



USAID COUNTRY PROFILE

PROPERTY RIGHTS AND RESOURCE GOVERNANCE

MEXICO

OVERVIEW

Mexico is an upper-middle-income country whose economy has grown steadily but much more slowly than that of other emerging-market countries. Mexico was hard hit by the global economic crisis because of its dependence on oil exports, trade with and remittances from the United States. Mexico's GDP actually fell by 6.5% in 2009, but it is expected to rebound and resume a steady but slow rate of growth.

Many of the benefits from Mexico's economic growth have been unequally distributed. According to Mexico's National Council on Evaluation of Social Development Policy, nearly half of the population lives below the national poverty line, and many of the poor live in extreme poverty. Over 60% of Mexico's extremely poor people reside in rural areas, and most are dependent upon subsistence agriculture. By international standards, agricultural productivity in Mexico is low. Agricultural growth has largely been concentrated in the commercial farming sector, and the rural poor have generally not experienced improvements in agricultural productivity.

Following legislation adopted in 1992, the fundamental transformation of Mexico's land regime, which allowed privatization and market transfers of *ejidal land* rights, is now largely completed. Follow-through is needed to: ensure an up-to-date and reliable land certification and registration process; increase support for women's land rights; increase access to credit; and improve the functioning of land markets.

Mexico's development is constrained by numerous environmental challenges, many pertaining to water and forest resources. The northern Mexican states are intensely water-stressed, and there is increasing contamination of both surface and underground water. Deforestation in Mexico is contributing to soil erosion and desertification. Mexico must improve its water and forest management systems to avoid limiting its potential for further growth.

KEY ISSUES AND INTERVENTION CONSTRAINTS

- **Support research on the effects of land regularization and privatization under PROCEDE and CORETT.** Understanding whether and to what extent improvements are possible in areas such as: tenure security; women's land rights; land transactions; agricultural productivity and investment; and land disputes will be valuable to the future course of land tenure reform in Mexico. *Donors could assist the Government of Mexico in conducting comprehensive field research on the PROCEDE and CORETT programs to understand the impact of the program on tenure security, land disputes, and related matters. The research should especially investigate the effects of certification on ejidos and comunidades, with specific focus on land tenure security.*
- **Work with the government and customary institutions to strengthen women's land tenure rights.** Most women in Mexico have not been direct beneficiaries of the land reforms initiated in 1992 and, despite statutory protections, traditional customs and practices (*usos y costumbres*) continue to restrict women's land rights. *Using findings from the recommended study of PROCEDE, donors could work with the GOM to develop strategies for improving the recognition and protection of the land- tenure rights of rural Mexican women. This could include a practical solution that "corrects" the existing land documentation by adding women's names to land titles. Additionally, donors could*

implement programs focused on empowering indigenous women to exercise their statutory land rights, as well as work with customary institutions to encourage them to include women in comunidad and ejido decision-making processes.

- **Improve land registration and land transfer systems.** One flaw of PROCEDE is that land certificates are not being regularly updated to reflect inheritances and transfers. *Donors could work with the GOM to develop strategies for ensuring the sustainable operation of the land-registration system. These could include built-in incentives such as free or low-cost registration of land transactions to encourage low-income landowners to register their rights and use the system regularly.*
- **Strengthen community-level awareness of land rights.** A large number of reported land disputes and grievances stem from lack of knowledge of relevant land policies and laws. Public awareness is also a key to improving and sustaining operation of the land-rights registration system. *Donors could work with the GOM to support grassroots-level public education to improve awareness of land rights, especially among poor and marginalized groups.*
- **Increase support for small farmers and develop accurate data on land distribution.** Individual farmers may in some cases have lands that are too small to farm productively, and fragmentation of *ejidal* land has, by some reports, become problematic. Accurate data on the extent of fragmentation and its effects is not currently available. *Donors could work with the GOM to study trends in land fragmentation, and its potential impact on land use and land conversion, as well as its governance, economic, financial and environmental effects. Donors could further partner with the GOM to explore ways to support owners of small-scale farms in developing competitive economies of scale through community associations, alliances, and partnerships.*
- **Mitigate water contamination.** One of the most severe water problems in Mexico is the increasing contamination of surface and ground water, including high levels of pollution along the Río Bravo/Río Grande border and in the Río Tijuana and Río Nuevo in Baja California. *Donors could work with the Mexican government to develop and implement a practical cross-sector strategy to reduce water pollution and clean up polluted waterways.*
- **Improve human-rights conditions in the mining industry.** The mining industry in Mexico has been plagued with conflict and alleged human-rights abuses. *Donors could work with the government to implement legal and other safeguards for mine workers, and to ensure that workers have fair and equitable access to the justice system in the event of grievance.*

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SUMMARY

Mexico is an upper middle-income country characterized by dramatic regional and urban-rural differences in income and quality of life. According to international poverty rates, 8.2% of the population lives below the poverty line, and 4% lives in extreme poverty. Today, Mexico is plagued by escalating violence arising from turf battles between drug cartels in northern Mexico, which have forced tens of thousands of people to leave their homes. By some estimates, 200,000 people fled Ciudad Juarez in the northern state of Chihuahua between 2007 and 2009 (World Bank 2010a; IDMC 2009).

Mexico implemented a large-scale land reform that began after the revolution in 1917 and ended in 1992. The reform distributed more than 100 million hectares from large farms to groups of households organized into *ejidos* (collective holdings). Indigenous groups also gained rights to their commonly held land during this period, which they

organized into *comunidades* (forms of collective ownership). These *comunidades*, however, lagged behind the development of privately held farms, and collective owners were more likely to be poor.

In 1992, Mexico fundamentally changed its land regime and allowed privatization and market transfers of *ejidal land* rights. This reform is now largely completed, though it has been hindered by: inadequate state participation in the land certification and registration process; insufficient protection of women's land rights; and lack of credit or marketing mechanisms. A large part of Mexico's rural population faces significant challenges in overcoming poverty and entering a future of broad-based, sustainable development in the countryside.

The rural sector is characterized by poverty for most residents. Rural living standards are much lower than those in urban areas. Sixty percent of the rural population is severely malnourished, compared to 19% of the urban population. Rural areas are home to 61% of Mexico's extreme poor. A majority of farmers are subsistence-oriented small farmers.

In the latter half of the twentieth century, Mexico experienced a fundamental shift from a rural to an urban society. This dramatic urbanization has strained the ability of the Government of Mexico (GOM) to build urban infrastructure, including housing. The lack of affordable housing has meant that rural-urban migrants cluster along the periphery of urban centers. The failure of state-funded urban housing to meet demand has led to the proliferation of informal settlements.

Women in Mexico were largely excluded from land redistribution programs and most *ejidal* land is held by men. Most women are not voting members (*ejidatarios*) of *ejidos* and do not hold use-rights. The 1992 reforms have in some cases further eroded women's rights on *ejidos*, as only *ejidatarios* were allowed to vote on new regularization and tenure regimes, and only *ejidatarios'* land rights were strengthened through these processes.

Box 1. Macro Indicators

	Year	Score
Population, total	2008	106,350,434
Population ages 0-14: 15-64: 65+ (% of total)	2008	29.1: 64.7: 6.2
Population growth (annual %)	2008	1.0
Rural population (% of total population)	2008	22.8
Population density (people per sq. km)	2008	54.7
Literacy rate, adult total (% of people ages 15 and above)	2007	92.8
Land area: Surface area (sq. km)	2008	1,943,950: 1,964,380
Arable land (% of land area)	2005	12.9
Agricultural land (% of land area)	2005	55.3
Permanent cropland (% of land area)	2005	1.3
Irrigated land (% of cropland)	2003	22.8
Forest area (% of land area)	2005	33.0
Nationally protected areas (% of total land area)	2006	5.3
Renewable internal freshwater resources per capita (cubic meters)	2007	3,884.9
Annual freshwater withdrawals, agriculture: domestic: industry (% of total freshwater withdrawal)	2007	77.1: 17.4: 5.5
Crop production index (1999-2001 = 100)	2005	107.2
Livestock production index (1999-2001 = 100)	2005	112.0
GDP (current US\$)	2008	1,085,951,228,589
GDP growth (annual %)	2008	1.8
Agriculture: industry: manufacturing: services, value added (% of GDP)	2008	3.8: 37.1: 18.8: 59.1
Ores and metals exports: imports (% of merchandise exports: imports)	2007	2.7: 3.0
Aid (% of GNI)	2007	0.0

Source: World Bank, 2009

Mexico faces a number of environmental challenges, many pertaining to water and forest resources. The northern Mexican states are intensely water-stressed, meaning that they face limited water availability, aquifer over-pumping, pollution, extreme events such as drought and water conflicts. One of the most severe water problems in Mexico is the increasing contamination of both surface and underground water. Thirty-three percent of Mexico's land area is forested, and the average annual deforestation rate is 0.4%. Deforestation contributes to soil erosion and desertification. Deforestation is driven by uncontrolled forest fires and illegal cutting, which primarily occur in contexts of poor social capital and scarce opportunities for economically viable and legal forest use. The GOM, with donor support, has recently undertaken significant measures to improve natural-resource management, including preparations for incorporating the Reduction of Emission from Deforestation and Forest Degradation (REDD) Program into existing forest management systems.

