provide models for the law dealing with water and sanitation services. They include the recent environmental laws, in particular the General Law of Ecological Balance and Environmental Protection (*Ley General del Equilibrio Ecológico y la Protección al Ambiente*); the General Law on Wildlife (*Ley General de Vida Silvestre*); the General Law for Sustainable Forest Development (*Ley General de Desarrollo Forestal Sustentable*), the Law on Fisheries and Aquaculture (*Ley General de Pesca y Acuacultura*). As an example, Chapter II of the General Environmental Law provides for the allocation of responsibilities between the federal level, the states and the municipalities and the co-ordination mechanisms (*Distribución de Competencias y Coordinación*).[19] Within this chapter, Article 5 deals with the federal responsibilities, Article 7 with the states' responsibilities and Article 8 with the municipal responsibilities.

Box 4.7. **Australia's governance and regulatory framework for water and sanitation services**

In Australia, many institutions govern and oversee water services:

- Australian government institutions, which seek to influence policy development and reform;
- state and territory governments, which have constitutional responsibility for water resources, oversee the water industry in their respective jurisdictions and are responsible for policy, planning and sometimes regulatory functions;
- regulators;
- municipal governments;
- utilities.

The Australian government plays a role in overseeing and encouraging reform, including for the urban water sector. Constitutional responsibility for water management lies with the states. The first Commonwealth Water Act was enacted in 2007. The Water Act addresses the integrated and sustainable management of the multi-jurisdictional Murray-Darling basin, the roles of the Commonwealth Water Holder and the Australian Competition and Consumer commission, and water information and accounting (through a role for the Bureau of Meteorology). The Commonwealth takes the lead on national water policy initiatives, such as the *Water Efficiency Labelling and Standards Scheme*. The federal government also plays a role in promoting better practices through the development of national guidelines. For instance, the Australian Government oversees the National Water Quality Management Strategy, which has led to the development of the Australian Drinking Water Guidelines and the Australian Guidelines on Water Recycling.

The National Water Initiative pricing principles were developed in 2010 jointly by the Australian Government and state and territory governments to provide a set of guidelines or road map for rural and urban pricing practices and to assist jurisdictions to implement the NWI water pricing commitments in a consistent way. The federal government responded to the recent drought in Australia with a programme that provided assistance to state, territory and municipal governments to establish infrastructure and research projects to improve urban water security. The National Water Commission, states/territories and the Water Services Association of Australia jointly publish national performance reports to annually benchmark water pricing and service quality, and to do so independently and publicly.

The Council of Australian Governments (COAG) is the main Australian forum for the development, implementation and co-ordination of policy across levels of government. It has been involved in water reform over the past couple of decades through a number of agreements, including the 1994 COAG Water Reform Framework, 1995 National Competition Policy, the 2004 National Water Initiative and the 2008 Enhanced Urban Water Reform Framework. The Intergovernmental Agreement on a National Water Initiative was signed at the 25 June 2004 COAG meeting and represents a shared commitment by governments to increase the efficiency of Australia's water use. The overall objective of the National Water Initiative is to achieve a nationally compatible market, regulatory and planning-based system of managing surface and groundwater resources for rural and urban use that optimises economic, social and environmental outcomes.

Box4.7. **Australia's governance and regulatory framework for water and sanitation services** (*cont.*)

In each jurisdiction, state and territory government departments are responsible for the policy, planning, management, and regulation of the water sector. Usually more than one state or territory department is involved in the urban water sector in each jurisdiction, such as: health departments, which usually play a role in drinking water and recycled water regulation; environmental protection authorities, which are involved in environmental regulation related to wastewater discharge; treasury departments, which are involved in budgets, community service obligations, borrowing controls and dividend policy; and in some cases, ministers are responsible for setting water prices and other key decisions. Within that framework, the urban water sector's regulatory arrangements vary by jurisdiction, with independent economic regulators determining prices in some jurisdictions, while state and municipal government take on that role in others. Corporatised utilities rarely determine the prices of their services. The independent economic regulators set prices through a transparent process, involving community consultation and draft and final price determinations, with the aim of balanced service standards with cost recovery and a return on capital. While allowing the opportunity for review, price paths are generally set for a period of 3 to 4 years.

Where there are small populations or widely dispersed communities, *urban water and wastewater services provision* has been the responsibility of vertically integrated government-owned monopolies. This remains the case in South Australia, Western Australia, the Northern Territory and the ACT. Significant structural and ownership reform has taken place in recent years in some jurisdictions, which has changed the urban water supply structure. Since the 1990s, most metropolitan utilities have been corporatised, as have utilities in regional urban areas of Victoria and Tasmania. In the metropolitan areas of Sydney and Melbourne, structural reform has led to vertical separation of the bulk supply and retail–distribution functions of the supply chain. The private sector is becoming increasingly involved in urban water supply and wastewater treatment.

Sources: Australian Government National Water Commission Environment, Water, Population and Communities (2012), "Review of Pricing Reform in the National Water Sector", Australian Government National Water Commission, *http://archive.nwc.gov.au/library/topic/pricing/review-of-pricing-reform-in-the-australian-water-sector*, accessed on 21 November 2012; Australian Government National Water Commission Environment (2011), "Urban water in Australia: future directions", *http://archive.nwc.gov.au/library/topic/urban/future-directions,* accessed on 21 November 2012; Australian Government Productivity Commission website, *www.pc.gov.au/*, accessed on 21 November 2012

Support consistency, fill the existing gaps and promote exchange of practices

The diagnosis in Chapter 1 highlighted the existing gaps in Mexico's regulatory framework. Regulation of water and sanitation services addresses tariff setting, as well as other regulatory functions identified in this report that appear relatively neglected in Mexico's regulatory framework and need reform. A federal law on water supply and sanitation could establish an overarching framework to help fill existing gaps and to support the consistency of regulation across the territory. In particular, it could set the standards for access to and quality of water and sanitation services as well as acknowledge the role of different stakeholders in service provision. The 1997 Water Services Act in South Africa illustrates the range and scope of regulatory issues that a federal water and sanitation service law can include (see Box 4.8).

National laws have proven to be useful in other countries to frame the collection of information on water services performance. In France, for instance, the Water Law of

2006 requested the establishment of an Observatory (*Observatoire des services publics d'eau et d'assainissement*) to support the country's municipalities to *i)* monitor water services; *ii)* provide transparent information to consumers and citizens on tariffs and quality of services; *iii)* and develop a database of service provision performance indicators. In Australia, the Water Act of 2007 expanded the Bureau of Meteorology's water information functions that were allocated under the Meteorology Act 1955.

Box 4.8. **The scope of the 1997 Water Services Act in South Africa**

- Provide for the rights of access to basic water supply and basic sanitation.
- Provide for the setting of national standards and of norms and standards for tariffs.
- Provide for water services development plans.
- Provide a regulatory framework for water services institutions and water services intermediaries.
- Provide for the establishment and disestablishment of water boards and water services committees and their powers and duties.
- Provide for the monitoring of water services and intervention by the line minister or by the relevant province.
- Provide for financial assistance to water services institutions.
- Provide for certain general powers of the minister.
- Provide for the gathering of information in a national information system and the distribution of that information.

Source: Republic of South Africa (1997), "Water Services Act, *Government Gazette*", 19 December, *www.dwaf.gov.za/Documents/Legislature/a108-97.pdf*.

Foster good regulatory policy principles

The preparation of any specific legal framework should follow good quality principles for preparing laws and regulations. Box 4.9 introduces the "OECD Reference Checklist for Regulatory Decision Making", a set of principles for preparing laws and regulations, which can assist decisions makers in Mexico with regulation reforms in the water and sanitation sector.

According to OECD (2011b), better regulation efforts could be further incentivised at the sub-national level. Indeed, important efforts to improve the quality, efficiency and transparency of federal regulations have been made at the federal level, including a general review of the regulations inside government that resulted in the elimination of 67% of all the rules, and the publication of nine handbooks on general application in the areas of procurement, public works, human resources, financial resources, material resources, information and communication technologies, transparency, auditing, and control. Similar reviews of regulations inside government and better regulation efforts should be carried out at the sub-national level. According to OECD (2011b), the federal government could provide sub-national decision makers with incentives to adopt these policies, including financial support, performance lists to motivate competition, awards, etc. OECD (forthcoming) further notes that institutions such as the National Governors' Conference (CONAGO – *Comisión Nacional del Agua*) and the Federal Council for

Regulatory Improvement (COFEMER) provide venues for multi-level co-operation, but have not been used to foster strong enough political commitment from all levels of government (local, sub-national, national) to pursue regulatory improvement.

Box 4.9. **Good quality principles for preparing laws and regulations**

1. *Is the problem correctly defined?* The problem to be solved should be precisely stated, giving evidence of its nature and magnitude, and explaining why it has arisen (identifying the incentives of affected entities).
2. *Is government action justified?* Government intervention should be based on explicit evidence that government action is justified, given the nature of the problem, the likely benefits and costs of action (based on a realistic assessment of government effectiveness), and alternative mechanisms for addressing the problem.
3. *Is regulation the best form of government action?* Regulators should carry out, early in the regulatory process, an informed comparison of a variety of regulatory and non-regulatory policy instruments, considering relevant issues such as costs, benefits, distributional effects and administrative requirements.
4. *Is there a legal basis for regulation?* Regulatory processes should be structured so that all regulatory decisions rigorously respect the "rule of law"; that is, responsibility should be explicit for ensuring that all regulations are authorised by higher level laws and consistent with treaty obligations, and comply with relevant legal principles such as certainty, proportionality and applicable procedural requirements.
5. *What is the appropriate level (or levels) of government for this action?* Regulators should choose the most appropriate level of government to take action, or if multiple levels are involved, should design effective systems of co-ordination between levels of government.
6. *Do the benefits of regulation justify the costs?* Regulators should estimate the total expected costs and benefits of each regulatory proposal and feasible alternative, and should make the estimates available in accessible format to decision makers. The costs of government action should be justified by its benefits before action is taken.
7. *Is the distribution of effects across society transparent?* To the extent that distributive and equity values are affected by government intervention, regulators should make transparent the distribution of regulatory costs and benefits across social groups.
8. *Is the regulation clear, consistent, comprehensible and accessible to users?* Regulators should assess whether rules will be understood by likely users, and to that end should take steps to ensure that the text and structure of rules are as clear as possible.
9. *Have all interested parties had the opportunity to present their views?* Regulations should be developed in an open and transparent fashion, with appropriate procedures for effective and timely input from interested parties such as affected businesses and trade unions, other interest groups or other levels of government.
10. *How will compliance be achieved?* Regulators should assess the incentives and institutions through which regulation will take effect, and should design responsive implementation strategies that make the best use of them.

Source: OECD (1995), "OECD Reference Checklist for Regulatory Decision Making", OECD, Paris.

The benefits and pitfalls of establishing an independent regulator for water and sanitation services

In the context of fragmented regulatory responsibilities for water and sanitation services, a single regulatory institution for water and sanitation services was identified in the 2009 draft law proposal for water and sanitation services prepared by ANEAS as a mechanism that could bridge the regulatory vacuum and the various co-ordination gaps identified between federal and sub-national levels.[20] The current draft law proposal (prepared by academia and CONAGUA), under circulation to various stakeholders, takes up this discussion again, and in addition to sketching a framework for water and sanitation services in Mexico, encourages the setting up of a federal independent regulatory agency for water and sanitation services and the establishment of 32 regulators at the state level (31 in states and 1 in the Federal District).

The establishment of independent regulators represents a key feature of recent global trends in regulatory governance of public services. The take off in regulatory agencies in the telecom, energy and transportation sectors has been important, and in some cases it has set a precedent for the mandatory establishment of sector-specific regulatory agencies – the EU is an example of a case where setting up an independent regulatory agency in the energy sector has become a requirement. In the water sector, the take up in agencies responsible for economic regulation has been slower but consistent. Experience establishing agencies in the water sector has varied widely, in terms of governance structure, mandate, water regulator performance and agency interplay with other levels of government (national and sub-national levels). Box 4.10 provides some evidence on the establishment of regulators in various countries.

According to OECD (forthcoming), agencies entrusted with significant regulatory powers need a certain level of independence in order to ensure that decisions affecting key infrastructure and economic sectors are shielded from short-term political considerations and from specific private interests. Consequently, OECD (forthcoming) shows that "independent regulatory authorities need proper institutional design as well as a strong governance framework to generate the benefits of a high-quality regulatory framework." OECD (forthcoming) also shows that setting up independent regulators is not without risk. They may become captured by the regulated industry, specific political interest or their own bureaucratic interest and lose their credibility. The failure of regulators may have dramatic and lasting consequences. Consequently, should this option be chosen, the establishment of a regulatory agency in charge of water and sanitation services in Mexico would need to respond to the good principles on the establishment of regulatory agencies that have emerged from similar experiences at the international level (see Box 4.10 and 4.11).

The issue of independence and accountability deserves special attention in the Mexican context. Analysing the cases of three regulators (CRE, CNBV, SENASICA) and relying on OECD (2012b) for an analysis of COFETEL (Federal Commission for Telecommunications), OECD (forthcoming) shows that in Mexico, according to the 1976 law (*Ley Organica de la Administracion Publica Federal*), regulatory agencies are administrative deconcentrated bodies. Consequently, "they are subordinated to a ministry in terms of their property, accountability and budget, which implies that there are no safeguards protecting their decision-making process from political interference." For instance, COFETEL was created as a separate entity to the Ministry of Communications and Transport, with certain autonomy and responsibility for regulating and developing the telecommunications industry. However, per the Federal Public Administration Law it remains hierarchically subordinated to the Ministry (OECD, 2012b).

Box 4.10. **Establishing regulators for water and sanitation services**

In **Brazil**, water and sanitation services (WSS) responsibilities are allocated by the Constitution to state and municipal levels and comprise the following issues: drinking water, sanitation, drainage systems and wastewater treatment. There are six different institutional models for WSS provision: state WSS utilities; state decentralised WSS bodies; inter-municipal WSS providers; municipal departments or decentralised bodies in charge of WSS; municipal utilities and private operators. There is no national regulator for WSS, but several state multi-sectoral regulatory agencies are in charge of regulatory functions related to WSS.

In **Chile**, the Agency for Sanitary Services (SISS – *Superintendencia de Servicios Sanitarios*) is the regulatory body in charge of WSS. It was established in 1990 as the main regulatory and enforcement body of WSS policies, which are in the hands of the Ministry of Economy. This body is responsible for setting tariffs, contracting concessions, auditing utilities and participating in the environmental evaluation system. It does not have political or financial autonomy, but the detailed regulatory framework for setting tariffs, for instance, does not allow much political discretion in decisions.

In **Colombia**, the Regulatory Commission for Water and Basic Sanitation Services (CRA – *Comisión de Regulación de Agua Potable y Saneamiento Básico*) establishes the tariff-setting methodology. Providers set their own tariffs in accordance with this methodology (or apply to the CRA to set tariffs in a different way), and the Ministry of Economic Development sets service standards. The Public Services Superintendent (SSP) monitors the providers to verify that they follow the tariff-setting rules and comply with the service standards. Where private providers operate under concession contracts with a municipality, the general practice is for the contract to set service standards and tariffs, which are to be monitored and enforced by the municipality.

