



# Environmental policies in the peri-urban area of Mexico City: The perceived effects of three environmental programs



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## ABSTRACT

Managing peri-urban areas is complicated due to the unique rural and urban characteristics and because sectorial policies are not always compatible. In Mexico City, peri-urban spaces (particularly the Conservation Zone in the south of the city) provide important ecosystem services for urban residents. However, despite this environmental importance, the Conservation Zone suffers from land-use changes as a result of the economic transition from rural to urban activities. Different government agencies have implemented environmental programs attempting to address this problem. The present paper focuses on the beneficiaries' perceptions of the effects of three such programs. The results demonstrate the importance of the conservation programs but at the same time show numerous unresolved issues, including excessive administrative fulfillments, social and political conflicts, and a lack of coherence among programs. An alternative could be an integrated spatial and environmental planning process in which federal and local authorities, beneficiaries, and city inhabitants participate.

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## 1. Introduction

Studies of peri-urban areas have reemerged over the past two decades (Lerner & Eakin, 2011; Allen, 2003; Fisher, 2003; Simon, 2008; Zasada, 2011). Urban sprawl and the economic transformation of peri-urban agriculture have attracted the attention of scholars in various fields, including geography (Ruiz & Delgado, 2008), economics (Cabus & Vanhaverbeke, 2003; Brinkley, 2012), sociology (Lindsay, Greig, & McQuaid, 2005), anthropology (Ruiz & Delgado, 2008), and planning (Willemen, Hein, & Verburg, 2010; Ruiz, 2013).

Peri-urban areas are easy to identify but difficult to conceptualize (Lerner & Eakin, 2011; Ruiz & Delgado, 2008). Nonetheless, there is consensus that such zones are not merely a juxtaposition of urban and rural landscapes. For instance, in some cases, industrial and conservation areas are important in defining what is understood as peri-urban (Portnov & Pearlmuter, 1999; Allen, 2003; Stoian, 2005; Keivani & Mattingly, 2007; Hornis & Eck, 2008a; Said-Mohamed, Neukermans, Kairo, Dahdouh-Guebas, & Koedman, 2009; Shu-Li, Wang, & Budd, 2009; Ayenew, Wurzimer, Tegegne, & Zollitsch, 2011; Kritsanaphan & Sajor, 2011; Vejre, Sondergaard, & Thorsen, 2011; Zasada, 2011;

Díaz-Cervantes, 2012). Moreover, there are new challenges in defining and managing these areas based on the need to include additional economic activities.

The economic and social transitions of many cities have challenged the way that urban and peri-urban lands have been managed (Allen, 2003; Simon, 2008; Ruiz, 2013; Lerner & Eakin, 2011). On the one hand, urban and industrial activities have traditionally pressured agricultural usage. On the other hand, recent concerns regarding environmental issues have positioned the discussion of compact cities at the center of numerous policies because the urban periphery is considered to consist of open and preserved spaces. However, problems arise with respect to how a space that is subject to various pressures and land uses should be managed when it does not have special status in law or in policy (Allen, 2003; Lerner & Eakin, 2011; Simon, 2008). Striking a balance among economic development, urban usage, sustainable exploitation and spatial conservation in peri-urban spaces is a major challenge faced by many governments (Pérez, Perevochtchikova, & Ávila-Foucat, 2011; Pérez, Perevochtchikova, & Ávila-Foucat, 2012; Ruiz, 2013).

In the context of this paper, peri-urban zones are important because they provide ecosystem services to the city and their land-use transformation affects the urban population in numerous ways (Colding, 2011). Water runoff, carbon storage, biodiversity and natural aesthetics are among the most important ecosystem services provided by peri-urban zones (Vejre et al., 2011; Niemela, 2012), and their preservation is thus crucial for the urban population (Simon, 2008; Vejre et al., 2011).

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Our main interest is the participation in environmental programs and more particularly how beneficiaries perceive the implementation, social, economic and environmental effects of such environmental programs. This understanding is relevant for understanding positive and negative aspects and for identifying specific necessities of those programs within a complex context in order to improve them and increase the probability of conservation through environmental instruments. This work aims to identify recommendations for improving government policies in peri-urban contexts. The three programs analyzed are Payment for Hydrological Environmental Services (PHES), Management Units for Conservation and Sustainable Use of Wildlife (UMAs) and the Communitarian Funds for Rural Sustainable Development Program (FOCOMDES).

Mexico City is challenging as the subject of study in this regard because the law forbids the transformation of forested areas in the peri-urban zone, but the law is not enforced. Thus, land-use changes (typically to urban and agricultural uses) and unsustainable economic activities are common. In response, the government has promoted land-use sustainability, and the mechanisms used to achieve these goals are environmental programs that require active social participation.

The next section focuses on the peri-urban zones transformation and the need for an environmental policy specifically designed for those areas. The second and third sections describe the study area and results. The article concludes with some final considerations.