Although Mexico is one of the leading mineral producers in Latin America, the mining industry is a source of conflict and alleged human-rights abuses. Many mining jobs are short-term and low-wage. In several instances, mine workers and security forces have violently clashed over unionization and salary, resulting in injuries and fatalities.

I. LAND

LAND USE

Mexico has a total land area of 1.9 million square kilometers and a 2009 population of 107 million people. Twenty-three percent of the population is rural, while the remaining 77% live in rapidly developing urban areas. In 2009, growth turned sharply negative as a result of the financial crisis in the US, and Mexico's GDP fell to US \$875 billion, 4% of which was agricultural, 38% industrial, and 58% related to services. According to international poverty standards, 8.2% of the population lives below the poverty line and 4% lives in extreme poverty. Based on Mexico's national poverty line, however, roughly half (47%) of all Mexicans are poor. By the same standard, poverty is most intense in rural areas, with 60% of the rural population being extremely impoverished, as compared to 19% of the urban population (Brizzi 2001; World Bank 2009a; World Bank 2010a; USDOS 2010).

Development patterns in Mexico differ between the northern and southern parts of the country. For example, northern Mexico is largely urban and industrialized, and only 12% of rural inhabitants live in extreme poverty. In contrast, southern Mexico has a less developed economy, primarily based on subsistence agriculture. Approximately 47% of rural dwellers in the southern region live in extreme poverty (Burstein 2007; Fuentes and Montes 2004).

Urbanization in Mexico has been fueled by rural-urban migration and population growth. Migrants leave rural areas that lack job opportunities, such as the southern states and the densely populated central plateau, for urban centers and the US-Mexico border. Rapid urbanization is particularly evident in Mexico City – the country's largest city – which has grown to 18 million individuals (22 million by other estimates). Sixty percent of the population of Mexico City is considered poor or moderately poor. The urban area has expanded to overtake steep hillsides and dry lakebeds, on which informal settlements have developed (Connolly 2003; USDOS 2010).

Urban land scarcity in itself is not an acute problem in Mexico's cities, except in those located in the mountains or in marshy areas. Empty lots represent approximately 20% of the residential land stock. However, a housing deficit and scarcity of affordable land affect population density patterns. The national housing deficit is estimated at 4 million units. Households that cannot afford legal or regularized housing cluster along the urban periphery (Prud'homme 2003; World Bank 2009b).

Mexican cities are characterized by low population density and, as a result, urban sprawl is high. Even within city centers, many households have single detached homes on relatively large lots. Urban sprawl negatively affects inner-city transportation and limits job possibilities for the urban poor, who may not be able to afford the high cost of transportation from peri-urban areas (Prud'homme 2003).

While the rural population constitutes less than one-quarter of Mexico's overall population, rural areas are home to over 61% of Mexico's extreme poor. Of the total rural population, 28% are extremely poor and 54% are moderately poor. Approximately 24% of the rural population is engaged in agriculture, which is further divided into independent farming and agricultural wage labor (World Bank 2004).

Fifty-five percent of Mexico's land area is agricultural land, and 23% of cropland is irrigated. Nearly 94% of the lands belonging to *ejidos* and *comunidades* are non-irrigated (World Bank 2010a; Brizzi 2001).

By international standards, agricultural productivity in Mexico is low. Agricultural growth has largely been concentrated in the commercial farming sector, and the rural poor have not benefited from economic growth (World Bank 2004).

Mexico faces environmental challenges in almost every region. Thirty-three percent of Mexico's land area is forested, and the average annual deforestation rate is 0.4%. Deforestation contributes to soil erosion and desertification. Along Mexico's coastlines, inadequately regulated exploitation of petroleum deposits has damaged water and fisheries. In addition, urbanization has increased pollution, causing health problems and damaging ecosystems on the urban periphery. Thirteen percent of total land area is nationally protected (Merrill and Miró 1996; FAO 2006; World Bank 2010a).

LAND DISTRIBUTION

Mexico underwent a profound agrarian reform beginning with the Mexican Revolution of 1910 and ending with neoliberal reforms in 1992, the effects of which are still being realized. A primary cause of the 1910 revolution was inequitable, feudal-like land distribution, in which landless Mayan laborers worked in indentured servitude for large-scale private farms. Between 1917 and 1992, the GOM distributed approximately 100 million hectares – 50% of the country's arable land – from large private farms to *ejidos* and *comunidades*, rural village collectives in which land was held communally. The government retained ownership of the redistributed land, allocating only usufruct rights, which were not alienable, to members of the newly formed *ejidos* and *comunidades* (de Ita 2006; Brizzi 2001; Deininger and Bresciani 2001; Castellanos 2010; Penner and Associates n.d.).

In order to obtain *ejido* or *comunidad* land, groups applied to the federal government. To become members, people had to establish residency within the *ejido* or *comunidad*. In most *ejidos* and *comunidades*, members received: (1) usufruct rights to a portion of land for their house; (2) usufruct rights to a portion of land to farm individually; and (3) rights to shared access to communally held property and land of the *ejido* or *comunidad*. In terms of individually farmed land, members (and their families) were allowed to farm individually up to 4 hectares of forestland and up to 8 hectares of brush land, and land was supposed to have been divided equally among members. All *ejido* members had voting rights through the *ejido*'s General Assembly, through which they also elected a leader called a *comisariado*. To retain their holdings, *ejidatarios* had to fulfill mandatory work requirements and had to maintain the land in agricultural production. Usufruct rights to *ejidal* land were considered a family's patrimony and could be inherited. The GOM distributed social benefits through the *ejido* structure, tying aid to the requirements imposed on members (Castellanos 2010; Deininger and Bresciani 2001; Haenn 2004).

Through constitutional amendment in 1992, the GOM gave *ejidos* and *comunidades* the opportunity to privatize their land, creating the possibility for significant changes in land-rights distribution in (mostly) rural Mexico. The goals of the amendment were to increase the efficient functioning of factor markets (specifically land and credit markets) and to increase agricultural investment. The overarching goal of improving efficiency in agricultural production was further driven by: (1) awareness that the rural population was aging; and (2) the need for increased international competitiveness due to the North Atlantic Free Trade Agreement (NAFTA). Rural Mexico's response to these changes has been lukewarm. Initially, the reforms were greeted with widespread concern that changes in the land tenure structure would lead to land sales on a massive scale and the disappearance of the social sector. In fact, land rights in Mexico have not changed hands on a large scale following the constitutional and legal changes of 1992 (Deininger and Bresciani 2001).

In 2002, there were 27,941 *ejidos* and 2157 *comunidades* with an estimated 3.2 million members. The total area occupied by these holdings amounted to roughly 103 million hectares or 56% of national lands usable for agriculture. While most of these *ejidos* and *comunidades* are rural, 1122 are located in urban areas (de Ita 2006; Brizzi 2001).

In addition to lands held by *ejidos* and indigenous *comunidades*, 73 million hectares of rural land in Mexico are owned by 1.6 million private landholders. In order to prevent the excessive concentration of land, the GOM sets a

maximum legal limit on the number of hectares (100 irrigated hectares) that can be held privately and by commercial enterprises (de Ita 2006).

National territories (not including federal zones, national parks, and ecological reserves) constitute approximately 11 million hectares (de Ita 2006).

Most people in the rural sector live in poverty. A minority of farms is commercial and globally competitive, but most farmers operate subsistence-oriented small farms. Commercial farmers and rural entrepreneurs represent a small minority and are mostly driven by the export market. Further, state investment has favored private lands over *ejido* and *comunidad* lands, and private lands have thus benefited more from irrigation and other infrastructure projects (de Ita 2006; Brizzi 2001; Brown 2004).