In Portugal, a national independent authority, ERSAR, has been created with the aim of performing economic and quality regulation of the service. It is also competent for solid waste management, which is organised in a similar way. ERSAR operates at the national level but only has responsibilities over the concessionaire market, i.e. it regulates concession contracts between multi-municipal systems and the state (about 18 contracts) and between municipalities and private operators (about 20 contracts). The exception is the control of drinking water quality; it was assigned full responsibility over all water services (and not only concessionaires). The national government appoints three board members who govern ERSAR, which has administrative and financial autonomy (it is financed by operators' taxes). Its powers are giving advice, issuing recommendations, preparing regulations, reporting on the performances of the systems and supervising the economic balance of the whole sector. The only binding decision power of ERSAR refers to drinking water quality. Concerning the pricing policy, IRAR issues non-binding opinions on tariffs in the concession of multi-municipal and municipal systems. In terms of entry into the market, ERSAR issues recommendations about the awarding process of multi-municipal or municipal concessions, and as regards investment policy, it can issue an opinion about concessionaires' investment plans. In terms of the service quality regulation, ERSAR proposes regulatory standards and gathers information on quality levels of the services, which is used to compare the different concessionaires. This information is published regularly and is intended to create competitive pressures through benchmarking.

In Italy, the national government chose to strengthen the regulatory framework in 2011, by delegating economic regulation to an independent authority already operating in the field of gas and electricity at the national level. This is intended to reduce political interference in the price setting and to provide more reliable guarantees to financial markets about the bankability of WSS management plans and the corporate solidity of water companies. The national authority will regulate water prices and minimum customer quality standards while local regulators will retain the definition and implementation of plans concerning network extension, asset management and investments. It is still too early to evaluate whether this reallocation of competences will be enough to overcome the difficulties experienced in the previous setting (see Box 4.22). The most important challenges will regard the need to ensure an adequate mix of standardised rules and customised arrangements that cope with local specificities and to manage the interplay between central and local regulators.

Sources: Ehrhardt *et al.* (2007), "Economic Regulation of Urban Water and Sanitation Services: Some Practical Lessons", *Water Sector Board Discussion Paper Series*, No. 9, World Bank, Washington, D.C., June; Gobierno de Chile (2012), Superientendencia de Servicios Sanitarios (SiSS) website, *www.siss.gob.cl*, accessed in November 2012 ; *www.cra.gov.co*.

Box 4.11. **OECD Recommendation on Regulatory Policy and Governance**

The OECD Recommendation of the Council on Regulatory Policy and Governance acknowledges that countries should "develop a consistent policy covering the role and functions of regulatory agencies in order to provide greater confidence that regulatory decisions are made on an objective, impartial and consistent basis, without conflict of interest, bias or improper influence".

In order to comply with this recommendation, the OECD enumerates a series of preconditions to be taken into account.

Legislation that grants regulatory authority to a specific body should explicitly specify the objectives for doing so. In particular, the legislation should spell out the policy objective it aims to achieve rather than the process by which the objectives will be achieved. The appropriate degree of prescription or detail in legislation is a matter for judgement. Principle-based legislation is likely to be the most appropriate way of meeting policy objectives in complex or rapidly changing policy environments. However, this is contingent on the regulatory authority having the necessary sectoral expertise and capacity to implement its legislative responsibilities. In addition, it should be acknowledged that it imposes communication challenges that must be managed by the regulatory agency.

It is important to consider how governance arrangements of a regulatory agency will influence public trust. Creating a regulatory agency independent from the government and from those it regulates can provide greater confidence that decisions are fair and impartial. This may be warranted when the decisions of the regulatory agency have significant financial and market consequences and are required to be arm's length from the political process to reduce the regulatory risk of investments. Accordingly, when a separate regulatory function is established, consideration should be given as to whether the regulatory agency is set up outside ministerial structures (while still being accountable to the government) or is set up as an administrative unit within a ministry. Arrangements should also focus on avoiding a situation of regulatory capture of the agency.

A regulatory agency exists to achieve objectives deemed by the government to be in the public interest. It operates within/in accordance of the powers conferred by the legislature. Therefore, a system of accountability needs to take account of the performance of regulatory duties. Regulatory agencies should report regularly – either to the legislature or the responsible ministry in their policy area – on the fulfilment of their objectives and the discharge of their functions, including through meaningful performance indicators. Key operational policies and other guidance material covering matters such as compliance, enforcement and decision review should be publicly available. Regulatory agencies should establish processes for internal review of significant decisions and publish arm's-length review results. Likewise, regulatory agencies should be subject to independent review of regulatory decisions especially those that have significant economic impacts on regulated parties.

Effective co-ordination of regulatory activities can also bring significant administrative benefits. The activities of one regulatory agency can overlap and impact another; either because the harms they regulate are of a similar nature (for example related to consumer protection), or because they interact with the same businesses. Regulators should be encouraged to see themselves as part of an integrated system of regulation and to work together and learn from each other. The first step is to improve awareness of the complexity in the regulatory system by developing a complete list of regulatory agencies, including their functions and responsibilities.

Source: OECD (2012), "Recommendation of the Council on Regulatory Policy and Governance", OECD, Paris.

Under the current legal framework, the Mexican regulatory bodies face significant difficulties in exerting some of their powers (OECD, 2004). This was identified by COFEMER in a number of recent reports.[21] Keeping politics away from regulatory decisions remains a difficult endeavour, in particular because ministerial oversight has traditionally overshadowed the role of regulators (OECD, forthcoming). Ministers are responsible to the President and the Congress for regulators' decisions, and they have the power to instruct the regulatory authority and veto its decisions. Clear attribution of roles across regulatory authorities and ministries is also lacking, in some cases leading to the

exercise of shared powers (the so-called "double-window" issue) and to confusion by the regulated on who does what, and who is the contact point for what (OECD, 2012b).

A regulatory body for water and sanitation services should avoid pitfalls experienced by regulators in other fields. In a highly fragmented, local and politicised sector such as water and sanitation services, a certain degree of independence (or distance from political appointees) would help to overcome political interferences in key decisions such as tariff regulation. However, it is not clear to what extent a deconcentrated body would manage to achieve the necessary level of independence. Box 4.12 provides some early recommendations from the forthcoming *OECD Regulatory Policy Review of Mexico* on the strengthening of regulatory governance. Some of the report's recommendations address the general framework as initially set in the law that supports the creation of the deconcentrated bodies in Mexico (*Ley Organica de la Administracion Publica Federal*). Other recommendations touch upon the concrete levers in the hands of policy makers to promote independence, i.e. through appointment, staffing and financing. Because independence needs to be balanced by accountability, the recommendations also touch upon the accountability mechanisms that would need strengthening to ensure that regulators work in the public interest.

Box 4.12. **The governance of regulators in Mexico: Recommendations from OECD**

1. The institutional regulatory framework should be modernised through a review of powers, attributions and governance arrangements of regulatory authorities to clarify and streamline the division of powers between regulators and with parent ministries.
2. The governance of regulators should be amended to strengthen their independence from political interferences and vested interests. This may involve:
   - Setting clear procedures for the appointment of the head and management board of the agency, for their dismissal or the renewal of their mandates.
   - Staffing should be based on competences to ensure adequate capacity of the agency and should avoid conflicts of interest with regulated.
   - Putting in place procedures that enable regulatory agencies to be financed through their own, stable resources (such as levies and service fees paid by the regulated).
3. Greater independence of the regulators should be balanced by strengthened accountability mechanisms, including an improved system of appeals, performance assessment, regular reporting to Congress, transparency in decision making and regular consultation on regulatory proposals.

Source: OECD (forthcoming), *OECD Regulatory Review of Mexico*, OECD Publishing, Paris.

Another important dimension to consider is the extent to which the new institutional set up would help to clarify and streamline regulatory responsibilities for water and sanitation services in Mexico. This report shows the complexity and gaps in the regulatory framework in this area. In this context, it is not clear under which conditions a model with a federal regulator and 32 regulators at the state level would bring more clarity. The risk is that the multiplication of regulators – whose establishment would have to be governed by specific laws and legislative frameworks at the state level – and the layering of federal and sub-national authorities would amplify the fragmentation of responsibilities and the dispersion of performance and experiences across states. Implementing a model that concentrates a number of regulatory functions in a single

institution at the federal level is not without difficulty, and would require a reshuffling in practices and responsibilities of other institutions. It would also require an institutional design for the regulator that respects the allocation of competences between federal and sub-national levels as conferred by the Constitution.

Box 4.13 presents the US and Australian model where economic regulators are set up at the state level. Australia provides an example where economic regulators for water and sanitation services are set at the state level (there are six states: New South Wales, Victoria, Queensland, Western Australia, South Australia and Tasmania; and two territories: the Australian Capital Territory [ACT] and the Northern Territory), but with different institutional settings and levels of independence. While the system overall tends towards the model of independent regulator, there is a continuum on the ground between the full fledge model of independent regulation in New South Wales, Victoria and the ACT and situations where regulation is still discharged by state departments and different authorities – such as the competition authority – that are in charge of specific and limited regulatory functions. Similarly, in the US, regulators operate at the state level, but voluntarily belong to an association at the national level that produces guidance and other soft law tools.

Building on the experience of states to strengthen the capacity at sub-national levels

Today, there is an important heterogeneity among states and municipalities in the way that they regulate and provide water services. To remedy some of the capacity and incentive challenges at the local level, the 2030 Water Agenda proposes "that state congresses guarantee the financial adequacy of water utilities by defining the composition they consider most appropriate between tariffs and subsidies" and assigning "the attribution of water and sanitation services […] to state governments in all those municipalities that are not in a position to do so, that do not have the necessary capacities or cannot develop them in the medium term" (Initiative 10). The agenda also seeks to strengthen "the capacities and attributions of the CONAGUA and its state water commissions in order to promote, supervise and regulate drinking water and sanitation services" (Initiative 13).

There are examples of good practices at the state level that illustrate how state water commissions or other state bodies can play an important supporting role. They show how the commissions support utilities, channel service provision concerns of users and consumers, harmonise information gathering at the municipal level, conduct technical studies for those municipalities that do not have capacities to do so, and take the lead in capacity-building activities. These good practices could be collected and reviewed systematically to constitute a basis upon which other states could build. Box 4.14 presents examples of the comprehensive legal framework for water and sanitation services established in the state of Jalisco, the regulation on the efficient use of water in the state of Queretaro and the recent establishment of a Regulatory Commission for Water in the state of Mexico.

Box 4.13. International experience of regulators for water and sanitation services in federal states

Water service regulation in the US: A flexible interplay between federal, state and local government

In the US, regulation of water services results from the interplay of many territorial levels. Environmental and health regulations are defined and enforced by the federal government through legislation and the Environmental Protection Agency (EPA), which is responsible for setting emission standards and authorising water discharges and pollution control, while water uses are licensed by river basin commissions. This level of regulation is complemented by state and local institutions.

Water utilities are organised at the municipal level, mostly under public management, but sometimes also through various forms of private sector involvement, either in the form of delegation or full divesture and private ownership. Economic regulation is provided by public utility commissions established at the state level, which, beyond water supply and sanitation, are also competent for the economic regulation of other utilities such as gas distribution and electricity. Their jurisdiction concerns in the first place are privately-run utilities; municipal utilities are self-regulated in principle, but can rely on state regulators on a voluntary base. It is estimated that nearly 7 700 utilities are now directly regulated by the Public Utility Commission (PUC) (3 300 private, 4 100 public) for matters concerning water prices; they represent approximately 20% of the industry. Nevertheless, many other self-regulated, publicly owned utilities adopt regulatory schemes, accounting rules and other regulatory tools that are provided by the PUCs, even if they are not subject to their jurisdiction.

The PUCs operate at the state level; nevertheless, they are voluntarily associated in a nation-wide institution, the NARUC, which performs a number of tasks ranging from the definition of harmonised regulatory tools and templates, accounting rules, benchmarking, etc. Although it is not mandatory for the PUCs to follow NARUC's guidelines they are very influential. The American Water Works Association, a body representing professionals, also plays an important role in the definition of technical standards. Another fundamental institution operating at the state level are the state revolving funds, providing soft loans to water utilities on a mutual base.

The set up or economic regulators in Australian states: The transition to an independent regulation at various stages

Economic regulators are independent in metropolitan New South Wales, Victoria and the Australian Capital Territory (ACT). The states are moving in the direction of South Australia, Western Australia and Tasmania, but are at different stages as illustrated below:

- In the state of Victoria, the Essential Services Commission (*www.esc.vic.gov.au/Water*) is the economic regulator of the Victorian water sector. The sector is comprised of 19 water businesses providing bulk and retail water and wastewater services to all of Victoria's urban and rural irrigation customers. The role of the commission encompasses regulation of prices as well as monitoring of service standards and market conduct.

Box 4.13. **The international experience of regulators for water and sanitation services in federal states** (*cont.*)

- New South Wales: IPART (Independent Pricing and Regulatory Tribunal) (*www.ipart.nsw.gov.au*) is an independent multi-sector regulator that determines the maximum prices that can be charged for certain retail energy, water and transport services in New South Wales. To ensure the quality and reliability of these services, IPART monitors service delivery, audits suppliers and oversees license compliance by certain water utilities.
- In the ACT, the Independent Competition and Regulatory Commission (*www.icrc.act.gov.au*) is a statutory body set up to regulate prices, to access infrastructure services and other matters in relation to regulated industries, and to investigate competitive neutrality complaints and government-regulated activities in the ACT. The commission also has responsibility for licensing utility services and ensuring compliance with licence conditions.
- In Western Australia, the Economic Regulation Authority (ERA) (*www.erawa.com.au*) is the independent economic regulator. The ERA has two main functions: to act as Western Australia's economic regulator, and to be an independent and transparent advisory body to the state government. The ERA was established on 1 January 2004 as a corporate body with perpetual succession under Section 4 of the Economic Regulation Authority Act 2003.
- In Tasmania, since 2008, the Office of the Tasmanian Economic Regulator (*www.energyregulator.tas.gov.au*) has been in charge of the economic regulation of the water and sewerage sector. The regulator's functions are to: *i)* administer the licensing system for the water and sewerage corporations; *ii)* establish and administer the customer service code; *iii)* regulate prices, terms and conditions for water and sewerage services; *iv)* monitor the performance of the water and sewerage industry and report on the performance of regulated water and sewerage corporations; and *v)* carry out other functions as assigned to the regulator by the Industry Act and its subordinate legislation.
- In Queensland, the Competition Authority (*www.qca.org.au/water*) plays some regulatory roles in relation to the water industry, including: *i)* to investigate and report on the pricing practices of certain declared monopoly or near monopoly business activities of state and local governments; *ii)* to receive, investigate and report to ministers on competitive neutrality complaints; *iii)* to mediate and/or arbitrate access disputes and water supply disputes; and *iv)* to investigate and report on matters relevant to the implementation of competition policy.

Sources: US: Luís-Manso, P. (2007), "Reform and Risk Management in the Urban Water Sector: The Role of Regulation", Thèse No. 3 966, presented 20 November, EPFL Lausanne; Massarutto, A., L. Anwandter and E. Linares (2012 forthcoming), "Financial Economies of Scale in the Water Sector", Research Report, IEFE, Bocconi University, *www.iefe.unibocconi.it*, forthcoming; Australia: websites provided for each example.

Box 4.14. **Selection of state practices**

In the state of Jalisco, the Water Law and its secondary legislation (*Reglamento*) provide a comprehensive legal framework that clearly establish the responsibilities of the authorities and comprehensively cover many of the regulatory functions described in this chapter.

By law, the provision of WSS is the responsibility of decentralised municipal or inter-municipal operators. Decentralised municipal operators have their own legal personality and assets, as well as technical and administrative autonomy and hold responsibilities established by this law, its rules and municipal codes. Decentralised inter-municipal operators are created through agreements between two or more municipalities to co-ordinate the provision of WSS. Operators are responsible to: *i)* plan, study, approve, maintain, extend, rehabilitate, administrate and operate WSS systems; *ii)* promote the efficient use of water; *iii)* propose studies on tariffs based on WSS costs; and *iv)* apply quotes, rates and tariffs for the provision of WSS.

The responsibilities of the State Water Commission encompass standard setting, monitoring of service provision, efficiency enhancement actions and the promotion of public participation (see Box 4.3).

The state of Queretaro has developed a regulation for the efficient use of water that sets rules, responsibilities, criteria and sanction mechanisms regarding the efficient use of water among water users.