## 2. Peri-urban spaces and environmental challenges

The peripheries of cities have been analyzed in various disciplines and studied from different perspectives (Ruiz & Delgado, 2008; Simon, 2008; Zasada, 2011). From a “classic urban point of view”, the primary role of peri-urban spaces is to serve as land reserves for future urbanization. However, “emergent views”<sup>3</sup> instead emphasize the economic role of such peripheries in a globalized context (Keivani & Mattingly, 2007; Nelson & Nelson, 2010) and the importance of ecosystem services to the city (Portnov & Pearlmutter, 1999; Allen, 2003; Da Gamma Torres, 2008; Hornis & Eck, 2008a; Shu-Li et al., 2009; Kritsanaphan & Sajor, 2011).

Worldwide, urban peripheries have changed dramatically over the last 40 years (Simon, 2008). Those transformations are the result of multiple factors, including economic activities, natural assets, land and housing markets and the urban, rural and environmental planning strategies of local and national governments (Fisher, 2003; Simon, 2008). Although there are significant differences between and within countries, there are also common aspects that have provided new insights into the study of peripheries, including the following: urban expansion and land-use change (Nechyba & Walsh, 2004); the importance of non-agricultural activities, such as commerce, services (Zasada, 2011) and infrastructure construction; and the new political focus on environmental management (Allen, 2003), including the centrality of ecosystem services (Vejre et al., 2011).

Urban peripheries are complex spaces that require an interdisciplinary and integrated approach (Niemela, 2012). Peri-urban zones are not urban or rural or a combination of the two; they are a particular type of space with their own characteristics, including environmental characteristics (Colding, 2011). These spaces can be homogenous or heterogeneous transition zones (Simon, 2008). These zones are frequently home to complex processes that lead to the creation of areas with specific characteristics and cultures (Ruiz & Delgado, 2008). Moreover, combinations of land uses (rural, urban and environmental) occur within social and cultural contexts. Therefore, the conceptualization of the urban periphery must be changed to locate the characteristics and processes within a more integrated analytical framework.

<sup>3</sup> Colding (2011) refers to them as “planning for development” and “sustainable development”, respectively.

The urban periphery cannot be exclusively regarded as a space for agricultural production for urban markets (Hudalah, Winarso, & Walter, 2007; Ayenew et al., 2011; Gant, Robinson, & Fazal, 2011). In this sense, peri-urban agriculture must adapt to cope with the challenges imposed by global agricultural markets, changes in the urban middle class diet and pressures to change land uses (Cavailles & Wavresky, 2003; Crossman, Brett, Ostendorf, & Collins, 2007). Consequently, specialized (more selective) agricultural practices—in conjunction with other activities, such as industry, tourism and payments for environmental services—have been implemented as part of a strategy to increase profits while maintaining agriculture as an important activity in the peri-urban space (Alix-Garcia and Wolff, 2014; Stoian, 2005; Wunder & Börner, 2010; Zasada, 2011).

Developing countries have their own important particularities. For example, in Latin America, trends of urban expansion have demonstrated that the real-estate sector is closely linked with the persistence of illegal settlements. Those settlements have a direct impact on soil and land degradation.

Unfortunately, the environmental management of peri-urban zones has not been an important consideration in many countries (Allen, 2003; Simon, 2008; Lerner & Eakin, 2011). The ecosystem services these areas provided for cities are generally overlooked, although these services are crucial for the survival of many cities. For instance, in Mexico City, approximately 70% of all potable water comes from the infiltration of water in the peri-urban Conservation Zone (Escolero, Edda Martínez, Kralish, & Perevochtchikova, 2009). Moreover, the peri-urban forest captures an important amount of the CO<sub>2</sub> (SEDESOL, 2013). In other cases, the importance of ecosystem services provided by urban peripheries is linked with agriculture. Certain agricultural practices have been shown to prevent soil degradation, preserve certain endangered species and provide income to farmers through either the sale of their products and/or ecotourism (Zasada, 2011; Brinkley, 2012). The relevance of hydrological services for urban uses has also been highlighted and the payment for environmental services studied in this context (Neitzel, Caro Borrero, & Daniel, 2013; Bremer, Farley, & Lopez-Carr, 2014). In the same way, outdoor recreation, green areas and wildlife tourism have also been recognized as important but are not well linked to environmental services or land-use planning.

## 3. Study area: conservation zone of Mexico City

### 3.1. General characteristics

The Federal District, also known as Mexico City, is the capital of Mexico and is situated in an area of approximately 148,000 km<sup>2</sup> with a population of more than 8.5 million, which makes it Mexico's most densely populated city. Mexico City is divided into two major areas: urban and conservation. The former corresponds to the built zone (the city), and the latter is an administrative category designed to protect natural and environmental resources. The Conservation Zone of Mexico City is an area designated by law in the territorial ordinance; according to the Environmental Plan, in Spanish the “Programa General de Ordenamiento Ecológico del Territorio” (PGOETDF, 2000), the Conservation Zone represents 58% of the total area of Mexico City (85,000 ha) (see Fig. 1). It is important to note that land property in the Conservation Zone is principally collective (communities and ejidos<sup>4</sup>).

Geomorphologically, Mexico City is highly diverse and consists of a valley, transition areas and mountain areas. According to Castelan and

<sup>4</sup> Communities (Comunidades in Spanish) are rural farming units (areas), recognized by Mexico's National Agrarian Registry (NAR; Registro Agrario Nacional) that own and manage their commons resources.

Ejidos are a Mexican form of land property, recognized by NAR, and refer to the areas of communal land used for agriculture where members individually possess and work a specific parcel.

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