



## Water assessment in a peri-urban watershed in Mexico City: A focus on an ecosystem services approach



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### ABSTRACT

Among hydrological ecosystem services, water supply is one of the most relevant to society because of its role in human wellbeing; accordingly, it has been significantly modified worldwide. There has been a recent increase in the necessity of combining methods and tools to create interdisciplinary evaluations of water ecosystem services, especially in developing countries where there is a lack of systematized and updated socioenvironmental information. We propose a framework for the assessment of water supply ecosystem services that includes environmental, social and economic dimensions. We describe and develop each of these dimensions with a particular focus on identifying the key variables that are needed to answer them. First, we performed research of the literature regarding the evaluation methods that are sufficiently flexible to apply them to local scales in countries where information is limited. Then, we chose the Magdalena River Watershed to apply this perspective because it is an illustrative area of vital importance to Mexico City's ecosystem services. We believe that this proposal has outlined basic guidelines to help decision makers improve water management and may provide an opportunity to change public policies on peri-urban ecosystems.

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## 1. Introduction

Among all ecosystem services (ES), the ES that are related to water (ESw) are some of the most relevant to society because of their role in human wellbeing (Falkenmark and Folke, 2003; Brauman et al., 2007). In particular, water supply (ESws) is one of the ES that has been significantly modified worldwide because of century-old sociopolitical issues that have induced intensive and extensive land transformations (Rockström et al., 2009).

Authors such as Pahl-Wostl et al. (2011) and Maass (2012) suggest that water management must be conducted holistically by contemplating the following three basic aspects: a) to view water as an integrated natural resource in a particular socio-ecosystem context; b) to use an ES approach to translate the biophysical

functioning of ecosystems and their processes into terms that relate to human welfare; and c) to recognize watersheds as the natural ecosystem's functional units.

Watersheds have integral multidimensional and multifunctional scenarios that are ideal for promoting transdisciplinary research where biophysical and social processes can be analyzed together. Additionally, the use of watersheds as management units allows the identification of geographical areas where ES are generated and consumed and the location of the stakeholders and beneficiaries who are associated with these service dynamics (Flotemersch et al., 2015).

Peri-urban watersheds are the main source of ES for urban populations (Bouland and Hunhammar, 2009). Despite this importance, the value of peri-urban watersheds has been underestimated and has resulted in ecologically unsustainable land-use planning (Niemelä et al., 2010). This situation is concerning given that the ES that these areas provide heavily depend on land management strategies, which, in turn, depend on landowners'

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