Ethnicity in Mexico is broadly divided into *mestizo* and Indian, though these titles are used to designate cultural rather than racial groups. Census data reveals that Indians are the most marginalized segment of Mexican society. Indian communities have higher rates of illiteracy, lower rates of education, and significantly higher rates of morbidity, mortality and nutritional deficiency, as well as greater lack of access to improved water and sanitation sources. In addition, rural poverty is concentrated in areas with a higher density of Indians (Merrill and Miró 1996; IFAD n.d.).

Mexico experienced rapid urbanization in the second half of the twentieth century. Mexico City, Guadalajara and Monterrey are the largest cities in Mexico. Dramatic urbanization has strained the GOM's ability to build urban infrastructure, including housing, and in urban areas affordable housing is scarce. State-funded urban housing schemes have failed to meet demand, and because many workers cannot afford the monthly payments required to secure a unit, slum settlements proliferate (Merrill and Miró 1996; World Bank 2009b; Prud'homme 2003).

Slum settlements can be divided into five types.

1. *Colonias populares* are unconsolidated informal settlements located in high-risk areas. Many residents of these settlements lack secure title to the land on which they live. Quality of life varies within and across *colonias populares*. Many are home to poor and middle-income families; many have infrastructure and services that have been provided through combined efforts of local government and the resident households; in some of these settlements, housing is of solid construction; and in many cases tenure has been regularized and titles issued. Regularization has not, however, provided permanent tenure- security, as legalized properties can become illegal again through intestate inheritance, dilapidation and financial problems. *Colonias populares* comprise 50% of the urban area and house 60% of the urban population.
2. Inner-city slums (*vecindades*) are comprised of small-scale (one- or two-bedroom units) older housing in inner-city neighborhoods that have deteriorated over time and now house the poor. *Vecindades* constitute approximately 10% of all housing in Mexico City.
3. *Ciudades perdidas* are small-scale shanty settlements located on vacant land or in undesirable urban locations. These are no longer significant in number.
4. *Cuartos de azotea* are a form of makeshift accommodation located in servant quarters and on the roofs of apartments or early public housing. *Cuartos de azotea* constitute 0.4% of Mexico City's housing.
5. Deteriorated public housing projects consist of subsidized units originally built by the GOM for the working class. These have largely fallen into disrepair and are now prone to overcrowding and other social problems. These projects house approximately 15% of the population of Mexico City.

(Connolly 2003).

The vast majority of residents in slum settlements are homeowners. Within these areas, only 7% of housing is rented, compared to the metropolitan average of 17.3% (Connolly 2003).

LEGAL FRAMEWORK

The Constitution of Mexico (1917) establishes the basis for land relations. The key article regarding land tenure, Article 27, was amended in 1992 to reflect the country's new tenure regime which allows the certification, transfer, and privatization of *ejidal* and *comunidad* land. The amended Article 27 is implemented by the 1992 Agrarian Law. The Constitution provided for a land redistribution scheme under which, until 1992, land could be taken from large landowners and distributed to landless laborers. The Constitution also provides that indigenous communities can reclaim their historic landholdings (Brown 2004).

BOX 2. LAND TENURE INDICATORS		Score
<u>Millennium Challenge Corporation Scorebook, 2009</u>		
– Land Rights and Access (Range 0–1; 1=best)		...
<u>International Property Rights Index, 2009</u>		
– Physical Property Rights Score (Range: 0–10; 0=worst)		5.8
<u>World Economic Forum's Global Competitiveness Index, 2008-2009</u>		
– Property Rights (Range: 1–7; 1=poorly defined/not protected by law)		4.1
<u>World Economic Forum's Global Competitiveness Index</u>		
– Ease of Access to Loans (Range: 1–7; 1=impossible)		2.8
<u>International Fund for Agricultural Development, Rural Poverty Report, 2001</u>		
– Gini Concentration of Holdings, 1981-1990 (Range: 0–1; 0=equal distribution)		0.75
<u>International Fund for Agricultural Development, Rural Sector Performance Assessment, 2007</u>		
– Access to Land, 2007 (Range: 1-6; 1=unsatisfactory access)		3.9
<u>Food and Agricultural Organization: Holdings by Tenure of Holdings</u>		
– Total Number of all Agricultural Holdings, Year		...
– Total Area (hectares) of all Agricultural Holdings, Year		...
– Total Number of Holdings Owned by Holder; Year		...
– Total Area (hectares) of Holdings Owned by Holder; Year		...
– Total Number of Holdings Rented from Another; Year		...
– Total Area (hectares) of Holdings Rented from Another; Year		...
<u>World Bank Group, Doing Business Survey, 2009</u>		
– Registering Property-Overall World Ranking (Range: 1–181; 1=Best)		56
<u>World Bank Group, World Development Indicators, 2009</u>		
– Registering Property-Number of Procedures		5
– Registering Property-Days Required		74
<u>World Bank Group, World Development Indicators, 1998</u>		
– Percentage of Population with Secure Tenure		...
<u>Heritage Foundation and Wall Street Journal, 2009</u>		
– Index of Economic Freedom-Property Rights (Range 0-100; 0=no private property)		50
<u>Economic Freedom of the World Index, 2008 (2006 data)</u>		
– Legal Structure and Security of Property Rights (Range 0-10;0=lowest degree of economic freedom)		5.45
– Protection of Property Rights (Range 0-10; 0=lowest degree of protection)		5.51
– Regulatory Restrictions of Sale of Real Property (Range 0-10;0=highest amount of restrictions)		7.06

The 1992 Agrarian Law's key tenets include: (1) ending land redistribution from private farms to *ejidos*; (2) privatizing the housing plots of *ejidatarios*; (3) allowing for leasing of *ejidal* land to parties both within and outside of the *ejido*; (4) allowing for sales of *ejidal* land within the *ejido*; and (5) allowing for the full privatization of *ejidal* land (disincorporation of the *ejido*) through a two-thirds vote of the General Assembly. The law also recognized the *ejido* as a legal person and, as such, able to enter into contracts and joint ventures. The law also established new rules on expropriation, including a requirement of mandatory compensation, and created a new system of agrarian justice independent of the executive branch (Deininger and Bresciani 2001; Castellanos 2010).

Regulations issued pursuant to the 1992 Agrarian Law also contain important provisions regarding *ejido* relations and land tenure. These include: the Regulations of the Agrarian Law on Matters of the Certification of *Ejido* Rights and Title to Plots of Land; the Regulations of the Agrarian Law on the Code of Rural Lands; and the Regulations of the Agrarian Law for the Promotion of the Organization and Development of Peasant Women (González and Lopez-Gastélum n.d.).

The General Law on Human Settlements (1976) and the Law of Environmental Equilibrium and Protection also govern some aspects of *ejidal* land rights and development. The first of these was adopted to address rapid development of the informal urban settlements, which often took place illegally on *ejidal* lands. The law required state-level governments to administer urban planning (González and Lopez-Gastélum n.d.; Castillo 2004).

The Federal Civil Code and the states' commercial laws govern all matters regarding *ejidal* land that are not specified in the laws mentioned above, as well as the sale, mortgage and registration of non-*ejidal* private land (Martindale-Hubbell 2008; González and Lopez-Gastélum n.d.).

TENURE TYPES

There are four broad categories of landholding: private; federal; *ejidal/comunidad*; and possessory rights held in *colonias* (informal settlements) (Robles Garcia 2000; Brown 2004; Brizzi 2001; Deininger and Bresciani 2001; Penner and Associates n.d.).

Private property. Property owned by a private individual or corporate body and can be freely bought, sold, leased, mortgaged and inherited. In Mexico, rights to private property are referred to as “*domino pleno*” (i.e. freehold). Although the 1992 Agrarian Law gave *ejidos* the right to “fully privatize” their land, some observers argue that the law does not actually allow for full privatization because it grants the *ejidatario*’s family members a right of first refusal for any *ejidal* land offered for sale and allows the government to set mandatory minimum prices for land sales.

Federal property. This term applies to land owned by the national government and includes areas of public interest such as forests, and areas of public benefit, such as roads and airports.