Article 1: The regulation aims to establish a better supply of water and its efficient use according to the state's urban code, including actions to prevent and control water leaks, as well as to develop a culture of water. These responsibilities are entrusted to the state (through the State Water Commission) and municipalities (through operators) within the framework of the respective competencies.

Article 4: Operators are responsible for the:

- registry and control of service users;
- definition of criteria on water consumption for the various sectors of activities using water, the definition of efficiency standards and the application of sanctions;
- promotion of scientific research to develop technologies improving the efficiency of water use;
- development of a culture of water efficiency and protection;
- co-ordination of actions for the integrated management of WSS;
- investment of an annual percentage of resources from the three levels of government in programmes controlling water losses and leaks.

Article 9: Maximum water consumption rates are set for each sector of activity and economic areas (industrial, commercial, public use, public fire hydrant and domestic).

Article 32: Operators can engage social and private actors in organised groups (*Grupos organizados*) to help apply programmes and actions related to the disposition of this regulation.

Article 35: The operator is responsible for applying sanctions in case of: *i)* apparent waste of water; *ii)* non-application of supply dispositions set by the operator; and *iii)* non-respect of set consumption rates, etc.

Box 4.14. **Selection of state practices** (*cont.*)

Article 36: Depending on the degree and frequency of infractions, the operator can apply various sanctions: *i)* warning and reprimand; *ii)* fines; *iii)* temporary or permanent suspension of contracts or concessions.

In **the state of Mexico**, the Water Law of 2011 institutes the Regulatory Commission for Water (*Comisión Reguladora del Agua*) with the responsibility to elaborate tariffs and technical standards for water providers. Section 3 of the law establishes the modalities of the commission, its objectives and attributions. In particular, the commission is established as a public entity with technical and managerial autonomy, legal personality and ownership of assets. Its responsibilities include: *i)* ensuring the quality of services; *ii)* protecting the interests of the community; *iii)* controlling compliance with applicable regulations and, if necessary, assisting with the issuance and monitoring of concession titles. This involves:

- establishing technical norms underpinning the development of water infrastructure and the provision;
- ensuring compliance with the regulatory framework and establishing sanctions in case of infractions;
- proposing tariffs and the bases for their review;
- establishing indicators for the monitoring of service provision;
- resolving conflicts that may arise between users, water providers and others;
- evaluating service providers' programmes as important elements of the state water system;
- promoting the efficient use of water and the value of water among users;
- proposing technical norms that contribute to the efficient use of water and ensuring compliance;
- supporting public participation in the planning, financing and implementation of the state water policy.

Sources: State of Jalisco (2007), "Reglamento de la Ley del Aguapara el Estado de Jalisco y sus Municipios", *www.ordenjuridico.gob.mx/Estatal/JALISCO/Reglamentos/JALREGL0024.pdf*, accessed in November 2012; State of Jalisco (2007), "Ley del Agua para el Estado de Jalisco y sus Municipios", El Congreso del Estado, No. 18 434, *http://sedeur.app.jalisco.gob.mx/legislacion-urbana/estatal/Ley%20Estatal%20de%20Agua.pdf*; State of Queretaro (2012), "Ley Estatal Aguas Queretaro", vLex, *http://vlex.com.mx/tags/ley-estatal-aguas-queretaro-432825*; State of Mexico (2011), *Gaceta de Gobierno,* No. 16, 22 July, *www.edomex.gob.mx/legistelfon/doc/pdf/gct/2011/jul223.PDF*.

Supporting autonomous, efficient and financially sustainable water operators

As in many other countries, water service providers in Mexico have traditionally been municipality water departments. In the last two decades, these departments have moved gradually towards autonomous, corporatised entities. This is part of a trend aimed at ensuring efficient and financially sustainable service provision. A number of states, such as Sonora, Nuevo Leon, Aguascalientes and Guanajuato, are pursuing this (corporatisation of water utilities and clearer definition of roles), but the trend remains largely incomplete in most states. The diagnosis is consensual on this aspect: operators suffer from a strong politicisation of their activities because they are seen as a tool in the hands of local politicians to serve electoral interests. Overcoming political capture requires pursuing and strengthening the trend to make water utilities more efficient,

self-sustained and performance-oriented everywhere. Box 4.15 discusses the key attributes of well-performing utilities, as developed in the literature. The section below suggests steps that could be taken to strengthen operators, focusing on: *i)* institutional design; *ii)* organisation and management; *iii)* performance indicators; *iv)* users' participation; *v)* financial sustainability; and *vi)* the association of water providers.

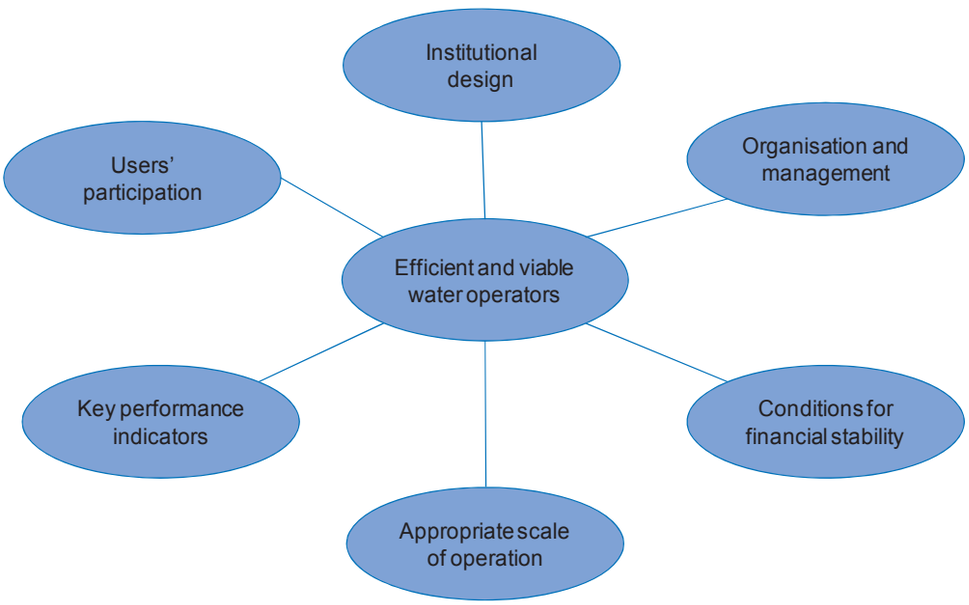
Box 4.15. **What makes water utilities well performing?**

Extensive literature has been produced around public water utilities trying to define the main features for a well functioning, financially sustainable and efficient service delivery. The following elements are considered to be essential for making public water utilities well-performing institutions:

1. **External autonomy:** External autonomy concerns the degree of independence from external interference that is provided to utility managers for important decision making that could significantly affect the results achieved by the utility, such as setting tariffs, assumption of debt and procurement.
2. **External accountability:** External stakeholders fulfil a number of important functions in the planning and operation of a utility. These include: *i)* policy making, which guides the management of the utility, its service delivery objectives, and quality standards; *ii)* ownership, which sets performance targets and financial objectives to maximise the value and efficiency of the assets; *iii)* regulation or authority to monitor compliance with the legal and contractual obligations and service standards placed upon operators, determining tariff levels, and resolving conflict between regulated companies and their customers; *iv)* demand for service or entitlement to receive services provided by the utility that are commensurate with tariffs paid and acceptable quality; and *v)* financing or authority to secure financing in both debt and equity.
3. **Internal accountability for results:** Internal accountability looks at how management and staff are held accountable for effectiveness (the degree to which the utility realises its goals) and efficiency (the cost effectiveness of resources used to produce its water services).
4. **Market orientation:** At various levels, utilities look for opportunities to lower costs through outsourcing certain functions, gradually making greater use of market forces and the introduction of market-style incentives within their organisations.
5. **Customer orientation:** Important measures of customer orientation include friendliness of the customer billing and collection system, orientation toward seeking customers' opinions and views, availability of options for service delivery, timely information to customers on developments in relation to water services, and response to customers' complaints.
6. **Corporate culture:** Good corporate culture of public water utilities is shaped by the chief executive and top management and involves moral, social and behavioural norms that inspire staff and managers to excel. Corporate culture is established through clear mission statements and performance objectives for service quality and coverage. It shapes the beliefs, core values, attitudes and ability of the staff to set priorities to achieve their mission. Indicators that illustrate the existence of a good corporate culture include whether the utility's mission statement is well understood by its members, whether the utilities have put in place criteria for promotion and salary, the level of staff turnover and the amount of training provided to staff and management.

Source: Baietti, A. *et al*. (2006), "Characteristics of Well-Performing Public Water Utilities", Water Supply & Sanitation Working Notes, No. 9, World Bank, Washington, D.C.

Figure 4.3. **The critical dimensions of efficient and viable water operators**



Institutional design: The needed corporatisation of water operators

A first step involves reform of operator corporate governance to ensure clear separation of functions and responsibilities between water utilities and municipalities, and to empower water operators to manage their revenues. This would help to promote transparency and accountability of water operators and to ensure that water revenues are reinvested in water service provision. Different legal forms are possible, including a mixed ownership status, such as in the case of Saltillo, which has proved helpful in supporting the autonomy of the water provider (see Box 4.16).

Organisation and management

This reform of water operator governance is an essential first step in the transition towards autonomous and financially viable operators. Accompanying steps include a careful selection of the members on the board of directors, based on their professional competences and merits with a view to avoiding potential conflicts of interest. Similarly, managers could be selected through a competitive process and based on criteria supporting a high level of qualifications. In that respect, senior staff nomination could follow what is already done in other sectors, where heads of agencies are selected for terms that do not follow the political cycle and do not only respond to political interest. The strengthening of utilities requires strong capacity building, and service providers need to be supported to improve the way they operate water services. For the time being, CONAGUA has been instrumental in providing technical assistance to utilities. More systematic professionalisation of the staff through the set-up of a professional civil service for staff working in water utilities could contribute to reducing the high turnover and politicisation of staff nominations.

Box 4.16. **The innovative case of Aguas de Saltillo**

In March, 2001, the municipality of Saltillo, Coahuila and its water utility (SIMAS – *Sistema Municipal de Aguas y Saneamiento de Saltillo*) launched a public bid to create a mixed entity (51% SIMAS and 49% private operator) to provide water and sanitation services in the city of Saltillo. In August 2001, an association contract and a technical assistance contract were signed with Interagbar de Mexico SA de CV (AGBAR – *Aguas de Barcelona*) for a duration of 25 years. In essence, the municipality maintains majority ownership and control of the resource, but the administration and execution of projects were delegated to the private sector.

The company has been operating since October 2001, providing water since March 2011 through 199 857 connections, and employing 385 workers. The current equity structure is 55% SIMAS and 45% AGBAR.

This experience has shown the benefits of this specific form of ownership in mitigating a number of risks: *i)* political interference in the management of the water utility has been reduced with the private operator appointing the general manager; *ii)* the company is protected from undue dissolution with each political change in the municipality thanks to a 25-year contract involving a chapter on dispute resolution; *iii)* interests between partners are balanced, owing to a ballot mechanism for topics which must be approved by certain number of votes of the advisers; *iv)* correct vigilance in the company's finances given that each partner is able to name a commissioner for auditing the company and reporting to the Board of Directors; and *v)* technology transfer, ensured by the technical assistance contract.

The mixed company has nevertheless had to face a number of challenges, including *i)* geographic limitation – initially the contract applied only to Saltillo and excluded nearby municipalities that were in need of assistance. In June 2012, however, the municipality of Ramos Arizpe formalised an association with Aguas de Saltillo for the management of its water and sanitation services, modifying the rules of association; *ii)* tariffs – tariffs are increased every month to take into account inflation but not of any other types of contingencies. This threatens the financial balance of the company in case of natural disasters, new taxes, increases in electricity costs, cancellation of taxes deductions, among others. Nevertheless, on 31 January 2012, the Administrative Board of Aguas de Saltillo and the City council approved a 26% average raise of tariff aiming to increase investments for rehabilitation, losses reduction as well as existing imbalances.

Performance indicators

The flip side of increased autonomy of water operators is the setting up of appropriate accountability mechanisms, including performance indicators and regular reporting exercises to both the board of directors and the relevant state auditing authorities. This involves the coherent development and use of performance indicators and a consolidation of accounting rules and information requests to reduce the costs on information providers of diverging data demands. In England and Wales, key performance indicators (KPI) were developed in consultation with consumers and utilities to avoid burdening companies, but also to capture the most relevant information for regulatory purposes (see Box 4.17). This experience and others have shown that this process can be long, but that the long-term benefits are high, in particular the strong pressure that credible and efficient monitoring exerts on companies to improve their performance and rally the top of the ranking.

Box 4.17. **Key performance indicators in England and Wales**

In England and Wales, the indicators were developed to provide stakeholders (including regulators, investors and customers) with an overall picture of company performance. They may serve several regulators, for example the economic regulator as well as the Environment Agency. The indicators are grouped into four high-level areas, for which OFWAT has set out *i)* a brief definition of the indicator; *ii)* relevant obligations that relate to the indicator; *iii)* how the indicator should be calculated; *iv)* the minimum frequency of reporting; *iv)* any targets set for the indicator; and where relevant, appropriate tolerances for the indicator.

The indicators

Customer experience	Service incentive mechanism (SIM)
	Internal sewer flooding
	Water supply interruptions
Reliability and availability	Serviceability water non-infrastructure
	Serviceability water infrastructure
	Serviceability sewerage non-infrastructure
	Serviceability sewerage infrastructure
	Leakage
	Security of supply index
Environmental impact	Greenhouse gas emissions
	Pollution incidents (sewerage)
	Serious pollution incidents (sewerage)
	Pollution incidents (water)
	Discharge permit compliance
	Satisfactory sludge disposal
Financial	Post-tax return on capital
	Credit rating
	Gearing
	Interest cover

Companies are required, by their licences (Section J) to provide information to the regulator. Although OFWAT has not published a report template, companies are expected to publish all of the indicators that are relevant to the services they provide at a minimum on an annual basis. The companies decide on a reporting format that sets out this information transparently.

The KPI were developed as part of a general update of OFWAT's regulatory approach. The consultation process involved a series of meetings and formal consultation documents. For the KPIs this included a series of workshop meetings with companies and other regulators to discuss a set of draft indicators, after which the formal consultation ensued. OFWAT estimates that the process of developing the KPIs took about two years, although it was quicker for KPIs that were already in use. New measures need more time to allow setting up data systems and processes. For example, one of the customer service performance indicators (SIM) took about three years to develop and test and another year for data to be robust.

Sources: OFWAT (2012), "Delivering Proportionate and Targeted Regulation – Ofwat's Risk-based Approach", OFWAT website, *www.ofwat.gov.uk/regulating/prs_web201203regcompliance* ; accessed in November 2012, OFWAT (2012), "Key Performance Indicators Guidance", OFWAT, *www.ofwat.gov.uk/regulating/compliance/gud_pro1203kpi.pdf*; OFWAT (2012), "Water Company Licenses", Ofwat website, *www.ofwat.gov.uk/industrystructure/licences*, accessed in November 2012.

Performance indicators are the predominant, but not only, basis for contractual arrangements with private water providers. As highlighted in the assessment of the framework for private sector participation in Mexico carried out by OECD in 2012, the concession contracts in Aguascalientes and Cancun present contrasted experiences with performance-based monitoring. In Aguascalientes, the private operator is monitored based on two main indicators: financial and technical efficiency. The contract with the private operator in Cancun is monitored every six months based on a long list of performance indicators (including coverage, delay of repair, users' satisfaction, etc.). A more consistent approach to performance- based contracts would help both the municipalities and the utilities to build greater certainty and confidence in their relationship. Experiences in other countries have illustrated the potential of performance-based contracts to support performance improvement of public water providers. Authorities in Eastern Europe and central Asia, for example, were supported by guidelines developed by the OECD "Guidelines for Performance-Based Contracts between Municipalities and Water Utilities". These guidelines address the key elements that need to be considered in connection with the preparation, negotiation, implementation and periodic revision of a successful performance-based contracting mechanism (Box 4.18).

Box 4.18. **OECD Guidelines for Performance-Based Contracts**

The main issues covered in the guidelines include, among others:

- contract preparation (choice of contract type and contract duration; review of the legal and regulatory framework; review of the utility's assets and liabilities – restructuring of the utility; preparation of the bidding and selection process; and accuracy of initial data and information);
- performance indicators (definition and selection of indicators; definition of the baseline scenario; monitoring of performance indicators; choice of a technical auditor);
- tariffs and financial obligations of the contracting authority;
- financial obligations of the contracting authority;
- monitoring of contract implementation;
- mechanisms for conflict resolution and contract enforcement;
- risk management;
- personnel management.

Based on the review of selected cases, the OECD makes two important points of relevance for Mexico. All the data collected during the tender process and used for calculating key indicators in the business plan should be updated before the contract starting date, particularly if time has elapsed between the starting date and the tender preparation. In case of uncertainties or difficulties in obtaining reliable data at the start of the contract, it is preferable to set annual performance targets as a percentage of improvement (calculated on the basis of a baseline to be defined) rather than as fixed numbers (in order to avoid recalculating a fixed figure each year) (this is particularly relevant for the indicator on the continuity of service).

Sources: Based on OECD (2011), *Meeting the Challenge of Financing Water and Sanitation: Tools and Approaches*, OECD Publishing, Paris; and OECD (2006), "Guidelines for Performance-Based Contracts between Municipalities and Water Utilities in Eastern Europe, Caucasus and Central Asia", ENV/EPOC/EAP(2010)4, OECD, Paris.

Users' participation

Strengthening users' participation in water utility consultative bodies and in water decision making is a necessary step and an essential accountability mechanism to ensure effective and efficient public services. Most state laws have opened up the possibility for water utilities to have a consultative body where public participation is expected. Where they exist, those arrangements should be reviewed to evaluate their effectiveness and to see the extent to which they can be improved. International experience provides interesting examples of how other countries have engaged customers in decisions on water issues. As an example, Box 4.19 describes the experience of OFWAT, the economic regulator for water and sanitation services in England and Wales.

Box 4.19. **Engaging customers in water and sanitation services discussions: The example of OFWAT**

In England, most business and household customers receive their water and sewerage services from one of 20 regional monopoly companies. One of the key roles of OFWAT is to set price limits for each of these companies. For OFWAT, effective customer engagement is vital to establish a legitimate and fair price regime and ensure customer buy-in. In August 2011, the institution published a "Customer Engagement Policy Statement", which recognised the increasing influence that customers have over the prices and services they receive at the next price review in 2014. OFWAT adopted a three-tiered approach to enable customers to influence price and services by:

- direct engagement with their water company on issues including local services and tariffs;
- challenging the shape of their company's overall business plan through customer challenge groups (CCGs);
- influencing and informing OFWAT's decisions through a sector-wide customer advisory panel (which first met in February 2012).

In this process, each participant (OFWAT, companies and consumer challenge groups) has been allocated clear responsibilities. Each company must engage directly with its customers, through customer representatives, to understand their views. The customer challenge groups (CCGs) have to review the company's engagement process and confirm the outcomes that the company will deliver for customers and challenge the phasing, scope and scale of work required to deliver them, together with the balance of risk incorporated into the company's plan and advise OFWAT on the effectiveness of the company's engagement and the resulting acceptability to customers of its business plan and bill impacts. The panel's role is to challenge the regulatory assumptions that will have an impact on all companies' business plans, the standards of service and price limits, and the price review methodology used by OFWAT.

Sources: OFWAT (2010), "Involving Customers in the Price-Setting Process: Ofwat's Customer Engagement Policy Statement", Ofwat, London; OFWAT (2012), "Information Note", OFWAT, *www.ofwat.gov.uk/future/monopolies/fpl/customer/prs_in1205customerengagement.pdf.*

Addressing the financing issue

Service providers crucially depend on revenues raised through tariffs (in addition to subsidies) to cover their operation and maintenance costs. The politicisation of tariff setting is an important barrier to a more effective use of tariff to promote financial sustainability (and to manage water demand – see Box 4.20 for an analysis of the multiplicity of objectives of tariff setting). Some steps could be taken to ensure a more

technical discussion on tariff setting and approval. For instance, making tariff regulation (the process of setting tariffs, of updating and approving them) more transparent and disclosing information and technical reports on the use of revenues would help to build a more consensual understanding on the link between tariffs and sustainability of service provision. Along the same lines, the OECD work on the framework conditions for private sector participation in infrastructure recommended to raise awareness in various circles, including in state congresses, on the economics of the water sector, including on the dynamics between the ultimate sources of revenues for the sector (tariffs, taxes and transfers).

Strengthening financial sustainability of utilities does not necessarily involve tariff increase. Improving bill collection rates and greater capacity of utilities to better manage the resources at their disposal would already substantially improve the balance sheet of utilities in most places. As an example, Aguas de Hermosillo has been able to maintain high commercial efficiency over the last five years, mainly based on a proper billing policy and capacities to enforce the bills. These steps not only helped to improve the financial well-being of the company, they also constituted critical advances in building consumer confidence – an essential first step prior to raising tariffs that helps to ensure social acceptability. Public authorities have a strong role to play as well to support greater bill recovery. For instance, they can ensure both that bills addressed to government bodies are promptly paid and that regulation and politics do not put undue constraints on invoicing and bill recovery. In that respect, a number of utilities have expressed concerns that the recent constitutional reform elevating access to water to the level of a human right would reduce the incentive to pay and prevent utilities from enforcing any recovery measures, ultimately undermining the sustainability of service provision.

Funding from federal programmes constitutes a key federal lever to ensure consistent achievement of water policy objectives. Better targeting of some of the federal programmes, better priorities on fund allocation, as well as greater synergies across federal programmes may be needed. This could rely on a more systematic evaluation of all the federal programmes that carefully looks at the particular impacts of each one to refine gaps and make them more focused on policy priorities in the water and sanitation services sector.

Scale of operations: supporting the associations of water operators

The association of water operators may be able to remedy the capacity challenges faced by operators. CIAPACOV (Inter-municipal Commission for Water and Sanitation Services) for the municipalities of Colima and Villa de Álvarez is an example of an inter-municipal association that also has a focus on improving regulatory procedures. In particular, CIAPACOV undertook some preliminary measures to simplify a number of procedures and started a one-stop shop for customers with response times and better information on core services (repair of leaks, installation of connections…). The invoicing scheme was redesigned and an innovative system to pay bills in shops was established. The advantages of inter-municipal arrangements as perceived by CIAPACOV are listed in Box 4.21.

Box 4.20. **Setting tariffs**

Setting the right tariffs for domestic water use is a challenging task. In many cases, utilities do not know the cost of the service and operate inefficiently, which adds costs to the provision of services. In addition, from a political standpoint, charging below cost can be seen as paying off. However, it is in general counterproductive. When tariffs are set below cost recovery, the provider must either rely on government subsidies or cut back on service, maintenance and investment. Generally, tariffs that are below the costs (at least of operation and maintenance) result in poor service, asset deterioration and an inability to invest to meet growing demand. The role of regulation in tariff setting is to bring tariffs up to a sustainable cost recovery level in which a variety of objectives, e.g. economic efficiency and affordability of services for lower income households, is reconciled (OECD, 2009a). There are four main objectives embedded in the design of water and sanitation tariffs: environmental conservation, financial sustainability, economic efficiency and social fairness (OECD, 2010b). In order to accommodate these objectives, three dimensions of tariffs policy are relevant: tariffs level, tariffs structure and the tariff setting and revision process.

- **Financial sustainability:** Water tariffs are a key element of long-term financial sustainability of water operators and of systems. Low levels of tariffs, coupled with inadequate compensation from other sources of revenue – typically taxes (and international transfers in developing countries) – over the long-run lead to a vicious circle of bad maintenance and deterioration of services that affect users' willingness to pay and might induce in turn a decrease in bill collection rate and further reduction of revenue for the sector.
- **Economic efficiency:** Prices provide important signals to providers and users that drive economic efficiency, i.e. that allow allocating water with priority to uses with highest value to society and service provision at cheapest costs.
- **Environmental conservation:** Appropriate pricing of water supply and sanitation services contributes to environmental conservation when it is used to manage demand and discourage "excessive" uses of water. To this effect, increasing block tariffs are typically used.
- **Social fairness:** Social fairness generally implies that the water tariff treats similar customers equally, and that customers in different situations are not treated the same. Social fairness accommodates affordability concerns, i.e. poor households are able to obtain adequate supplies of clean water. In practice, however, the debate on whether tariffs are the appropriate tool to address affordability concerns is lively. Increasing block tariffs – the traditional policy tool used to achieve social objectives – have raised many criticisms as they may not be appropriate if poor households consume more water than richer ones and if the poor are not connected to the water systems. Cross-subsidies have shown limitations over time when shifts in the balance between subsidised and subsidisers were not anticipated. Targeted subsidies for water consumption have also been criticised on the ground, pointing out that precise targeting requires good administrative capacity. Subsidies supporting connections to water networks have proved more helpful for the poor than subsidies to water consumption.

Source: Based on OECD (2009), *Managing Water for All*, OECD Publishing, Paris, and OECD (2010), *Pricing Water Resources and Water and Sanitation Services*, OECD Publishing, Paris.

The international experience in fostering associations of water operators is important. Box 4.22 presents the experience of Portugal and Italy. The more in-depth study of Italy shows the potential pitfalls of long-term reforms aimed at strengthening the financial sustainability of water operators and the crucial part that tariff regulation plays. France's

experience in this area is also worth mentioning. France has 36 000 municipalities and 2 600 inter-municipalities; recent evidence shows that the development of inter-municipalities has led to duplication of responsibilities and that consolidation is needed to reduce unnecessary public spending. This experience shows the importance of ensuring that inter-municipalities do not create an additional layer of bureaucracy without democratic accountability.

Box 4.21. **Advantages of the inter-municipal arrangement CIAPACOV**

- Broadens the horizon of work.
- Operating costs are optimised.
- Facilitates running program[me]s Water Care and Culture.
- Facilitates the execution of public works.
- Facilitates the relationship with the federal government.
- Attracts greater attention of the state executive.
- Facilitates contact with users.
- Inspires greater professionalism of the team.

Source: Extract from CIAPACOV (2012), "Intervention of the General Director of CIAPACOV" presentation at the OECD Public Policy Seminar on Making Water Reform Happen, Mexico City, Mexico, September.

Box 4.22. **The water and sanitation services reform in Italy and Portugal**

In Portugal, the water and sanitation sector was reformed with the aim of reinforcing the professional capabilities of water companies and guaranteeing their capacity to self-finance operations and investments. The reform created two layers of water management institutions, one for "retail" service (drinking water distribution, wastewater collection) and one for "wholesale" service (bulk water supply and wastewater treatment). Both layers are delegated to local authorities, although at different territorial scales. They can be organised either as municipal or multi-municipal systems. The national holding, *Aguas de Portugal*, fully owns the company operating in Lisbon (capital) and participates in shareholding agreements with municipalities, holding 51% of shares in the multi-municipal companies.

Italy launched an ambitious reform of the water supply and sanitation system in 1994, which was previously fragmented into more than 13 000 undertakings operating at the municipal scale. The whole system had been entirely subsidised by the public budget for capital expenditure, and operational costs were hardly recovered. The reform attempted to create financially self-sufficient bodies. Municipalities were not expropriated, but rather obliged to associate into compulsory inter-municipal bodies, having statutory responsibilities to provide the service. This would have to be delegated to a professional commercial company at arms' length from the public authority even if it could be either publicly or privately owned. The delegation scheme was supposed to follow the concession model, i.e. all investments under the responsibility of the water company, which was supposed to borrow from the market at its own risk, with the sole guarantee offered by the delegation contract and its corporate solidity.

Box 4.22. **The water and sanitation services reform in Italy and Portugal** (*cont.*)

The National Framework Law delegated the task of individuating the territorial units, disciplining the governance of inter-municipal agencies (AATO) and complementing national regulations to regions. Regions have created approximately 90 units; most of these have chosen to delegate WSS management to publicly owned companies, the biggest of which are partially privatised through quotation. Others have chosen delegation to mixed-venture company with public-private partnership (PPP), while only a few have fully delegated to private companies. "Private" companies are in fact often represented by the quoted public companies, with three of them (Acea, Hera and Iren) holding the largest part of PPP contracts.

Price regulation was inspired by the full-cost recovery paradigm. Its implementation was devoted to an automatic mechanism, the so-called "normalised pricing method" (MTN), defined at the national level by a ministerial decree. AATOs were supposed to adopt a plan identifying investment needs and target service levels and to calculate the resulting tariffs applying the MTN. Both the ATO plan and the related financial plan, with a detailed outline of tariff time-series for the contract, had to be incorporated into the delegation contract.

This scheme proved to be ineffective, since it underrated the need to ensure adequate flexibility to the regulatory model. Although the plan can be renegotiated, the renegotiation process is not adequately disciplined and is in practice left to discretional decisions of AATOs. The MTN left many grey zones open to interpretation (e.g. concerning the adaptation of prices to actual costs when these diverge from initial estimates). As a result, the system was perceived as opaque and regulatory behaviour highly unpredictable.

Despite some success, the reform has not delivered, and the expected results are far behind schedule. One remarkable cause for this is the credit crunch suffered by most water companies, which has been attributed by many observers to the fuzzy regulation and to the incomplete contracts. Yet popular discontent has been high because of public perception that price increases – which have been notable, although not sufficient to achieve financial self-sufficiency of operators – have not led to significant improvements, while fostering the transformation of utilities into commercial – if not truly "private" – companies. This concern has led to massive support for the June 2011 popular referendum mandating that operation should be kept public and no undue profit should be allowed on the provision of a service that fulfils a social right.

Sources: Portugal: Luís-Manso, P. (2007), "Reform and Risk Management in the Urban Water Sector: The Role of Regulation", Thèse No. 3 966, presented 20 November, EPFL Lausanne; Massarutto, A., L. Anwandter and E. Linares (2012 forthcoming), "Financial Economies of Scale in the Water Sector", Research Report, IEFE, Bocconi University, *www.iefe.unibocconi.it*, forthcoming; Italy: Massarutto, A. and P. Ermano (2012 forthcoming), "Drowned in an Inch of Water: How Poor Regulation has Weakened the Italian Water Reform", *Utilities Policy*.

Conclusions and recommendations

Conclusions

The regulatory framework for water and sanitation services is incomplete, lacks in enforcement and is scattered across levels of government and legal instruments. There is no overarching authority or legislative framework that sets clear rules of the game for water operators. While several states have issued water and sanitation services laws, the decentralisation process initiated by the constitutional amendment has remained patchy. Proper financial, human and technical resources to ensure that states and municipalities can comply with their role did not accompany the devolution of competences. In many cases, the institutional framework does not differentiate between service provision and regulatory functions for water and sanitation services. Consequently, in some states,

municipalities are both service providers and regulators; in others, utilities have been created for service provision, but their legal form does not guarantee their ability to operate autonomously.

Tariff regulation is heterogeneous across the territory and remains a highly politicised process, and despite the existence of norms, enforcement of quality standards presents important gaps in Mexico. Further, incentives for efficiency and social obligations are largely ignored at the state and municipal level, users' participation remains largely done on an *ad hoc* basis, and despite important efforts in performance monitoring, the system lacks consistency and enforcement.