Ejidal and comunidad lands. Owned by the state, *ejidos* and *comunidades* are managed communally by their residents. Individual households often hold individual land plots. Many *ejidos* and *comunidades* contain a mix of some individually parceled land as well as some land that is held and used communally. Since 1992, *ejidal* land can be freely leased and sold to other *ejido* members. Further, these lands can now be privatized and sold to outsiders if the *ejidal* body decides to privatize. *Comunidades* cannot sell or lease land, but do have the option of converting into *ejidos*, which would give members the option to make this decision. *Ejidal* land cannot be subdivided for inheritance, and thus inter-generational transfers cannot be formalized.

Colonias. These informal urban settlements have developed on formerly vacant land. *Colonias* residents often hold a right of possession, which is similar to private ownership, but subject to restrictions on transfer.

SECURING LAND RIGHTS

Private land can be acquired by purchase or inheritance. Land in the *ejidal* sector can be acquired by inheritance or in some cases by lease or purchase (Penner and Associates n.d.; Castellanos 2010).

Mexico has two systems for land-rights registration: the National Agrarian Registry (RAN) for all rights pertaining to *ejidos*, *comunidades* and *colonias*; and the Public Registry of Property for all rights pertaining to private property (Penner and Associates n.d.).

As a part of the 1992 reforms, the GOM instituted a massive land-rights regularization program known as PROCEDE (Program for the Certification of Ejido Land Rights and the Titling of Urban House Plots, or *Programa Nacional de Certificación de Derechos Ejidales y Titulación de Solares Urbanos*). The goals of this program were to register and title land-rights in *ejidos* and *comunidades* in order to strengthen land-tenure security, improve the efficiency of rural land markets (and credit markets), and pave the way for privatization. PROCEDE began with a large-scale information campaign, in which PROCEDE officials met with *ejido* General Assemblies. PROCEDE then guided the *ejidos* through a series of options and votes regarding the regularization and possible privatization processes. The *ejido* first voted to determine whether it wanted to join PROCEDE. The primary benefit to joining PROCEDE was that members would receive up to three land titles (one for their house plot, one for their farm plot and one representing a percentage of the value of the common goods, including common lands). Another important benefit of joining PROCEDE was individual plot delineation. If *ejidos* voted to join PROCEDE, as most did, the second vote determined whether members should receive any or all of the three titles listed above, and how much land to assign to each category. The third vote was whether to disincorporate the *ejido* through full privatization (Haenn 2004; Deininger and Bresciani 2001; Castellanos 2010).

PROCEDE worked to resolve boundary conflicts between neighboring *ejidos* and *comunidades* and also to recognize the property rights of individual members within each *ejido* and *comunidad*. Under PROCEDE, RAN issued land certificates to document individual parcels and each household’s proportional share of common lands. RAN also issued titles for lands that were privatized; these rights were then also documented in the local public registry of property. As of 2001, the program resulted in the issuance of certificates to 3 million households on an area covering 50 million hectares. If an *ejido* voted to disincorporate, PROCEDE notified RAN, which closed the

registry for this land. PROCEDA then assisted the *ejido* in registering the land with the local Public Registry of Property (Brizzi 2001; Deininger and Bresciani 2001; Haenn 2004; Penner and Associates n.d.).

PROCEDA was highly successful in regularizing land rights across rural Mexico. By 2005, 96% of agricultural households had registered their land rights, and 89% had received titles. One important aspect of PROCEDA was that *ejidos* were allowed to recognize new members based on actual occupation. By 1999, PROCEDA had recognized and given title to over 900,000 land plots in urban and rural areas that were previously held by unofficial *ejido* members or land possessors whose rights were insecure (Deininger and Bresciani 2001; Castellanos 2010).

Problems related to the certification process in Mexico include concerns that although initial coverage of the certification program has been widespread, maintenance and updating of the registry may be a problem. *Ejidal* land cannot be subdivided for inheritance and, thus, inter-generational transfers cannot be formalized. Further, the certification process generally only certifies land in the name of the male head of household rather than jointly to husband and wife. Concerns over the security of wives' land rights remain (Brizzi 2001; Brown 2004).

PROCEDA has not led to mass privatization and selling of *ejidal* lands, despite the hopes of some and the fears of many. In 2005, only 5.3% of *ejidos* had chosen to fully privatize, and most of these were located in urban areas. Observers note several reasons *ejidos* have not chosen to privatize: (1) private property is subject to taxes; (2) *ejidatarios* did not perceive a strong financial impetus to undergo privatization because they did not think they could succeed as independent small farmers; and (3) land is more than a commodity to most *ejido* members, representing a life-long struggle for liberty and the pivotal asset saving peasant farmers from becoming day laborers. In addition, most *ejidos* had been farmed on a subsistence level – only 15% were considered commercially viable – and the government did not provide sufficient institutional support for small farmers. Small farmers lacked access to modern technology, and competition in agricultural production increased significantly following NAFTA (Barnes 2009; Assies 2008; Castellanos 2010).

It is difficult to measure whether or not PROCEDA resulted in increased agricultural investment due to perceptions of improved tenure security or improved access to credit. Although controlling for external factors is difficult, it does not appear that PROCEDA resulted in a net increase in *ejidatarios*' access to credit, leading some observers to doubt investment gains (Bresciani 2004; de Ita 2006; Johnson 1998).

In 1993, the GOM established the Commission for the Regularization of Land Tenure (*Comisión para la Regularización de la Tenencia de la Tierra* — CORETT), which was charged with a role similar to that of PROCEDA, but with the purpose of regularizing *ejido* and other land within or adjacent to urban centers. CORETT verifies the eligibility of the land on which informal settlements are located for regularization and then works with government authorities to create an urban plan for the area. According to USAID/Mexico in 2011, informal housing areas must first obtain access to electricity from the Federal Electricity Commission (*Comisión Federal de Electricidad*), the country's sole, government-owned power utility, and then other government entities work to provide additional services, including provision of individual titles. CORETT then sells the land to the current residents for a "social price" that is based on their socioeconomic status within the community, the size of their plot, and the existing or intended use of their plot. The CORETT program is still in place, with a current focus of helping low-income people in informal settlements to register and title their land (GOM 2010; Barraza and Associates 2009; Castillo 2004; Brown et al. 2006).

Transactions for all private lands must be recorded in the Public Registry of Property. Registration of private land is widespread. Registration of a property transaction requires five procedures, takes 74 days, and costs approximately 5% of the property's value. The procedure requires that the notary public obtain the alignment and official number of the property at the corresponding Federal District Department, and obtain the cadastral plan from the Cadastre Department at the Public Registry of Property. The notary public then obtains a no-liens certificate; formalizes the sale purchase agreement; and registers the transfer of title at the Public Registry of Property of the Federal District (Martindale-Hubbell 2008; World Bank 2008a).

Foreigners cannot purchase residential real estate in "restricted zones." These areas include lands within 30 miles of the coast and 60 miles of the national borders. Such lands can, however, be acquired through a 50-year extendable trust mechanism known as a *fideicomiso* in which a Mexican financial institution acts as trustee (USDOS 2008).

INTRA-HOUSEHOLD RIGHTS TO LAND AND GENDER DIFFERENCES

Women enjoy largely equitable statutory land rights in Mexico. The Constitution establishes broad principles of gender equality. The Federal Civil Code (1928) governs most legal aspects of property distribution within marriage as well as succession and provides that spouses have equal authority to administer property (GOM Constitution 1917; FAO 2002).

At the time of marriage, spouses must state whether they are marrying under the system of community property (shared property) or separate property (independent control of property). Persons who live together for two years or longer or who conceive a child and who could otherwise marry are considered bound by common-law marriage and have the rights and obligations of legally married spouses (Martindale-Hubbell 2008).

BOX 3. LAND AND GENDER INDICATORS		Score
OECD: Measuring Gender In(Equality)—Ownership Rights, 2006		
— Women's Access to Land (to acquire and own land) (Range: 0-1; 0=no discrimination)		0.0
— Women's Access to Property other than Land (Range: 0-1; 0=no discrimination)		0.0
— Women's Access to Bank Loans (Range: 0-1; 0=no discrimination)		0.0
FAO: Holders of Land Classified by Sex, 1993		
— Percentage of Female Holders of Agricultural Land		...

Under present law, an *ejidatario* can designate whomever he or she wishes to inherit the land. *Ejidal* land cannot be subdivided for the purposes of inheritance. Without an explicit designation, the default order of succession is: spouse; companion; one child; one parent; and, finally, anyone who is economically dependent upon the deceased. However, land inheritance by sons is very common in rural areas, while daughters inherit only when they do not receive a dowry at marriage (Brown 2004; FAO 2002).