The recent constitutional amendment to Article 4 to integrate the right to water provides an opportunity to revise the legal framework for water and sanitation services. This opportunity is reviving the debate around a federal law that would provide an overarching framework for water and sanitation services. This type of a law would help clarify regulatory responsibilities for water and sanitation services and could also fill some of the existing gaps and support the consistency of regulation across the territory. Crucially, regulation of services needs to be clearly separated from service provision and policy making through decisive allocation of regulatory functions to specialised entities and autonomy of service providers. In addition, regulation of water and sanitation services is not only about tariff setting, it involves other functions identified in this work and that remain underdeveloped in Mexico. They involve standards for access to and quality of services, efficiency incentives, social regulation, collect of information and monitoring of performance, and the organisation of users' participation. In the development of an overarching framework, sub-national competencies need to be preserved to allow for differentiated approaches that respect the specificities of states and support greater compliance with the law.

Accompanying measures are needed to support autonomous, efficient and financially sustainable water providers. These include ensuring that the trend towards the corporatisation of providers is maintained to support their autonomy *vis-á-vis* municipalities through separation of accounts, functions and responsibilities. The corporatisation of water providers needs to be supported by both capacity building and the professionalisation of staff, involving a recruitment process based on competences and terms of appointment that do not coincide with political cycles. Increased autonomy of water operators needs to be accompanied by the setting up of appropriate accountability mechanisms, such as a consolidated monitoring framework for water and sanitation services (performance indicators, information requests) and strengthened user participation in water utility consultative bodies and in water decision making. Finally, increased autonomy will not be possible without the financial capacity of providers to carry out their activities. While not the only one, tariff regulation is an important determinant of the financial sustainability of water operators. So far, however, tariff regulation has largely been driven by political considerations. Consensus building and awareness raising on the role of tariff regulation in supporting the financial sustainability of providers, while providing incentives for efficient service delivery, remain much needed.

Recommendations

Clarify who is in charge of the regulatory functions for water and sanitations services, including tariff regulation, the enforcement of quality standards, the establishment of incentives and standards for water efficiency, social regulation, the

participation of users, the collect of information and performance monitoring. While all functions do not need to be assigned to a single authority, their allocation needs to follow clear lines of responsibility and accountability. Above all, there needs to be full separation between regulatory functions, service provision and policy making. An important dimension of this separation is the continued trend in corporatisation and professionalisation of water providers. A federal law could help delineate more clearly the regulatory responsibilities, but would not be enough to ensure operational separation in all states and municipalities (the levels responsible by Constitution for regulation and provision of water and sanitation services). This separation may be achieved through different models taking into account the specificity of state situations, including through the setting up of separate regulators as recently done for instance in the state of Mexico. There is a need to capitalise on this pilot case to assess the pros and cons of this model and the opportunity for duplication in other states.

Foster transparency on service performance and regulatory processes by pursuing the development of performance indicators and establishing the mechanisms for increased public scrutiny of regulatory processes. Transparency is a strong lever for improved performance and to re-establish the bond of trust between water users and water authorities (including providers). Consolidating the information base and monitoring framework for service providers needs to be pursued in parallel to corporatisation to ensure that increased autonomy translates into improved water and sanitation services performance. This involves putting in place the mechanism to collect information (metering, reporting of water providers) and consolidating key performance indicators agreed on by all. Similarly, credible regulatory authorities rely on transparent regulatory processes such as clear tariff regulation, systematic publication of decisions, public consultation on regulatory proposals and disclosure on use of revenues.

Establish a platform to share the good regulatory practices that are developing at state and municipal levels. Today there is an important heterogeneity among states and municipalities in the way they regulate and provide water services. Some evidence, however, shows that a number of states and municipalities have put in place innovative mechanisms or institutional organisations to support better regulatory processes and service provision. These practices could be collected and reviewed systematically to constitute a basis upon which other sub-national governments could build. Institutions such as the National Governors' Conference and the Federal Council for Regulatory Improvement provide venues for multi-level co-operation that could be better exploited. The National Association of Water and Sanitation Companies (ANEAS) could also play a stronger role in providing a platform for exchange of practices among water operators.

Evaluate the effectiveness of federal programmes at achieving the policy objectives for water and sanitation services. Given the heavy reliance of the water and sanitation services sector on subsidies, the federal programmes constitute an important lever in the hand of policy makers to incentivise better performance in water and sanitation services, and in particular the corporatisation and professionalisation of providers and more efficient use of water. Several programmes exist in Mexico with various Rules of Operation. While they are acknowledged as having contributed to improving water and sanitation services, their respective real impact has not been measured. A systematic evaluation would provide feedback on the effectiveness of the rules of operation, and would help to better capitalise on the synergies between federal programmes.

Notes

1. The term "regulation" in this project covers any instrument by which governments set requirements on enterprises and citizens. It therefore includes all laws (primary and secondary), formal and informal orders, subordinate rules, administrative formalities and rules issued by non-governmental or self-regulatory bodies to whom governments have delegated regulatory powers. Subordinate regulations may be mandated in the primary laws, or established directly by lower levels of government (state, region, etc.). For the purpose of this analysis, regulation of water and sanitation services has been divided between 11 regulatory functions (see Table 2): tariff regulation; quality standards for drinking water; quality standards for wastewater treatment; standards for wastewater discharges; information and data gathering; monitoring of service provision; incentives for efficient use of water and investment; supervision of contracts with the private sector; social regulation; customers engagement; and dispute resolution.

2. Data from the XIII National Census of Population and Housing in CONAGUA (2011).

3. Data from 2007.

4. In Spanish, the 1917 Mexican Constitution, Article 115, Section III A reads: "Los municipios tendrán a su cargo las funciones y servicios públicos siguientes: A) Agua potable, drenaje, alcantarillado, tratamiento y disposición de sus aguas residuales".

5. During the end of the 19th and most of the 20th centuries, however, the federal government played a key role in developing and financing water systems, which was the main reason it was in charge of water and sanitation services. Its role continued until it could no longer soley finance the needs of a growing urban population.

6. *www.conagua.gob.mx/Contenido.aspx?n1=1&n2=3*.

7. These co-ordination mechanisms are also established in state laws on water and sanitation services or water, described as responsibilities of State Water Commissions.

8. *www.sadm.gob.mx*.

9. Data taken from the National Tariffs System (*Sistema Nacional de Tarifas*), an on-line platform managed by CONAGUA with detailed information on water and sanitation services tariffs in 100 municipalities.

10. Secreataría de Economia, NMX-AA-147-SCFI-2008, Servicios de agua potable, drenaje y saneamiento – Tarifa – Metodología de evaluación de la tarifa.

11. Fraction VII of Article 73 of the Mexican Constitution establishes that Congress has the prerogative "to impose the necessary contributions to cover the budget."

12. In 2000, in the state of Colima, the tariffs set by the utilities were challenged in justice. In the municipality of Manzanillo several law suits (*amparos* suits) were sued

against the utilities and as a result, the judiciary decided that the state congress had the responsibility of setting water tariffs.

13. Poder Judicial de la Federación (2001), Amparo de revisión administrativo 221/2001 Rel. Con A.R.A. 220/2001 Y 222/2001, México, D.F. (5 noviembre).

14. See: *www.conagua.gob.mx/CONAGUA07/Noticias/ReglasOperacion2012.pdf*.

15. Information is based on the state's water commission website. There is in the annex a list of state water commissions and related websites when they exist.

16. The 2010 exercise covered 24 cities with more than 650 000 inhabitants. The 2011 exercise included 50 Mexican cities with more than 250 000 inhabitants and methodological inconsistencies were tried to solve.

17. *www.aneas.com.mx/contenido/xxvpresent/SIGO_introduccion.pdf*.

18. Several workshops, congresses and conferences take place on water and sanitation services in Mexico and in some of those gatherings specialists sketch possible solutions for the sector.

19. *www.diputados.gob.mx/LeyesBiblio/ref/lgeepa.htm*.

20. *www.aneas.com.mx/contenido/Exposicion%20motivos.pdf*.

21. *www.cofemer.gob.mx/contenido.aspx?contenido=146*.

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Annex 4.A1
Excerpts from a selection of state water laws

State of Queretaro *Decree for the Creation of the State Water Commission*	The decree establishes the State Water Commission, its responsibilities, dedicated assets, and governance. Art.1: Provides for the creation of a decentralised body named State Water Commission with its own legal personality and assets and with technical and organisational autonomy. Art.2: Specifies that the State Water Commission will serve as co-ordinator and contributor to federal, state and municipal authorities in all activities related to planning, studies, projects, construction and operations of systems using water and benefiting the state population. Art. 3: Sets the objectives of the State Water Commission: – co-ordinate with competent authorities the planning, projects, studies and construction of hydraulic works and infrastructures; – negotiate with federal, state and municipal authorities, co-operation agreements for the construction, rehabilitation, extension and improvement of drinking water systems. Art.4: Establishes that the State Water Commission administration is formed of the Executive Board and executive members representing the key stakeholders (users' groups, Chamber of Commerce, Chamber of Industry, etc.).
State of Jalisco *Law on Water for the State of Jalisco and its Municipalities* (2000)	The law aims to: *i)* establish the general ground for provision of public WSS; *ii)* create the State Water Commission; *iii)* regulate relations between authorities and users regarding WSS; *iv)* set the responsibilities of municipal and state governments on the provision of WSS and the co-ordination with users; *v)* establish general grounds for the total or partial provision of WSS by social or private sectors. Art. 6: Municipalities are in charge of WSS in accordance with this law and the Federal Law on Water. Art. 9: Are responsible for the respect of this law, within the framework of their respective competencies: – municipal government when in charge directly or through an operator, of the provision of WW; –State Commission on Water and Sanitation; –Secretary of Rural Development. Art.15: The State Water Commission is created as a decentralised body with its own legal identity and assets, administrative power, and is in charge of co-ordinating and planning the uses of water. Art.17: Responsibilities of the State Water Commission include: – formulate, administrate and strengthen the State Water System; – propose technical norms, criteria and guidelines for the provision of public WSS; – update technical norms; – supervise and validate projects and works in public or private WSS; – build and supervise public water and sanitation systems; – promote programmes for the efficient use of water; – promote social participation in the provision of public WSS. Art.37: The provision of WSS is the responsibilities of decentralised municipal or inter-municipal operators. Art. 38: Decentralised municipal operators have their own legal personality and assets as well as technical and administrative autonomy and holds responsibility established by this law, its rules and municipal codes. Art. 39: Decentralised inter-municipal operators are created through agreements between two or more municipalities to co-ordinate the provision of WSS. Art. 40: Operators are responsible to: – plan, study, approve, maintain, extend, rehabilitate, administrate and operate WSS systems; – promote the efficient use of water; – propose studies on tariffs based on WSS costs; – apply quotes, rates and tariffs for the provision of WSS. Art.46: Users can participate, under the control of authorities, in the financing, construction, extension, maintenance, conservation, operation and administration of WSS. Art. 48: Municipalities can sign contracts for the provision of WSS. Art. 50: Contracts cannot extend 20 years and can be renewed for the same period of time. Art.54: Contracts for service provision can be signed with a private operator. Art. 57: Contracts must include general grounds, the object, rights and obligations, legal disposition, guarantee and penalties. Art. 86: In the case of private sector participation, municipal regulations establish mechanisms to determine and update quotes and tariffs. Art. 96: In the framework of private sector participation, sanctions are applied by the competent authorities or operators.

Excerpts from a selection of state water laws (*cont.*)

State of Michoacan *Law on Drinking Water, Sanitation and Wastewater Treatment of the State of Michoacán* (2002, latest reform)	Art. 2: The law aims to establish the normative grounds for the provision of WSS, and the organisation and operation of bodies and utilities that form the State System for Drinking Water, Sanitation and Wastewater Treatment. Art. 3: WSS can be provided through: *i)* municipal operators and local assemblies; *ii)* inter-municipal operators; *iii)* state bodies through contracts or agreements with municipal governments; *iv)* individuals through concessions or contracts. Art. 7: Municipal governments are in charge of: – the provision of WSS through municipal operators; – the design of policies; – the analysis and approval of quotes and tariffs; – the co-ordination of the State Water System; – the supervision of the provision and operation of WSS. Art. 19: Municipal operators are in charge of the provision of WSS. Art. 45: As a decentralised body with its own legal personality and assets, the Committee for Drinking Water, Sanitation and Wastewater Treatment (the committee) is in charge of: – planning, programme and budget for the WSS sector; – the creation and co-ordination of operators; – the provision of technical support. Art. 55: Private and social sectors can participate in: *i)* the provision of public wastewater service; and *ii)* the construction and operation of wastewater plants. Art. 56: Municipal governments can grant the private sector: – total or partial concessions of WSS; – total or partial concession of the use and operation of infrastructures; – contracting for projects, rehabilitation of the water systems; – contracting for the financing, rehabilitation and maintenance of wastewater plants. Art. 74: The municipality approves the quotes and tariffs for WSS based in the operators' proposals. Art. 82: Municipal and inter-municipal operators, and in some cases the committee, are in charge of overseeing the provision of WSS. Art. 85: Infractions as stated in this law are sanctioned by the service operators.
State of Nayarit *Law on Water and Sanitation for the State of Nayarit* (1995)	The law aims to regulate: *i)* the State Water and Sanitation System; *ii)* the provision of public WSS; *iii)* the organisation and management of operators; *iv)* cost recovery; *v)* and the supervision of service performance. Art. 3: The provision of WSS is the responsibility of municipal operators, inter-municipal operators, the state water commissions or individuals with concession or contract. Art. 6: Municipalities of the state are in charge of WSS provision. Art. 7: The state is responsible for: *i)* the State Water and Sanitation System; *ii)* the design of policies, strategies, objectives and norms; *iii)* the monitoring of service provision and management. Art. 50: The participation of social and private sectors can take the form of: – contracts for public works and service provision; – contracts for projects, financing, construction and technical support to sustain service provision; – necessary contracts to improve WSS. Art. 85: Tariffs are set by the operators' governing boards or the State Water Commission. Art. 95: Operators and the State Water Commission are responsible for overseeing the performance of WSS provision. Art. 115: Infractions as stated by this law are sanctioned by the operators and the State Water Commission.

Excerpts from a selection of state water laws (*cont.*)

State of Nuevo Leon *Law on Water and Sanitation for the State of Nueva Leon* (1997; last reform in 2007)	Art. 5: The administration of WSS is the responsibility of the State Water Commission, state operators, municipal operators and inter-municipal operators. Art. 6: Their responsibilities include: – design of state policies on water; – planning of water management for the state and municipalities; – establishment of water and sanitation systems; – participation in river basin councils; – design of a financing system; – monitoring of the law's application. Art. 7: State responsibilities in water and sanitation include: – design of strategies and programmes; – co-ordination with federal and municipal governments on water issues; – monitoring of service provision in accordance with state policies. Art. 9: Municipal responsibilities in water and sanitation include: – the provision of WSS; – the construction, operation and maintenance of water infrastructures. Art. 40: Water tariffs are applied by operators and are approved by state or municipal legislations depending on the area. Art. 47: Operators are in charge of supervising the performance of service. Art. 58: Infractions stated in this law are sanctioned by the operators.

Annex 4.A2
State water commissions

State	Water commissions
Aguascalientes	*Instituto del Agua del Estado de Aguascalientes*. Decentralised body.
Baja California	*Comisión Estatal del Agua de Baja California*. Decentralised body. *www.ceabc.gob.mx*
Baja California Sur	*Comision Estatal del Agua de Baja California Sur*.
Campeche	*Comisión de Agua Potable y Alcantarillado del Estado de Campeche*. Decentralised body.
Coahuila	*Comisión Estatal de Agua y Saneamiento de Coahuila*. Decentralised body. *www.ceascoahuila.gob.mx*
Colima	*Comisión Estatal del Agua de Colima.*
Chiapas	*Instituto Estatal del Agua de Chiapas*. Decentralised body. *www.institutodelagua.chiapas.gob.mx*
Chihuahua	*Junta Central de Agua y Saneamiento de Chihuahua*. Decentralised body. *www.chihuahua.gob.mx/jcas*
Distrito Federal	*Sistemas de Agua de la Ciudad de México*. Decentralised body, created by the merge of the General Direction of Water Constructions and Operations and the Water Commission of the Federal District. www.sacm.df.gob.mx
Durango	*Comisión de Agua del Estado de Durango.*
Guanajuato	*Comisión Estatal de Agua de Guanajuato*. Decentralised body. *www.guanajuato.gob.mx/ceag*
Guerrero	*Comisión Estatal de Agua, Alcantarillado y Saneamiento del Estado de Guerrero.* *www.capaseg.guerrero.gob.mx*
Hidalgo	*Comisión Estatal del Agua y Alcantarillado del Estado de Hidalgo.* *www.ceaa.hidalgo.gob.mx*
Jalisco	*Comisión Estatal del Agua de Jalisco*. Decentralised body. *www.ceajalisco.gob.mx*
Mexico	*Comisión del Agua del Estado de México*. Decentralised body. *www.edomex.com.mx/caem*
Michoacán	*Comisión Estatal del Agua y Gestión de Cuencas*. Decentralised body. *www.michoacan.gob.mx/ceac*
Morelos	*Comisión Estatal de Agua de Morelos*. Decentralised body. *www.ceamamorelos.gob.mx*
Nayarit	*Comisión Estatal de Agua de Nayarit*. Decentralised body. *www.cea.nayarit.gob.mx*
Nuevo León	*Comisión Estatal de Agua*. Not yet created.
Oaxaca	*Comisión Estatal del Agua de Oaxaca.* *www.cea.oaxaca.gob.mx*
Puebla	*Comisión Estatal de Agua y Saneamiento de Puebla*. Decentralised body. *www.ceaspue.puebla.gob.mx*
Querétaro	*Comisión Estatal de Aguas de Querétaro*. Decentralised body. www.ceaqueretaro.gob.mx
Quintana Roo	*Comisión de Agua Potable y Alcantarillado.* *www.capa.gob.mx*
San Luis Potosí	*Comisión Estatal de Agua y Saneamiento de San Luis Potosi.* www.ceaslp.gob.mx
Sinaloa	*Comisión Estatal de Agua Potable y Alcantarillad de Sinaloa*. Decentralised body.
Sonora	*Comisión Estatal de Agua de Sonora*. Decentralised body. www.ceasonora.gob.mx

State water commissions (*cont.*)

State	Water commissions
Tabasco	*Comisión Estatal de Agua y Saneamiento de Tabasco*.
Tamaulipas	*Comisión Estatal de Agua de Tamaulipas*. Decentralised body. *www.ceat.tamaulipas.gob.mx*
Tlaxcala	*Comisión Estatal de Agua de Tlaxcala*. Decentralised body. *www.ceat.gob.mx*
Veracruz	*Comisión del Agua del Estado de Veracruz*. Decentralised body.
Yucatán	*Junta de Agua Potable y Alcantarillado de Yucatan*. Decentralised body. *www.japay.yucatan.gob.mx*
Zacatecas	*Comisión Estatal de Agua Potable y Alcantarillado de Zacatecas.*

Annex 4.A3
Tariff regulation

Table 4.A3.1. **Tariff regulation in selected Mexican cities (2011)**

State	City	Tariff set by	Publication
Baja California	Ensenada	Council	Official Gazette
	Mexicali	Council	Official Gazette
	Tijuana	Council	Official Gazette
Baja California Sur	La Paz	Council	Official bulletin
Campeche	Campeche	Council	Official Gazette
Coahuila	Saltillo	Council	Gazette
	Torreon	Council	Official Gazette
Chiapas	Tuxtla Gutierrez	Council	Official Gazette
Distrito Federal	Mexico City	State Council	Official Gazette
Guanajuato	Celaya	Congress	Official Gazette
	Comonfort	Congress	Official Gazette
	Guanajuato	Congress	Official Gazette
	Leon	Congress	Official Gazette
	Penjamo	Congress	Official Gazette
	Salamanca	Congress	Official Gazette
Guerrero	Acapulco	Congress	Official Gazette
	Chilpancingo	Congress	Official Gazette
	José Azueta	Council	Official Gazette
Jalisco	Guadalajara	State Executive	Official Gazette
	Magdalena	Congress	Official Gazette
	Puerto Vallarta	State Executive	Official Gazette
Nuevo Leon	Monterrey	State Executive	Official Gazette
Queretaro	Queretaro	Council	Official Gazette
	San Juan del Rio	Congress	Official Gazette
San Luis Potosi	Ciudad Valles	Congress	Official Gazette
	San Luis Potosi	Council	Official Gazette
Tlaxcala	Apizaco	Council	Official Gazette
	Tlaxcala	Municipality	Official Gazette
Veracruz	Coatepec	Congress	Official Gazette
	Cordoba	Council	Official Gazette
	Minatitlan	Council	Official Gazette
	Papantla	Council	Official Gazette
	Poza Rica	Council	Official Gazette

Source: Elaborated based on data from CONAGUA (2012), "Sistema Nacional de Tarifas", CONAGUA website, *www.conagua.gob.mx/tarifas,* accessed on 21 November 2012.

Table 4.A3.2. **Tariff regulation in selected states' legal frameworks for WSS**

States	Publication of law	Body that approves the tariffs	Aspects considered in tariffs			
			Are costs covered?	Depreciation?	Sewerage cost included?	Sanitation cost included?
Aguascalientes	2005	Board of Governors	Yes	Yes	Yes	Yes
Baja California	1969	State Congress	Yes	N/A	N/A	N/A
Baja California Sur	2001	Board of Governors	Yes	N/A	Yes	N/A
Campeche	1992	Board of Governors	Yes	Yes	Yes	Yes
Coahuila	2006	Board of Governors	Yes	Yes	N/A	N/A
Colima	2000	Board of Governors	Yes	Yes	Yes	Yes
Chiapas	2000	Board of Governors	Yes	Yes	Yes	Yes
Chihuahua	2004	State Council	Yes	N/A	Yes	Yes
Durango	2005	City Council	Yes	Yes	Yes	Yes
Guanajuato	2000	City Council	Yes	Yes	Yes	Yes
Guerrero	2002	City Council	Yes	Yes	Yes	Yes
Hidalgo	1999	State Congress	Yes	N/A	Yes	Yes
Jalisco	2007	State Congress	Yes	Yes	Yes	Yes
Mexico City	2003	Legislative Assembly	Yes	N/A	N/A	N/A
Michoacan	2004	City Council	Yes	Yes	N/A	N/A
Morelos	2002	State Congress	Yes	Yes	Yes	Yes
Nayarit	1995	Board of Governors	Yes	Yes	Yes	Yes
Nuevo Leon	1997	State Executive	Yes	Yes	Yes	Yes
Oaxaca	1993	Board of Governors	Yes	Yes	Yes	Yes
Puebla	1994	State Congress	Yes	N/A	N/A	N/A
Queretaro	1992	Board of Governors	Yes	Yes	Yes	Yes
Quintana Roo	1996	N/A	N/A	N/A	N/A	N/A
San Luis Potosí	2001	State Congress	Yes	Yes	Yes	Yes
Sinaloa	2002	Board of Governors	Yes	N/A	Yes	Yes
Sonora	2006	State Congress	Yes	Yes	Yes	Yes
State of Mexico	1999	Board of Governors	Yes	Yes	Yes	Yes
Tabasco	2005	State Congress	Yes	Yes	Yes	Yes
Tamaulipas	2006	State Executive	Yes	Yes	Yes	Yes
Tlaxcala	2001	City Council	N/A	N/A	N/A	N/A
Veracruz	2001	Board of Governors	Yes	Yes	Yes	Yes
Yucatan	1982	State Congress	Yes	N/A	N/A	N/A
Zacatecas	1994	Board of Governors	Yes	Yes	Yes	Yes

Notes: Updated in June 2009. Yes = the state Constitution contains the condition. N/A = the condition is unspecified.

Source: Elaborated based on data from CONAGUA, Deputy Director General's Office for Drinking Water, Sewerage and Sanitation.

Annex 4.A4
Description of federal programmes

The **Water Utilities Modernization Program** (PROMAGUA – *Programa para la Modernización de Organismos Operadores*) functions as an additional source of financial resources, on the condition of a structural change to consolidate water utilities, improve efficiencies, gain access to technology, and foster sustainability through private sector participation (PSP). This programme is mainly focused on municipalities more than 50 000 inhabitants, and can support water supply, sanitation, macro-projects and investments to improve water management. The type of projects and the maximum non-recoverable contribution of PROMAGUA are described in Table 4.A4.1.

Table 4.A4.1. **Projects subject to PROMAGUA**

Concept	Requirement	Non-recoverable contribution	Actions to be supported
MIG: Integral Management Improvement (*Mejora Integral de la Gestión*)	Diagnosis and Integral Planning (DIP)	Up to 40%	Commercial system: inventory of users, metering, billing, charging, tariff scheme, etc. Operational system: rehabilitation and sectorisation of networks, electricity consumption savings, metering
Water supply	DIP and more than 62% of physical efficiency and 75% of commercial efficiency	Up to 40%	Connections work, pipes, desalination plants, water treatment plants, distribution pipes and storage
Water supply + MIG	DIP and physical efficiency of 62% or less and commercial efficiency of 75% or less	Up to 40% of MIG and 49% of water supply	Same as MIG and water supply concepts
Sanitation	Performance indicators	Up to 40%	PTAR, treatment and disposal of mud, co-generation of electricity through use of biogas and re-use pipes for wastewater treatment. Additional infrastructure, such as drainpipes or emitters, requires a justification
Macro-projects	DIP + more than 62% of physical efficiency and 75% of commercial efficiency	Up to 49%	MIG projects, water supply and sanitation of more than 1 000 million
Macro-projects + MIG	DIP and physical efficiency of 62% or less and commercial efficiency of 75% or less	Up to 40% of MIG and 49% of water supply	Same as MIG and water supply concepts.

Source: Elaborated based on data from CONAGUA (2011), *Programa para la Modernización de Organismos Operadores de Agua (PROMAGUA)*, CONAGUA, Mexico.

The **Drinking Water and Sanitation Program for Urban Areas** (APAZU – *Programa de Agua Potable y Alcantarillado Sanitario en Zonas Urbanas*) helps states and municipalities develop projects to increase the quality and availability of water supply, sewerage and sanitation in urban areas. It disburses subsidies targeted to improve

the operating, commercial and financial efficiency of service delivery. The programme can contribute up to MXN 100 million to a given project, covering up to 45% of the funding required to improve efficiency and expand access in these areas. The project selection criteria are established in the "Rules of Operation" (see Table 4.A4.2).

Table 4.A4.2. **Selection criteria for APAZU projects**

Criteria	Scores
Works initiated in previous fiscal years that require continuity	60
Water utilities that include actions to increase and maintain in operation metering systems	From 0 to 40
Water utilities that include actions in the inventory of users, billing and charging	From 0 to 25
New works to expand WSS coverage	From 0 to 20
Works of artificial recharge of aquifers	From 0 to 15
Water utilities that include actions to sectorise distribution and detect and eliminate water leaks	From 0 to 10
Water utilities that include other actions considered by the programme	From 0 to 5

Source: Elaborated based on data from SEMARNAT (2012), "Reglas de Operación para los Programas de Infraestructura Hidroagrícola y de Agua Potable, Alcantarillado y Saneamiento a Cargo de la Comisión Nacional del Agua, Aplicables a Partir de 2012", *Official Gazette*, Mexico, December.

Information on how resources are allocated is difficult to obtain, as the only reporting is done through the Information System of Water Basic Services (*Sistema de Información de Servicios Básicos del Agua* – SISBA), which is not publicly available (CONEVAL and SEMARNAT, 2012a). In 2007, the federal contribution to the programme amounted to MXN 76.4 million leveraging some MXN 79.3 million of contributions by third parties (CONAGUA and Instituto de Ingeniería, 2008).

Despite the progress achieved through APAZU, according to CONEVAL and SEMARNAT (2008), the programme would benefit from a better definition of the issue at stake and of the programme's target, namely, the water utilities in "localities with more than 2 500 inhabitants, which do not have in the household drinking water services and disposal of wastewater (drainage and sewerage)". In cases of communities where there is no water utility, the state can request support from the programme. A more recent evaluation of the "Rules of Operation" of APAZU (COLMEX, 2012) suggests a new definition of the rankings of urban communities, which would facilitate the identification of highly marginalised zones and states and communities that have not yet taken advantage of the programme. According to CONEVAL and SEMARNAT (2012a), "results of the programme have never been documented in a separate way". It is therefore difficult "to know exactly how the resources from APAZU have contributed to reduce the backwardness of urban areas in terms of water and sanitation services coverage, and the effectiveness of its costs". The programme does not have a specific inventory of beneficiaries and does not collect socio-economic information about water utilities (*ibid*). The allocation and spending of resources are mainly done based on explicit requests by the states, and do not follow a proper planning of needs at the level of communities and water utilities.

The **Program for the Sustainability of Drinking Water and Sanitation Services in Rural Communities** (PROSSAPYS – *Programa para la Construcción y Rehabilitación de Sistemas de Agua Potable y Saneamiento en Zonas Rurales*) supports water and sanitation services development in rural areas, in particular in communities with less than 2 500 inhabitants,[1] promoting decentralisation of administrative responsibilities and

strengthening financial management in marginalised areas. It requires collaboration from municipalities and states to execute the works and it relies on their financial contribution. The programme is in its third phase. It has improved over its 15 years of experience. The prioritisation of communities that receive funding is based on the criteria in Table 4.A4.3.

Table 4.A4.3. **Selection criteria for PROSSAPYS projects**

Description	Scores
Localities with high and very high levels of marginalisation	30 points
Localities with less than 20% of coverage of the requested service	30 points
Increase in WSS coverage included in the proposal	0-20 points
Bigger number of population benefiting from the funding	0-15 points

Source: Elaborated based on data from SEMARNAT (2012), "Reglas de Operación para los Programas de Infraestructura Hidroagrícola y de Agua Potable, Alcantarillado y Saneamiento a Cargo de la Comisión Nacional del Agua, Aplicables a Partir de 2012", *Official Gazette*, Mexico, December.

PROSSAPYS has made important contributions to expand water and sanitation services in rural areas, particularly to marginalised communities, where water and sanitation services required urgent rehabilitation and investments for new infrastructure. According to CONEVAL and SEMARNAT (2012), access to drinking water in rural communities expanded from 15.3 million in 1996 to 19.6 million inhabitants by 2010. Performance indicators for the programme (*ibid*) show that the "percentage of drinking water coverage in rural zones" improved by 0.71% in 2011, and the "percentage of sewerage coverage in the rural environment" by 0.47 in the same year; the "percentage of rural population benefited by the programme with drinking water service" has improved by 2.94% and the "percentage of rural population benefited by the programme with sewerage service" by 1.19%. Nevertheless, PROSSAPYS presents some challenges (Dominguez, 2012): it could better define the target beneficiaries and develop a yearly implementation plan; it would benefit from better data collection to elaborate CONAGUA's inventory of beneficiaries; it could better incorporate the social perspective of the water and sanitation services coverage; and it could establish synergies with other federal programmes.

The **Water Utilities Efficiency Improvement Program** (PROME – *Programa de Mejoramiento de Eficiencias de Organismos Operadores*) was established in 2010 to support water utilities in improving their physical and commercial efficiency. PROME includes the preparation of diagnostic studies to identify gaps and potentialities for improvement. With funding from a World Bank loan of USD 100 million, PROME supports water utilities in cities with more than 20 000 inhabitants and uses the "Rules of Operation" of the APAZU programme. PROME has two main components:

1. Improvement of information and knowledge management in water and sanitation services, which includes the following activities: training on physical and commercial efficiency; development of manuals for water utilities; design of information systems for data collection and processing; preparation of rules; dissemination of good practices; organisation of conferences, workshops and seminars.
2. Modernisation of service provision of water utilities, which aims to increase administrative and operational efficiency, as well as financial viability.