Despite equitable statutory rights, in practice women have unequal access to land rights. Traditional customs and practices (*usos y costumbres*) often discriminate against women. Under *usos y costumbres*, there is a strong male preference in the inheritance of land and generally only sons inherit. In addition, women have largely been excluded from land redistribution efforts. For the first 50 years following land reform, the exclusion was legal, but even as legal restrictions were lifted, cultural barriers remained. Initially, women were only eligible to become members of *ejidos* or *comunidades* if they were widows or single women supporting a family. Though this rule has since been revoked, most women do not hold use-rights and are not voting members of *ejidos* or *comunidades*. Some *comunidades* even bar women from their meetings (FAO 2002; Deere and Leon 2001; Young 1998; Brown 2004).

According to most observers, the 1992 reforms have further eroded women's rights on *ejidos* and *comunidades*. Since most women were not official members of these groups, they were unable to vote on critical land-tenure issues under PROCEDE, and were also not recipients of strengthened land rights. In addition, *ejidal* plots that are privatized can now be sold by the head of household, rendering the land rights and access of women within the household less secure. While spouses have the first right of refusal, they very well may not have the financial resources to purchase the plot (Young 1998; Brown 2004; Haenn).

LAND ADMINISTRATION AND INSTITUTIONS

The Secretary of Agrarian Reform (*Secretaria de Reforma Agraria* – SRA) regulates national lands, identifies unused lands, expropriates land for public purposes and is involved in the implementation of PROCEDE. The GOM created the Office of the Agrarian Attorneys General (*Procuraduria Agraria*) in the wake of the 1992 Agrarian Law. The *Procuraduria* is responsible for providing legal assistance to *ejidatarios* and *comuneros* in discerning and exercising their rights under the 1992 reforms (Brizzi 2001; Brown 2004; Deininger and Bresciani 2001).

The National Agrarian Registry (*Registro Agrario Nacional* – RAN) is the federal agency responsible for recording rights to land under federal control, including *ejidal*, *comunidad*, and *colonias* land. All acts related to the use, disposition and modification of these land rights must be recorded with RAN, which operates through state-level offices. RAN is also responsible for issuing: (1) *certificados particulares*, which document a household's rights to individually cultivated plots and its proportional share of common-use lands; (2) urban plot certificates; and (3) titles for land held in *domino pleno*, which are then registered in the Public Registry of Property. Other rights pertaining to private property are also registered by the Public Registry of Property, which

is decentralized to local offices (Brizzi 2001; Brown 2004; Deininger and Bresciani 2001; Penner and Associates n.d.).

CORETT, operating through state-level offices, is housed in and acts as the executive of the Sub-secretary of Urban Development and Planning (GOM 2010).

The National Institute for Statistics and Geographic Information (INEGI) is charged with mapping and delineating *ejido* boundaries (both for individual plots within *ejidos* and boundaries between *ejidos*) (Haenn 2004).

LAND MARKETS AND INVESTMENTS

Before 1992, *ejidatarios* could not legally lease, sell, mortgage or otherwise transfer their rights to *ejidal* land, although informal transactions were common. The 1992 reform permitted leasing and sharecropping of *ejidal* parcels. Land can also be freely sold within the *ejido*, but not to outsiders unless the *ejido*'s governing body has decided to permit privatization (*domino pleno*) (Brizzi 2001; Deininger and Bresciani 2001).

The development of a vibrant rural land market has not generally ensued from the 1992 legal and institutional reforms. As of 2001, less than 1% of *ejidos* participating in PROCEDA had opted for privatization. Those that did decide to privatize were generally located in peri-urban areas and did so out of an interest in selling their lands at high market prices. Rural *ejidos* did not have this motivation, however. Land sales prices in most rural areas are low in part because corporations prefer renting over buying, with an eye to relocation flexibility. Also, poor soil quality and location diminish the value of many rural plots. According to USAID/Mexico in 2011, lack of access to water undercuts the value of much rural land; in areas where *ejidatarios* have access to water (i.e. where the lands are within one of the existing irrigation districts), plots are readily rented to industrial-scale growers. Further, for many *ejidatarios* the primary value of the land plot is not commercial; the plots are instead considered important assets for social security, through subsistence yields that augment unstable wage labor. According to a study reported in 2001, 5% of *ejido* farmers bought land, and 4% sold land. It is unclear, however, whether these transactions took place between *ejido* members or with outsiders (Brizzi 2001; Castellanos 2010; Deininger and Bresciani 2001).

The 1992 reforms and PROCEDA have led to some increase in lease transactions. According to a 1999 study, land rental markets operated more efficiently where *ejidal* land was certified than they did where *ejidal* land was not certified. According to another study (reported in 2001), approximately 10% of farmers in the *ejidal* sector leased in land as transferees, and 15% leased out land as transferors (Brizzi 2001; Castellanos 2010; Deininger and Bresciani 2001).

Rental markets function differently in *ejidos* that have completed the land-rights certification process and *ejidos* that have not. In non-certified *ejidos*, large farmers tend to be transferees who lease in land, and small farmers tend to be transferors who lease out land, while the opposite is true in certified *ejidos*. Thus, in non-certified *ejidos*, the rental market tends to contribute to land concentration instead of redistribution towards smaller producers. By contrast, in certified *ejidos*, the exact opposite is true – the rental market is more active and distributes land towards those with lower endowments. This is consistent with the hypothesis that the implementation of PROCEDA increased tenure security and, by allowing small landowners to increase their operational holding-size through renting land, helped bring about efficiency-enhancing land transfers. Certification of land rights appears to have increased overall demand for cultivated land and allowed small producers to enter the market on the demand side (Brizzi 2001).

One of the unintended outcomes of legalizing *ejidal* land sales has been a rise in informal transactions. Transactions following the 1992 land reform have not been widely registered; in 1997, unregistered transactions accounted for 60–70% of transactions in *ejidal* land. Transactions have continued, but the failure to formally register these is attributed to a number of factors, including: (1) scarcity of *ejidal* land for sale, which leads to higher competition among potential buyers; (2) mistrust of *ejido* representatives who might otherwise advise community members to register land sales; and (3) the persistence of cultural norms that oppose the sale of land. In addition, changing rules around *ejidal* land sales have pushed some transactions into the informal sector. In some places of high land demand in Mexico, such as tourist and coastal areas, investors are increasingly acquiring

ejidal land prior to official disincorporation, with only a verbal commitment that the title will pass at a later point (Bouquet 2009; Penner and Associates n.d.).

When approved by a two-thirds majority vote, common lands of an *ejido* or a *comunidad* can be transferred to a mercantile or civil company of the *ejido*'s or *comunidad*'s creation in which the *ejido*, *comunidad* or their members participate (Brown 2004).

Urban land prices vary greatly. Unserved land plots on the urban periphery may cost US \$1–2 per square meter (2003 data). In contrast, the cost of a served plot of land in a city center may be as high as US \$300 per square meter (2003 data) (Prud'homme 2003; World Bank 2009b).

COMPULSORY ACQUISITION OF PRIVATE PROPERTY RIGHTS BY GOVERNMENT

The Constitution of Mexico (1917) provides that private property may, with compensation, be expropriated for "public utility." The term "public utility" is broadly defined by the Law of Expropriation (1936) to include the creation of rights-of-way, municipal facilities and public services as well as the creation or development of an enterprise that benefits the public, which could include private development projects. Compensation is generally determined with reference to the property's value as assessed for taxation, subject to modification by accepted expert testimony (GOM Constitution 1917; Del Duca 2003).

Several laws and regulations explicitly govern the expropriation of *ejidal land*. These include: the 1992 Agrarian Law and the Regulations of the Agrarian Law on Matters of Organization of Rural Lands; the Expropriation Law; and the Regulations of the Institute for Administration of National Properties. Taken as a whole, these documents require that, during the expropriation process, the government conduct an appraisal to determine the commercial value of the land and improvements. Payments for the value of the property are made either directly to the *ejido* or to the National Fund for the Promotion of Ejidos. The 1992 Agrarian Law clarified rules and safeguards in regard to expropriation, including compensation requirements. One issue that remains unclear, however, is how to evaluate and compensate the rights of a third party in possession of the land, such as a lessee, in the event of expropriation (Deininger and Bresciani 2001; González and Lopez-Gastélum n.d.).