The Program for the Reimbursement of Duties on Water Use and Wastewater Discharge (PRODDER – *Programa de Devolución de Derechos*) allocates water use and wastewater discharge duties to water and sanitation providers to fund qualifying investments. All funds received from PRODDER and matched by the water and sanitation providers must be invested in the system. Such investments must be consistent with a work plan that has been accepted by CONAGUA. The beneficiaries of PRODDER are *i)* states, municipalities, para-state or para-municipal organisms that are in charge of using or exploiting the national waters and cover the corresponding rights; *ii)* enterprises that through concessions or authorisations substitute the state, municipalities or para-state or para-municipal organisms in water and sanitation services provision; and *iii)* colonies constituted as a moral person and through concession of states, municipalities and para-state or para-municipal organisms provide drinking water service for domestic use. The components of the PRODDER include actions in three main areas (SEMARNAT, 2010):

3. Improvement of efficiency, through acquisitions and works on macro-metering, micro-metering, detection and control of water leaks, commercial systems (users' registry, automatisation of billing process), technical training, water saving devices, rehabilitation of water and sanitation services infrastructure, disinfection of drinking water, etc.
4. Execution of new drinking water infrastructure, such as collecting works, water supply networks, water treatment plants, storage tanks, substitution of supply sources, etc.
5. Execution of new infrastructure for sewage and wastewater treatment for recollection, treatment, emission and rain drainage.

The **Federal Sanitation Program for Wastewater** (PROSANEAR – *Programa Federal de Saneamiento de Aguas Residuales*) has the objective to provide funds to build wastewater treatment systems, reduce pollution, and prevent the incidence of water-born illnesses and contribute to environmental sustainability.

The **Federal Program for Wastewater Treatment** (PROTAR – *Programa de Tratamiento de Aguas Residuales*) supports better use of infrastructure, in particular in relation to wastewater treatment. The PROTAR supports minor infrastructure works of less than MXN 5 million, and bigger projects. Those between MXN 10 and 100 million require a cost-effectiveness analysis, while those of more than MXN 100 million have to comply with a cost-benefit analysis (CONAGUA, 2011f).

The **Federal Program for Clean Water** (*Programa de Agua Limpia*) supports compliance with water quality norms. The main target of the programme is to support the 1 250 municipalities considered as highly marginalised in Mexico. The programme helps to rehabilitate infrastructure to disinfect water, to acquire new inputs for disinfection, protection of water sources, etc.

Note

1. According to the 2010 Population Census in Mexico, there are 188 593 communities with less than 2 500 inhabitants.

Annex 4.A5
Performance indicators

Table 4.A5.1. **Core performance indicators monitored by CONAGUA**

Indicator	Explanation	Target
Drinking water coverage (%)	Share of population with service at the entrance of the household.	The coverage in 2011 was 91.6%, the target for the end of 2012 is to reach 92% of coverage.
Sewage coverage (%)	Percentage of population that has sewage system from the street to the household.	The coverage in 2011 was estimated at 86%. The target for the end of 2012 is 88%.
Treatment coverage (%)	Percentage of water treated in treatment plants in relation to the volume of collected wastewater in the sewage system.	Treatment coverage was estimated at 45.7% in 2011. The target is 60% by the end of 2012.
Service continuity (%)	Share of connections with 24-hour service in percentage of total registered connections.	In some cases, rationing is necessary, but the target is to have 100% service continuity.
Allocation per inhabitant (l/h/d)	Daily volume produced in the system in relation to the total population.	Allocation should be established by criteria, population density and the particularities of the climate.
Effect on electricity	Amount paid for electricity in relation to the operational costs.	The average in 2011 was 30%. The target is established by water utility to identify specific problems and improve efficiency.
Coverage of macro-metering (per number of meters)	Percentage of installed meters in relation to the total of active water supply sources.	The target is 100%.
Coverage of micro-metering	Percentage of installed meters in good shape in relation to the total of registered active sources.	Target: all connections should be metered.
Physical efficiency	Share of the water volume sold or billed to users in percentage of the volume produced.	The average in 2011 was 57.6%.
Commercial efficiency	Percentage of bill recovery.	The average in 2011 was 76.6%.
Global efficiency	Percentage of physical efficiency per percentage of commercial efficiency.	The target is to increase from 36.4% in 2006 to 44.2 in 2012. The average in 2011 was 44.1%.

Source: Elaborated based on data from CONAGUA (2011), "Programa para la Modernización de Organismos Operadores de Agua (PROMAGUA)", CONAGUA, Mexico updated directly by CONAGUA.

Table 4.A5.2. **Performance indicators for utilities developed by the Water Consultative Council**

Concepts	Indicators	
Quality	Drinking water coverage	1. Percentage of total population connected to the drinking water system.
	Sewage or sanitation coverage	2. Percentage of total population connected to the sewage or sanitation system.
Efficiency	Service continuity and extension	3. Continuity and extension (percentage of faucets with drinking water 24/7).
	Productivity	4. Number of faucets by worker.
	Metering	5. Number of operating meters compared to existing faucets.
	Physical efficiency	6. Volume of billed water in relation to the total volume of water produced in a year.
	Commercial efficiency	7. Volume of charged water in relation to the total water billed in a year.
Finance	Operational results	8. Total earnings of WSS in relation to the operating costs.
Environment	Wastewater treatment	9. Volume of treated wastewater in relation to the total of wastewater produced in a year.
Institutionality	Institutionality	10. Sum-up of binary qualifications (0,1) in relation to each one of the institutional variables considered.

Source: Consultivo del Agua (2011), "Gestión del Agua en las Ciudades de México. Indicadores de Desempeño de los Sistemas de Agua Potable, Alcantarillado y Saneamiento", Consejo Consultivo del Agua, Mexico, p. 19.

Table 4.A5.3. **Performance indicators used by IMTA**

Drinking water coverage (%)	Coverage of reported sewage (%)	Consumption (l/h/d)
Costs between produced volume (USD/m^3)	Allocation (l/h/d)	Commercial efficiency (%)
Charging efficiency (%)	Physical efficiency 1 (%)	Physical efficiency 2 (%)
Global efficiency (%)	Dedicated employees to leaking control	Employees per 1 000 connections (number)
Hours with service in rationing zones (%)	Macro-metering (%)	Micro-metering (%)
Users' register (%)	Losses per network length (m^3/km)	Losses per connection (m^3/connection)
Complaints (per 1 000 connections)	Networks and installations (%)	Rehabilitation of household connections (%)
Pipelines rehabilitation (%)	Relation cost-tariff	Relation of work (%)
Relation investment-GDP (%)	Connections with continued service (%)	Users receiving service with tank trucks (%)
Users with payments on time (%)	Treated volume (%)	

Source: www.pigoo.gob.mx., accessed on 21 November 2012

Chapter 5

Making water reform happen: A tentative implementation plan

This chapter builds on previous OECD work on Making Reform Happen and key findings from this report to suggest a tentative implementation plan to support Mexican water reform in the short term. It puts forward practical steps to consider in the development of the whole-of-government and systemic Action Plan, suggests potential indicators to monitor progress in reform implementation, and highlights good practices in OECD and non-OECD countries that could serve for peer learning. Cross-references are made to the 2030 Water Agenda initiatives and actions that address issues pointed out in the implementation plan.

OECD work conducted within the framework of the *Making Reform Happen* Project[1] highlighted that there is no one-size-fits-all "toolkit" for reform. However, reform processes do share some common features, many of which are relevant to making water reform happen in Mexico (OECD, 2010). These include:

- **An electoral mandate for reform.** The Mexican administration elected in July 2012 has an opportunity to enshrine water in its action plan, building on the legislative reforms contemplated in the sector.

- **Effective communication to persuade voters and stakeholders of the need for reform.** The new Mexican government (2012-2018) highlighted five priority areas for reform (security, poverty alleviation, economic development, education, and multi-lateral co-operation), all of which would benefit from spillovers generated by successful water reform.

- **Solid research and evidence-based analysis to support policy design and enhance prospects for reform adoption.** In the case of water, the OECD report, *Making Water Reform Happen in Mexico,* provides thorough evidence-based analysis on both the challenges and assets that Mexico should consider, which could be a starting point for government action.

- **Appropriate institutions, capable of supporting reform, from decision making to implementation.** Key findings from this report showed that Mexico has a well developed policy framework for the water sector, with a number of institutions and instruments in place at different levels. The main objective is to make the most of these, take into account their distinctive capacities to allocate roles and responsibilities accordingly and foster complementarity and synergies.

- **Leadership.** The 2030 Water Agenda showed a clear political commitment to design a long-term vision of the sector, but requires further action. The new administration could work to foster a sense of ownership of the reform at all levels, engage stakeholders in implementation and, where needed, adjust the scope of the reform.

- **Time.** Successful structural reforms are long processes to prepare, adopt and implement; they often take several attempts. Complex changes like those required in Mexico's water sector will inevitably take years. Circumstances at all levels can change during the reform implementation period, and water reform can only be successful if it has the flexibility to adapt to shifting circumstances.

Water policy reform in Mexico could benefit from benchmarking and from drawing lessons from international experience with similar reforms. Of particular relevance are lessons learned on how to sustain coherent policy reform, and how to ensure cross-fertilisation and policy coherence across economic, social, environmental and governance issues.

Urgent questions: A reformer's initial checklist

While neither the *Making Reform Happen* work nor the political economy literature in general can yield any universal formulae for reform success, the research undertaken by OECD suggests that policy makers should bear in mind the following questions when designing both policy reforms and strategies for their adoption and implementation:

1. Do the authorities have a *clear mandate* for change?
2. What more can be done to demonstrate the *need for change* and/or the desirability of the proposed solutions to the public and key stakeholders?
3. How strong is the *evidence* and *analysis* underlying the arguments for reform?
4. Are *institutions* in place that can manage the reform effectively, from design to implementation, or is there a need to create/strengthen such institutions?
5. Does the reform have clearly *identifiable "owners"*, in terms of both politicians and institutions responsible for taking it forward?
6. What is the expected *timeframe* for design, adoption and implementation?
7. What is to be the *strategy* for engaging those threatened by reform? Can they be persuaded to support it? To what extent can/should their objections be overridden?
8. Should they be *compensated* for their anticipated losses – and, if so, *how* and *to what extent*?

Source: OECD (2010), *Making Reform Happen: Lessons from OECD Countries*, OECD Publishing, Paris, doi: 10.1787/9789264086296-en.

Table 5.1 suggests practical steps and potential monitoring and evaluation indicators that correspond to OECD recommendations and that may assist Mexico and its authorities in making water reform happen in the water sector. It draws on relevant OECD experience and cross-references the 2030 Water Agenda initiatives.

The tentative implementation plan is structured around the four areas identified as priorities for water reform in this report, i.e.:

- improving multi-level governance
- strengthening river basin governance
- improving economic efficiency and financial sustainability
- institutionalising regulatory functions for water supply and sanitation provision

Table 5.1. **Tentative implementation plan in support of Mexico's water reform**

A. Priority area of reform: Improve multi-level governance to address territorial and institutional fragmentation

OECD recommendations	Practical steps	Potential indicators	Relevant OECD experience	Cross-reference with the 2030 Water Agenda
Develop a whole-of-government implementation action plan building on the 2030 Water Agenda Policy goals and initiatives that • fosters policy coherence with agriculture, energy and territorial development; • sequences priorities and aligns policy objectives across federal, regional and state water plans and programmes.	• Set up a **multi-lateral platform** across ministries and public agencies at federal level for upper horizontal co-operation on water-related policies (for example, using the model for the existing inter-ministerial framework for climate change). • Explore the potential for **policy coherence at watershed level**, through adoption of good practices on the ground (e.g. voluntary schemes for removing subsidies to farmers against accompanying measures). This diffusion process may need targeted and time-limited financial and other support (e.g. support for "green" investments") to mitigate the transition costs that change may impose on some and to encourage agents to promote change. • **Align the multi-level planning apparatus** with the 2030 Water Agenda policy goals and foster cross-sectoral planning (water, territorial development, infrastructure projects, etc.). • **Back up regional water programmes with concrete roadmaps** reflecting local needs and consensus at basin level, with milestones to be reached and sequenced budgeting in support of water reforms.	• **N° of regular meetings across ministries and public agencies** to discuss water reform implementation and impacts of resulting collegially taken decisions implemented. • **Number of cross-sectoral projects** developed and monitoring of their impacts (e.g. risk reduction, return on investment). • **Number of best practice tools adopted** (e.g. assessments, public consultation, strategic planning) and monitoring of their evolution. • **Number of watersheds in which policy coherence initiatives are undertaken** (to get a sense of breadth and depth of change) and the **monitoring of their impacts** (e.g. reduction in aquifer over-exploitation, discharged volumes of untreated water). • **Satisfactory/perception surveys** across levels of government to reflect progress on reform implementation.	**Australia** (2004 National Water Initiative). **South Africa** **Brazil** (for institutional adaptation to the territorial specific needs).	**Initiative 24**: Creating the National Development Planning Institute, which would ensure the due long-term harmonisation among the different sectoral and territorial development policies in Mexico. **Initiative 25**: Strengthening the process of formulation, follow-up and evaluation of long-term water programs by hydrological region aimed at water sustainability.

A. Priority area of reform: Improve multi-level governance to address territorial and institutional fragmentation (*cont.*)

OECD recommendations	Practical steps	Potential indicators	Relevant OECD experience	Cross-reference with the 2030 Water Agenda
Set up mechanisms and incentives for enhancing water policy outcomes in the current decentralisation framework. Flexibility is needed to adjust to the features of each state and basin institutional structure and to bring consistency to water governance.	• Launch a t**ender on innovative local water initiatives** with co-funding mechanisms to scale up good projects at local level and replicate them where relevant. The tender process should be accessible and largely communicated to avoid capture by groups that are already well-served. • **Assess river basin institutions' performance** to identify implementation gaps and good practices on the ground. • **Select 1-2 pilot cases for further decentralisation of funding** prerogatives of river basin organisations, and test progress. • **Foster water governance pacts to better articulate interdependencies across levels of government** through contracts, multi-annual budgeting, inter-municipal tools. • **Develop customised capacity-building programmes** for river basin organisations staff and river basin council leadership.	• Set **progressive targets** with percentage of the budget collected at basin level by 2030 (timing horizon of the Water Agenda). • Assess the **diffusion of information** about call for tenders among local and regional authorities, incl. river basin ones. • **Absorption capacity of federal funds** allocated to sub-national authorities (i.e. impact and efficiency assessment of federal programmes). • **Balance and type of projects** carried out (hard or soft infrastructure?). • **Performance measurement mechanisms** in place to make partner commitments credible and more enforceable. • **Number and content of water-governance pacts** concluded across levels of government. • **Assessments of river basin organisations' (RBOs) capacity needs and feedback from RBOs on results of capacity-building exercises**.	**Australia** (place-based policies). **Brazil** (river basin plans). **France, European Union** (contracts, water information systems).	**Initiative 1:** Giving a more relevant role to COTAS (technical groundwater committees) in aquifer management. **Initiative 2:** Strengthening the organisation and functioning of RBCs and their auxiliary bodies. **Initiative 3:** Consolidating the governance functions and regional organisation of the CONAGUA.