LAND DISPUTES AND CONFLICTS

Land disputes have been common in Mexico in both rural and urban areas. On *ejidos*, disputes related to inheritance and parcel boundaries are common. Prior to the 1992 reforms and PROCEDE, lack of parcel boundary demarcations was a significant cause of disputes. Although *ejido* members were supposed to receive equally-sized plots for individual cultivation, boundaries were not well marked or measured, and many members suspected that their plots were too small (Haenn 2004; Deininger and Bresciani 2001; Brizzi 2001).

Within most *ejidos*, disputes among members were resolved by the General Assembly or by the *comisariado* (elected by the General Assembly). However, reliance on non-*ejido* bureaucrats to help resolve land disputes was not uncommon; in some cases the local mayor (*presidente municipal*) would help resolve disputes between individual members and the *ejido* itself (Deininger 2001 and Bresciani; Castellanos 2010).

Following the adoption of the 1992 Agrarian Law, the federal government created a new court system to ensure accessible and effective justice for the *ejidal* and non-*ejidal* sector, and to reduce the authority of elected *comisariados*, many of whom had assumed a great deal of authority and control within the *ejidos*. This new system contained 42 Agrarian Tribunals (*Tribunales Unitarios Agrarios*) as well as an appeals court, the *Tribunal Superior Agrario*. The Agrarian Attorneys General (*Procuraduría Agraria*) was also established to serve as a sort of ombudsman or attorney general office for rural land rights, helping rural landholders negotiate the justice system to secure their rights. Between 1992 and 1999, the court system processed approximately 350,000 conflicts. In dealing with conflicts, the tribunals are explicitly instructed to seek a settlement out of court (Brizzi 2001; Deininger and Bresciani 2001; Castellanos 2010).

Land disputes in urban areas are also common. Almost 5% of Mexico's *ejidos* are located in the country's 110 main cities, and 15% of all *ejidos* are affected by problems caused by land invasions and informal settlements. This has given rise to widespread conflicts between new (informal) occupants and *ejidatarios*, undermining the broader framework of governance in rural areas (Brizzi 2001).

KEY LAND ISSUES AND GOVERNMENT INTERVENTIONS

PROCEDE formally ended in December 2006, but *ejidos* and *ejidatarios* continue to parse out the implications and outcomes of the program. CORETT currently operates two programs through its state-level offices. The first, PASPRAH, is the Program to Support Regularization for Residents in Informal Settlements who Lack Title and Live in Conditions of Material Poverty (*Programa de Apoyo de los Vecindados en Condiciones de Pobreza Patrimonial para Regularizar Asentamientos Humanos Irregulares*). This program gives up to 8000 pesos to qualifying families to pay for the costs of registering and titling their land. The second program, Apoyo CORETT, targets poor residents of informal settlements who want to regularize their land rights but do not meet the requirements to participate in PASPRAH. This program offers beneficiaries 7500 pesos toward the costs of regularization (Perramond 2008; GOM 2010).

Mexico fundamentally changed its land regime in 1992 when reforms began to grant individual property rights to *ejidatarios*, allowing leasing (previously illegal, though common), privatization and market transfers of land rights in *ejidos*. The reforms also strengthened the self-governance rights of *ejidos* and allowed them to choose from among several property rights regimes. However, the reforms ended the expropriation and redistribution of land for rural agriculture and, as a result, 20% of those who applied for land prior to the reform did not receive land (Brizzi 2001; Brown 2004).

Mexico is a signatory to NAFTA. As of 2003, NAFTA had created 5.3 million jobs in the formal and informal sectors. However, NAFTA also resulted in the loss of 1.3 million jobs, primarily among subsistence farmers. Mexican support for small farmers was dismantled under the agreement, and small and subsistence farmers grew poorer. Many corn and bean producers lost their livelihoods when cheaper imported products flooded the market. In contrast, agribusinesses and large farmers growing cash crops for export benefited (White et al. 2003; Castellanos 2010).

DONOR INTERVENTIONS

USAID supports cross-sectoral projects that focus on improving land-use to reduce greenhouse gas emissions, in order to decrease vulnerability to climate change and preserve biodiversity. These projects include promoting sustainable watershed management and use; promoting regional land-use planning; and preventing the conversion of forests to agricultural land. One such project works with farmers to promote improved water-use and other efficient farming practices, thereby reducing farmers' incentive to encroach on forestland (USAID 2009a; USAID 2009b).

In 2005, the World Bank approved a US \$100 million loan to Mexico for the Access to Land for Young Farmers Pilot Project. The project, which ran until June 2010, established a beneficiary-driven land transaction model to help young farmers with entrepreneurial potential to access land and other productive assets within selected states. The project provided beneficiaries with the knowledge and abilities (including financial management skills) required to carry out a productive land project and promoted secure and sustainable access to land by qualified young rural entrepreneurs (World Bank 2005).

2. FRESHWATER (LAKES, RIVERS, GROUNDWATER)

RESOURCE QUANTITY, QUALITY, USE AND DISTRIBUTION

Mexico's average annual precipitation is estimated at 1528 cubic kilometers, generating a surface runoff of 394 cubic kilometers. The average aquifer recharge is estimated at 75 cubic kilometers. Total water extraction for consumption and non-consumption uses is 217.6 cubic kilometers, of which 145.1 cubic kilometers are used for hydropower and 72.5 cubic kilometers are used for consumption. Of the water used for consumption, 77.1% is for agriculture and livestock, 17.4% for public water supply and 5.5% for self-supplied industry. Ninety-five percent of the urban population and 69% of the rural population have access to an improved water source (Asad and Garduno 2005; UNESCO 2006; World Bank 2009a).

Water resources are not evenly distributed throughout the country. The northern Mexican states are intensely water-stressed, meaning that they face limited water-availability, aquifer over-pumping, pollution, extreme events such as drought, and water conflicts. In contrast, the central states are moderately water-stressed, while the southern states are only minimally water-stressed (González and Magaña n.d.).

In Mexico's arid and semiarid zones, many irrigation districts and irrigation units supplied both by surface and groundwater face serious problems due to demographic pressure, urban growth, and prolonged drought. Further, hydrological statistics and studies indicate that systems were not appropriately designed. Stresses on Mexico's groundwater system also exist. Many farmers have been forced to abandon their lands due to high pumping costs and poor water quality, and many economic activities sustained by groundwater risk imminent collapse (Asad and Garduno 2005).

One of the most severe water problems in Mexico is the increasing contamination of both surface and ground water. Studies show severe restrictions on use in many basins due to the prevalence of poor water quality, especially in the central and northern regions. An important issue affecting relations between Mexico and the US is the high level of pollution along the Río Bravo/Río Grande border and in the Río Tijuana and Río Nuevo in Baja California. It is estimated that 352 million liters of inadequately treated sewage is dumped into the Río Grande every day. Nuevo Laredo alone dumps 3.2 million liters of untreated water into the river daily, and Laredo, its neighbor on the US side, contributes another 2 million liters of untreated water. Mexico uses the river for irrigation and for energy generated by two hydroelectric plants (Contijoch 2003; IBWC n.d.).

LEGAL FRAMEWORK

The Constitution of Mexico (1917), Article 27, states that waters that lie within the limits of the national territory are property of the state, and that the state has the right to transmit dominion over the water to individuals in accordance with rules and conditions established by law (GOM Constitution 1917; FAO 2000).

The National Water Law (LAN) was approved in 1992, and its regulations were passed in 1994. The law sets out broad mandates for the development and implementation of plans and policies related to water-resources management and assigns the National Water Commission, created in 1989, the responsibility to carry them out (World Bank 2008b).

TENURE ISSUES

Under LAN and its regulations, irregular and provisional water permits must be recorded in the Public Water Rights Registry (REPDA), and all users of national waters must obtain a concession entitlement and record it in the REPDA. The concessions are granted for 10 years for the volumes that users state that they use (because there is no practical way to determine actual water usage), and such volumes are to be adjusted once water availability is published (Asad and Garduno 2005).

Although Mexico is one of the few countries in which the large majority of water users are registered, the registration of water rights is problematic. Water rights are registered to newly recognized or newly established Water User Associations for set periods of time. However, there is no clear continuity with existing water rights, no consideration of local water-rights arrangements, and no consideration of reduced water access caused by overexploitation (Palerm-Viquería n.d.; Asad and Garduno 2005).