A. Priority area of reform: Improve multi-level governance to address territorial and institutional fragmentation (*cont.*)

OECD recommendations	Practical steps	Potential indicators	Relevant OECD experience	Cross-reference with the 2030 Water Agenda
Foster information sharing, integrity and public participation across all levels of government for more transparent, accountable and inclusive policy making.	• Streamline existing water information systems and **develop a one-stop-shop online platform on water information (agreed upon by the stakeholders),** regularly updated and easily accessible. • **Develop a programme for economic information and evaluation** to collect, analyse and publish water policy driven information/technical data. • **Develop a National public participation strategy or "scheme"** to engage representatives of environmental protection associations (e.g. NGOs), consumers' associations and professional associations (e.g. Chambers of Agriculture, trade unions) in policy making processes at all levels. • **Disclose all information related to the allocation and use of public funds in the water sector** (including grants from federal programmes) to the Superior Auditor of Mexico (ASF) and build on the results of its annual audit to fight illegal practices (e.g. new Integrity Pacts).	• Monitor the **development and activities on the online information platform** (e.g. number of up-dates, their frequency, coverage in terms of information use, etc.). • Share/balance of representatives from users, socio-economic groups, policy area taking part in water policy making at basin, municipal, state and federal levels and **impact assessment of consultation processes.** • Follow-up to the **ASF Annual audits and conclusion of corruption reviews** (e.g. Transparencia Mexicana). • Number and amount of fines levied under the framework provided by Initiative 22 of the 2030 Water Agenda.	**On information systems** **France** (*Observatoire de l'eau* – ONEMA). **European Union** (WISE – Water Information System Europe; or Eurobarometre). **On public participation** **France** (multi-level organisation of water users' associations). **On transparency and integrity** **Spain** (Transparency Index for RBOs – INTRAG).	**Initiative 35:** Developing regional information systems to reinforce water management by catchment and aquifer. **Initiative 36:** Creating an information system on investments in the water sector made by the three branches of government and by users. **Initiative 22:** Increasing the fines to civil servants who allow the non-compliance of land use plans in urban development.

B. Priority area of reform:
Strengthen river basin governance for truly integrated water resources management

OECD recommendations	Practical steps	Potential indicators	Relevant OECD experience	Cross-reference with the 2030 Water Agenda
Strengthen the role, function and autonomy of river basin councils and their auxiliary bodies so that they can • design context-tailored policies; • develop effective basin plans; • prioritise projects and generate the resources needed to carry out their duties.	• **Develop a tailored approach rather than a national one-size-fits-all model,** which takes into account basins' capacity, specific challenges reform needs and priorities. • **When relevant, decentralise decision-making functions to COTAS regarding aquifer monitoring** such as the ability to create areas of restricted use or the establishment of sanctions in case of groundwater pollutions (e.g. discharge of untreated wastewater). • **Select 2-3 pilot cases where (advanced) river basin councils are able to design and implement their own river basin management plans** to improve the quality and adapt the quantity of available water, based on their mapping of significant pressures and impacts of human activities on their respective catchment. • **Define a clear checklist of what river basin plans should contain,** based on international experience (e.g. EU) and get a consensus on it. Usually, common items include environmental objectives, economic analysis, action plans, consultation measures and a sequenced implementation plans with associated targets to be reached and budget planning.	• **Set up performance indicators (to be disseminated in annual reports) across COTAS and RBC** to monitor aquifer quality and quantity (*e.g.* levels of hydrochemicals, salinity, water recharge capacity) and evaluate the progress achieved. • **Set up indicators monitoring** (*ex post*) compliance to river basin plan requisites and share results for enhancing reputational incentives and bench learning across the country.	**European Union** (Water Framework Directive). **Brazil** (place-based approach when setting governance instruments e.g. basin committees are not widespread in the country but gradually adopted, based on local needs and capacities).	**Initiative 1A:** Legally reinforce their intervention in aquifer monitoring activities. The organisational and promotional work of the Technical Groundwater Committees (COTAS) has shown their potential to undertake tasks of greater magnitude such as intervening in the measurement and monitoring of flows withdrawn from aquifers, and in the planning, management and regulation of the use of aquifers; to achieve this, their intervention needs to be legally reinforced for this and other important support tasks for the institutional administration of the nation's water, modifying the legal rules that facilitate their intervention. **Initiative 2:** Strengthening the organisation and functioning of the river basin councils and their auxiliary bodies **Initiative 3:** Consolidating the governance functions and regional organisation of the CONAGUA.

B. Priority area of reform

Strengthen river basin governance for truly integrated water resources management (*cont.*)

OECD recommendations	Practical steps	Potential indicators	Relevant OECD experience	Cross-reference with the 2030 Water Agenda
Establish a platform to share good practices across river basin organisations, councils and auxiliary bodies to enhance capacities through peer learning.	• **Convene annual conferences of river basin organisations, councils and auxiliary bodies** (that could be focused on specific topics to discuss lessons learnt and foster the exchange of experiences (and could build on recent events organised for example in the state of Hidalgo). • **Create interactive online platforms of information/think tanks for each hydrological region** to encourage river basin institutions and other stakeholders to exchange with each others on the specificities of each region and develop co-ordinated place-based solutions to their region's main water challenges.	• **Dissemination of key messages/ reports after each annual meeting** setting overall strategic lines for river basin institutions throughout Mexico. • **Monitoring of activities and updates** on the interactive platforms.	**France** (Annual Conference of Public river basin territorial agencies – EPTB). **LANBO** (Latin American Network of Basin Organisations).	**Initiative 2F:** Developing continuous training processes that foster better skills and capacities among the members of the river basin councils, in order to promote, co-ordinate, and consult on joint actions with shared responsibilities, as well as to intervene in the diagnosis, formulation of plans and programs, evaluation of water management and in data and information management on water and catchments, as well as in their dissemination.

B. Priority area of reform

Strengthen river basin governance for truly integrated water resources management (*cont.*)

OECD recommendations	Practical steps	Potential indicators	Relevant OECD experience	Cross-reference with the 2030 Water Agenda
Consider giving river basin organisations a gradual degree of autonomy to raise and allocate funds locally for priority investment. This could be considered when policy objectives are well defined and recurrently reviewed, and would allow river basin organisations to generate the resources needed to carry out their duties closer to local stakeholders.	• **Select 2-3 river basin organisations that are more advanced** on budget management and fund raising activities to test further decentralisation options if relevant. • Carry out **evaluations of river basin organisations'** capacities and performance. • **Train river basin organisations staff on financial resources management and spending** (for example with peer-learning across hydrological regions); develop the possibility to "professionalise" RBOs' employees in an administrative and technical staff category, dissociated from political leadership.	• **Share of revenues collected** by river basin institutions in pioneer case studies. • **Conclusion/results of fiscal reviews/audits** of pioneer case studies.	**France** (water agencies as financial vehicles with prerogatives on tax collection).	**Initiative 1D:** Ensuring their financial operation through some legally binding procedure linked to withdrawals and to users.

B. Priority area of reform:

Strengthen river basin governance for truly integrated water resources management (*cont.*)

OECD recommendations	Practical steps	Potential indicators	Relevant OECD experience	Cross-reference with the 2030 Water Agenda
Engage stakeholders in river basin councils within a framework of joint responsibility, transparency and accountability. Participation should not be restricted to consultation and approval of programmes, but extended to an active role in the decision making.	• **Set criteria/mechanisms to ensure a balanced representativeness** of the various water users and sectors (*e.g.* equal percentage of representatives for each key sectors and users' groups). • **Define, through a national debate, a public participation strategy or "scheme"** to truly "democratise" decision making and avoid political "capture" by power elites through better planning prerogatives and capacity at basin level. • **Launch a communication campaign in urban and rural areas** to present the role and functions of river basin councils and their auxiliary bodies, and to clearly explain how each individuals can play a role in these structures to better manage water resources at the local level.	• **Share of marginal groups** (e.g. indigenous communities) in river basin councils and their auxiliary bodies. • Respective **share of "sectoral" stakeholders** (e.g. agricultural, energy, civil society, private enterprises, etc.). • **Number of new members per year** in each river basin councils and their auxiliary bodies, and the sector/group to which they are affiliated.	**Spain** (Water Users' Assembly).	**Initiative 2B:** Revitalising the Assemblies of Water Users in each of the country's catchments and aquifers so that, in conformity with the National Water Law, users can get to know and deliberate on the issues and problems faced in each catchment and aquifer and so that the representatives of the users in the river basin councils are designated or renewed, being committed to provide information on and account for their actions and performance on that body. **Initiative 2E:** In collaboration with all members of the river basin councils and the governments or groups they represent, developing public consultation schemes to capture the opinion of broad segments of citizens and of the users themselves on water problems and possible solutions in each catchment and aquifer. **Initiative 35:** Developing regional information systems to reinforce water management by catchment and aquifer.

C. Priority area of reform:

Enhance economic efficiency and financial sustainability of water policies

OECD recommendations	Practical steps	Potential indicators	Relevant OECD experience	Cross-reference with the 2030 Water Agenda
Enhance the cost effectiveness of water policies through better institutional architecture and strategic financial planning.	• Systematically **align investment plans** with basin priorities. • **Back investment plans by strategic financial plans**, which *i)* define who will pay for what and when; *ii)* rely on several sources of funding; *iii)* clarify expected outputs and assess cost-efficiency; and *iv)* pay proper attention to low-cost options (e.g. green infrastructures or community management). • **Systematically assess the impacts of** (agriculture, energy, land use) **policies** on water. • **Promote water impact assessments** in any water-related policy design.	• **Share** (in numbers of plans and extent of coverage of those plans) **of investment plans backed by financial plans, projections on expected outputs and cost-efficiency analyses**. • **Diversity of sources of finance in investment plans.** • **Frequency of water impact assessments** in the context of other (non water) policies.	**Many OECD countries.**	**Initiative 26:** Applying a results-oriented evaluation to all public programs that have an impact upon or that affect in some way the pursuit of water availability.

C. Priority area of reform:

Enhance economic efficiency and financial sustainability of water policies (*cont.*)

OECD recommendations	Practical steps	Potential indicators	Relevant OECD experience	Cross-reference with the 2030 Water Agenda
Fully exploit the benefits of existing economic instruments in line with the Polluter-Pays, Beneficiary-Pays, Equity and Policy Coherence principles. Reform abstraction and pollution charges, water tariffs, Payment for Ecosystem Services (PES) schemes, buy-back programmes, and water markets so that they contribute to water policy objectives.	• **Improve collection rates** of water bills, using best practices in the country as benchmark. • **Assess the impact of higher tariffs** on poor households and farmers' competitiveness. • **Replicate and scale up successful initiatives** related to the reform of *Tarifa 9* and water and sanitation services tariffs. • Set up **pollution charge on fertilizers.**	• **Collection rates of water bills** (households, farmers). • Estimate **percent of household disposable income spent on water bills.** • **Revenues from pollution charges on fertilizers**. • **Incidence of fertilizer use.** • **Measures of water quality change** in response to pollution charges.	**Instruments in other countries (EU, Australia, Chile, Israel, the United States) can help, but need to be adjusted to local contexts.** A lot can be learned from front-runners in Mexico, especially on water tariffs (e.g. reform of *Tarifa 9*).	**Initiative 7F:** Charging a tax for fertilizers according to their non-point polluting effect and using these resources to attenuate the effects of this pollution.
Improve the contribution of federal programmes to water policy objectives and their cost effectiveness.	• Periodically **assess the contribution of federal programmes to water policy objectives and their cost** effectiveness. Compare *ex ante* and *ex post* assessments. • **Share and discuss the reviews in a political arena**, at national and state levels. • **Review and amend operating rules of federal programmes** so they contribute to water policy objectives.	• **Set up indicators as part of assessment reports to be produced on the efficiency and cost-effectiveness of federal programmes** (e.g. synergies with other sectors' investments [agriculture, energy, etc.], links to river basin priorities, amount of subsidies returned because of the lack of projects at sub-national level, etc.)	**Methods are known and available across OECD member and non-member countries but need to be subject to a political debate in Mexico among key stakeholders.**	

D. Priority area of reform:

Improve the regulatory frameworks for service provision

OECD recommendations	Practical steps	Potential indicators	Relevant OECD experience	Cross-reference with the 2030 Water Agenda
Clarify the regulatory framework for water services to address the overlaps and gaps in regulatory functions. There is a need to • identify and allocate clearly the responsibilities at each level of government; • strengthen enforcement and compliance; • increase the focus on capacity and financial sustainability of utilities, efficiency and quality of service provision and responsiveness to users.	• **Delineate clearly regulatory responsibilities in the Federal Law** under preparation. OECD's classification of regulatory functions could be used as a template. • **Use the recent establishment of a regulator in the State of Mexico as a pilot case** and assess its potential to be replicated in other states. • **Support the trend in corporatisation of service providers** via the training and professionalisation of staff in both municipalities and providers to support the transition of their functions. • Support the grounding of tariff regulation in technical consideration via awareness-raising in State congress and the establishment of incentives to use the federal norm.	• **Share of corporatised utilities** (as % of total utilities and % of services provided by corporatised utilities). • **Share of states allowing corporatisation of providers**. • **Monitor the up-take in the use of the Federal tariff norm**	**Australia** (state regulators at different levels).	**Initiative 11:** Promoting the systematic certification of management and technical staff of drinking water and sanitation utilities. **Initiative 12**: Promoting the definition of water tariffs that obey technical criteria, dissociated from political aspects.

D. Priority area of reform: Improve the regulatory frameworks for service provision (*cont.*)

OECD recommendations	Practical steps	Potential indicators	Relevant OECD experience	Cross-reference with the 2030 Water Agenda
Foster transparency on service performance and regulatory processes by pursuing the development of performance indicators and establishing mechanisms for increased public scrutiny of regulatory processes. Transparency is a strong lever for improved performance and re-establishment of trust between water users and water authorities (including providers). Consolidating the information base and monitoring framework for service providers needs to be pursued. Similarly, credible regulatory authorities rely on transparent regulatory processes such as clear tariff regulation, systematic publication of decisions and public consultation on regulatory proposals.	**Consolidate the framework of key performance indicators:** *In the short term* • Establish a **task force comprising CONAGUA, IMTA, ANEAS and other information collection initiatives to work together on a set of key performance indicators**, in consultation with water commissions and regulators where they exist. *In the longer term* • **CONAGUA should relinquish some of its information gathering and capacity building functions** for water and sanitation services utilities • **ANEAS should take a greater role as a platform for discussion and capacity building** for utilities on information issues. • **IMTA should strengthen its capacity building activities in the economics of water and policy making**. • **Regulators should be empowered with more responsibility in terms of information requests, benchmarking exercises and making this information** available to consumers. • The establishment of a **National repository of information** (e.g. observatory) should be considered.	• Percentage of metering. • Share of utilities reporting on their performance. • Progress of utilities against key performance indicators.	**England and Wales** (OFWAT's key performance indicators). **France** (Observatory of Water and Sanitation Services).	

D. Priority area of reform

Improve the regulatory frameworks for service provision (*cont.*)

OECD recommendations	Practical steps	Potential indicators	Relevant OECD experience	Cross-reference with the 2030 Water Agenda
Establish a platform to share the good regulatory practices that are developing at state and municipal levels. • Some evidence shows that a number of states and municipalities have put in place innovative mechanisms or institutional organisations to support better regulatory processes and service provision. • These practices could be collected and reviewed systematically as a base upon which other sub-national governments could build. • In addition, institutions such as the National Governors' Conference (CONAGO) and the National Association of Water and Sanitation Companies (ANEAS) could be better exploited.	• **Adapt and strengthen the role of CONAGO and ANEAS to play a greater role as platforms for the exchange** of experiences among States (CONAGUO) and among utilities (ANEAS) • **Undertake a systematic review of State experiences and practices in regulating water and sanitation services.**	• **Monitor the number of states that contribute to exchange of experiences** through CONAGO and ANEAS. • Ten years later, **monitor the impact of sharing of good regulatory practices across states.**	**Australia** (COAG, the Council of Australian Governments).	

Note

1. The Making Reform Happen (MRH) project, launched in 2007, aims to increase the OECD's support to governments in their reform efforts by working to identify and better understand the factors behind successful reforms and by providing direct support to member countries designing, adopting and implementing policy reforms.

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