GOVERNMENT ADMINISTRATION AND INSTITUTIONS

Three key institutions are involved in the water sector: (1) the National Water Commission (*Comision Nacional del Agua* – CONAGUA), at the federal level; (2) water commissions (*Comisiones Estatales del Agua* – CEAs), at the state level; and (3) basin authorities and basin councils. CONAGUA is the highest institution for water-resource management in Mexico, and its jurisdiction includes: water policy; water rights; planning; irrigation and drainage development; water supply and sanitation; and emergency and disaster management. CONAGUA's mission is to manage and preserve national water resources, and to achieve a sustainable use of the resource, with stakeholder participation. CONAGUA is formally under the authority of the Ministry of Environment and Natural Resources (FAO 2000).

Although local arrangements for water resource management exist throughout Mexico, these arrangements are not recognized by the national legal framework (Palerm-Viquería n.d.).

GOVERNMENT REFORMS, INTERVENTIONS AND INVESTMENTS

Starting from the 1980s and continuing into the 1990s, Mexico undertook the Time Slice Program, aimed at improving and expanding irrigation infrastructure. It also transferred responsibility for operation and maintenance

of the irrigation districts to Water User Associations (WUAs) and increased farmers' contribution to operation expenses and investment costs. This project had profound results in Mexico's irrigation sector. Responsibilities were transferred to farmers in more than 3.3 million of the targeted 3.4 million hectares within the irrigation districts. By 2002, 444 WUAs had been formed, and 11 federations of Water User Associations (SRLs) were granted full responsibility for the whole system. The project achieved a 73% increase from 1988 in the area of conservation works investments, and conveyance and distribution efficiency in the districts increased from 60% to 66% (Contijoch 2003).

The Water Rights Adjustment Program (WRAP) was launched in 2003 to recover over-concessed water volumes by means of economic incentives. The objectives are: (1) to promote the recovery of water volumes to benefit aquifers and river basins; and (2) to support producers so that, under criteria of mutual responsibility and commitment, the sustainability of water for agricultural, livestock or forestry use may become feasible in the medium and long terms. Implementation of WRAP faces significant legal difficulties because of uncertainties related to compensation for those who renounce water-abstraction entitlements (World Bank 2010; Asad and Garduno 2005).

In 2004, the GOM, the World Bank and the Global Environment Facility (GEF) agreed to jointly fund a US \$182 million project. The project, which will run until June 2011, aims to improve the provision of environmental services that bring both national benefits (primarily water services) and global benefits (primarily increased biodiversity conservation) by strengthening and expanding existing programs for payment of environmental services (PES) related to water, carbon capture and biodiversity, as well as supporting the establishment of new local PES mechanisms (World Bank 2006).

DONOR INTERVENTIONS AND INVESTMENTS

USAID supports a project to reduce greenhouse gas emissions in Mexico through improved watershed management. The project operates in the middle Usumacinta, the Pacific Coast, the Chimalapas and the Sierra Tarahumara to train watershed users in sustainable watershed use and management. USAID also works with the GOM to improve the production technology of state and municipal water utilities and optimize urban water-use systems (USAID 2009a).

In recent years, USAID has supported the US Forest Service's watershed management work in Mexico. This work has included improving local capacity on the sustainable management of watershed and aquatic resources in Sierra Gorda Biosphere Reserve and providing technical assistance in the protection of Rio Laja community watershed (USAID 2005).

In June 2010, the World Bank approved a US \$450 million loan to support GOM efforts to adapt the Mexican water sector to climate change. The proposed outcomes of the loan include: development of a management plan for primary aquifers; improved availability of information on Mexico's water resources; increased productivity of irrigation systems; and an increase in the proportion of treated sewage from 36% to 60%. The project is expected to end in 2012 (World Bank 2010d).

In the early 1990s, the World Bank supported the On-Farm and Minor Irrigation Program to introduce improvements in the irrigation districts recently transferred to Water User Associations. Initially the program included 14 irrigation districts covering 400,000 hectares and later expanded to other districts that met the design criteria. The project sought to make the Mexican irrigation subsector more efficient and less reliant on government funds, through shared investments by beneficiaries. The project benefits more than 40,000 farmers, 50% of whom earn incomes around the minimum wage (Contijoch 2003).

From 1997 to 2005, the World Bank loaned US \$120 million to Mexico to create an integrated water resource management system. The project: created conditions for better use of water resources; improved the country's hydrological network; and developed 13 comprehensive regional hydrologic plans to improve public participation (World Bank 2008b).

3. TREES AND FORESTS

RESOURCE QUANTITY, QUALITY, USE AND DISTRIBUTION

Mexico has 63.5 million hectares of forest, and 64.1 million hectares of scrubland and other types of low vegetation, all of which cover 66% of national territory (Anta Fonseca 2004).

Mexico has a series of mountain ranges covered by temperate forests. The country has the largest number of indigenous pine species in the world. Mexico also has 0.2 million hectares of forest plantations. Pines and hardwoods account for the majority of the area of forest plantations (FAO 2007; FAO 1999).

Mexico has 174 protected areas, constituting 13% of total land area. The most endangered forest types are cloud forests and dry forests, both rich in biodiversity. In the communities surrounding these forests, the forest sector makes a smaller contribution to local employment and income than do the agriculture and cattle-raising sectors. Generally speaking, deforestation, uncontrolled forest fires and illegal cutting occur mostly in contexts of poor social capital and scarce opportunities for economically viable and legal forest use (CONANP 2010; Sarukhan and Merino 2007).

Deforestation occurs at a rate of 0.4% per annum and is one of Mexico's most pressing environmental problems. Between 1990 and 2005, Mexico lost 6.9% of its forest cover (approximately 4.7 million hectares). Though deforestation rates have decreased since 2005, forest degradation and deforestation continue, primarily due to the conversion of forests to agricultural and pasture land. Other factors contributing to deforestation include forest fires, illegal logging, and the collection of fuelwood. Deforestation is most acute in tropical forests, threatening Mexico's biodiversity (FAO 2006; Karousakis 2007; Mongabay 2010).

LEGAL FRAMEWORK

In Mexico, forest-related activity is primarily regulated by the 2002 Law on Sustainable Forest Development (*Ley General de Desarrollo Forestal Sustentable*). The 2002 law states the requirements for obtaining authorization for forest use, as well as the commitments and obligations of the forest landowners and the GOM to conserve, protect, use sustainably, and restore forested areas of the country. A number of additional laws complement the 2002 law in regulating forest use. The General Law on Ecological Equilibrium and Environmental Protection (*Ley General del Equilibrio Ecológico y Protección del Ambiente*) regulates activities for protecting biodiversity and reducing the impact on forests and tropical areas of certain forest activities. The Wildlife Law (*Ley de Vida Silvestre*) governs the use of plants and wildlife found in the forests. The General Law on Sustainable Rural Development (*Ley General de Desarrollo Rural Sustentable*) provides guidance for activities aimed at protecting and restoring forests within the framework of rural development programs. Finally, the Agrarian Law (*Ley Agraria*) governs farmers' ability to use forest resources on their land (Anta Fonseca 2004).

TENURE ISSUES

Of the total forest surface, 80% is community property (belonging to *ejidos* and indigenous *comunidades*), 15% is private property (small-scale landowners), and the remaining 5% is government property (Anta Fonseca 2004).

To use forest resources for commercial sale requires authorization from the Secretariat of the Environment and Natural Resources (SERMARNAT). Forest use permits are generally issued for 10 years (Anta Fonseca 2004).

Mexico's forest regions are home to 14 million people who live in nearly 8500 communities, many of which are indigenous. In 2000, 50% of the inhabitants of forest communities lived in conditions of extreme poverty, 50% of them had no schooling beyond elementary education, and 37% of those older than 15 years were illiterate. These conditions undoubtedly affect the way forests are perceived and used, as well as the prospects for sustainability. Subsistence agriculture has been and remains the main economic activity of forest communities; cattle-raising is also practiced and has gained importance through the long presence of favorable subsidies (Sarukhan and Merino 2007).

GOVERNMENT ADMINISTRATION AND INSTITUTIONS

In Mexico, federal institutions govern regulation, advancement, protection and surveillance of forest resources. As such, the Secretary of Environment and Natural Resources (*Secretaria de Medio Ambiente y Recursos Naturales* – SEMARNAT) is in charge of regulating forest activities and authorizing the use of forest resources through its delegations in each of the 32 federal entities. The National Forest Agency (CONAFOR) is the agency in charge of promoting the activities related to proper forest use, forest protection, plantation development and restoration (Anta Fonseca 2004).

Forests owned by communities are managed through institutional arrangements that vary from community to community. Each forest community invests in the preservation and development of forest resources and has developed mechanisms for monitoring and counteracting forest fires and illegal harvesting. Many community-managed forests have strong biological productivity (Merino 2003).

GOVERNMENT REFORMS, INTERVENTIONS AND INVESTMENTS

Mexico has been actively involved in discussions on the Reduction of Emission from Deforestation and Forest Degradation (REDD) Program and is developing a REDD Readiness Plan. The REDD Readiness Plan proposes to incorporate the REDD Program in the country's existing forest program. The participation of forest communities and private forest owners is voluntary (Benneker and McCall 2009).

In 2010, the GOM announced its participation in the World Bank-supported Forest Investment Program (FIP), which is focused on reducing greenhouse gas emissions from deforestation and forest degradation. FIP is part of the World Bank's Strategic Climate Fund (*The Financial* 2010; World Bank 2010b).

DONOR INTERVENTIONS AND INVESTMENTS

USAID is working to improve natural resources management and slow carbon emissions through: promoting sustainable forest management; reducing the impact of forest fires; and providing economic incentives for the sustainable use of forests in biodiversity hotspots. USAID and its US and Mexican partners are focused on conserving biodiversity in forests as well as generating economic opportunities at the community level through the promotion of ecotourism, coffee, cacao and community forestry. USAID projects in Mexico focus on: reforestation of degraded areas; the promotion of sustainable harvesting practices; strengthening institutions to support effective forest management; and controlling the use of fire to convert forests to agricultural land (USAID 2009a).

In 2010, the World Bank granted Mexico two “green loans” (i.e. loans for environmental projects) totaling US \$800 million. In addition, the World Bank funds Mexico's participation in the Forest Investment Program (FIP) (World Bank 2010b).

The United States Forest Service (USFS) worked with USAID-Mexico to improve natural-resource management, conserve biodiversity and increase collaboration with partner organizations and institutions. The work ranged from targeted technical assistance for NGOs to implementing joint activities with Mexican and private institutions. Priority areas have included: watershed management; protected area management; migratory bird conservation; forest health protection; and integrated fire management (USAID 2005).

4. MINERALS

RESOURCE QUANTITY, QUALITY, USE AND DISTRIBUTION

Mexico is one of the leading mineral producers in Latin America and a significant world producer of a number of mineral commodities. In 2006, the country was the world's second-ranked producer of bismuth, fluorspar and silver; and the third-ranked producer of strontium (celestite). Mexico also was the fourth-ranked producer of Fuller's earth; the fifth-ranked producer of arsenic and lead ore; the sixth-ranked producer of bentonite, cadmium and zinc ore; the seventh-ranked producer of diatomite, gypsum and salt; the eighth-ranked producer of kaolin, manganese and molybdenum; and the tenth-ranked producer of cement (Torres 2006).

The mining industry comprises approximately 1.5% of the GDP of Mexico and employs an estimated 250,000 people. Although mineral deposits have been found in 22 of Mexico's 33 states, most mining activity takes place in a handful of states including: Sonora; Chihuahua; Coahuila, Durango; Zacatecas; and San Luis Potosi. In 2006, Mexico's exports of crude oil and petroleum products were valued at US \$39 billion, and the total value of nonfuel mineral trade was US \$15.9 billion. Iron accounted for almost 30% of the total value of exports followed by copper, silver and zinc. A significant portion of Mexico's mineral output was produced by a few large domestic companies. Many industrial minerals, however, were produced by medium- and small-sized companies. In 2008, 200 foreign companies (70% of which were Canadian) operated in Mexico's mining sector. Artisanal

mining has a minimal effect on mining production in Mexico (World Bank 2009c; Torres 2006; World Bank 1996).

The petroleum sector is controlled by state-owned *Petróleos Mexicanos* (PEMEX). Despite the fact that Mexico is one of the world's top ten oil producers, domestic demand exceeds supply, and the country imports 40% of its gasoline (Roig-Franzía 2008; Torres 2006).

The mining industry in Mexico has been plagued by conflict and alleged human rights abuses. Many mining jobs are short-term and low-wage. In several instances, violent clashes between workers and security forces over unionization and salaries have resulted in injuries and fatalities. Anti-mining activists have reported being abducted and beaten by pro-mining groups (Mandep 2007; Rosenberg 2010; CNS 2010).

LEGAL FRAMEWORK

Exploration, exploitation and processing of all mineral or substance deposits are governed by the 1975 Mining Law, which was restructured in 2005 to support deregulation of the mining sector. Key amendments to the law in 2005 allowed 100% private ownership over the right to explore and develop mineral substances, and allowed private-sector investment in minerals that were formerly state-owned, such as sulphur, phosphorus, potassium, iron and coal. According to the law, mining activities may be carried out by Mexican private individuals and corporations through concessions granted by the Federal Government. Foreign investors may own capital stock in Mexican companies. Foreign investors may also own 100% of the stock of mining corporations, but these must be incorporated as Mexican entities. Exploration activities may also be carried out by the Mexican Geological Service through mining assignments which are also granted by the Federal Government. The mining industry falls within the scope of the North American Free Trade Agreement (NAFTA), which regulates systems and equipment pertaining to mining activities (Martindale-Hubbell 2008; Baker and McKenzie 2006; World Bank 2009c).

In the Public Registry of Mines, all actions concerning organization, modification and dissolution of corporations organized for exploration, extraction or processing of mineral substances must be recorded. All actions related to the mining industry must be registered, including transfers and termination of concessions, contracts for exploitation of minerals and other contracts (Martindale-Hubbell 2008).

The Federal Environmental Regulations apply to all mining concessionaires, and the government must authorize environmental impact statements for mining activities (World Bank 2009c).

The legal framework for petroleum derives from the Regulatory Law of the Mexican Constitution in the Area of Oil (enacted in 1958 with regulations adopted in 1959). PEMEX Executive Decree of 1992 sets forth the Organic Law of PEMEX. According to the Constitution, PEMEX must give most of its revenues to the federal government. These revenues now account for an estimated 40 % of the federal budget. In addition, PEMEX must pay salaries and pensions to the oil workers' union (Martindale-Hubbell 2008; Roig-Franzía 2008; Victor 2008).

TENURE ISSUES

Under Article 27 of the Constitution of Mexico (1917) all minerals and substances existing in veins, strata, masses or beds, and which constitute deposits of nature different from land, are the property of the state (Martindale-Hubbell 2008).

The nation holds direct non-transferable domain over oil resources. The nation carries out all exploitations of petrochemicals through PEMEX (Martindale-Hubbell 2008).

Mining concessions for exploration are for six years (non-renewable), while the term for exploitation is 50 years (renewable). The application for renewal must be submitted five years prior to expiration of the exploitation concession. Concessionaires are entitled to certain benefits, such as certain tax exemptions and the right to expropriate land necessary for installation, storage plants and other facilities, easement of access, power and water lines, and use of subsoil waters (Martindale-Hubbell 2008; World Bank 2009c).

Mining concessions are subject to cancellation for a range of reasons, including non-exploitation, abandonment, lack of payment, and lack of proper authorizations (Martindale-Hubbell 2008).

GOVERNMENT ADMINISTRATION AND INSTITUTIONS

Assignments and concessions are granted by the executive branch of the Federal Government through the General Mining Coordinator (*Coordinación General de Minería*), housed at the Secretariat of Economy, and in certain cases (for example, gas deposits related to mineral carbon) at the Secretariat of Energy. The General Mining Coordinator also operates the Mining Promotional Trust (*Fideicomiso de Fomento Minero-Fifoni*), which is a US\$5 million public trust to support mining (Martindale-Hubbell 2008; World Bank 2009c).

GOVERNMENT REFORMS, INTERVENTIONS AND INVESTMENTS

The GOM adopted the National Mining Development Plan in 2002 and updated it in 2007. The plan sets forth the following strategic goals for the GOM's involvement in the mining sector: improve the legal and regulatory framework; increase efficiency and transparency in administration; promote investment; provide important geological information; supply technical and financial support; support social mining associations; and strengthen the chain of production for mineral extraction and development (World Bank 2009c).

DONOR INTERVENTIONS AND INVESTMENTS

USAID does not appear to be active in mining reform. Information about other donor-related minerals projects is unavailable.

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