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Gendered perspectives of ecosystem services: A systematic review

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ABSTRACT

Women and men often have differential access to and derive different benefits from ecosystem services; therefore, their perception and knowledge of ecosystem services also differ. Understanding these differences is critical to ensuring that policies aimed at enhancing access to and use of ecosystem services can provide benefits to all genders. We conducted a systematic review of studies that aim to understand the relationship between gender and ecosystem service perceptions to summarize research from this emerging topic and to identify patterns between gender and ecosystem service perceptions from different case studies. The results show that highly gendered ecosystem services include medicinal products from forest or mangrove ecosystems and freshwater supply. Women have a stronger perception of water quality and erosion control, soil formation, habitat conservation and sustaining biodiversity. Men, on the other hand, had more knowledge of fuel and timber and extreme event mitigation services. Our review also identifies the limitations of sample size for this interdisciplinary topic, calls for more case studies and comparative studies to identify relationships between gender and ecosystem service perceptions, and calls for the development of models on ecosystem services that incorporate gender. Finally, we discuss how our review can augment existing gender frameworks for policymaking.

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1. Introduction

The Millennium Ecosystem Assessment defines ecosystem services (ES) as the benefits that humans derive from their surrounding ecosystems (Reid et al., 2005). These services are often difficult to measure and quantify. Many researchers have argued that an in-depth understanding of how people value ecosystem services is crucial for policymakers to conceptualize the contribution of ecosystems to human society, for undertaking tradeoff analyses of development and conservation (Costanza et al., 1998), for understanding the size of economic activity in relation to its ecological life support capacity (Daly, 1992), and for providing financial compensation to preserve these services.

While the need to protect ecosystem services is critical, it is also extremely relevant to acknowledge the extensive and balanced involvement of women and men as important parts of the use, conservation and management of ecosystem services (Kariuki and Birner, 2016; Rajvanshi and Arora, 2010). In this article, we define gender as the differential experiences of men and women. We further define an approach to be gender-sensitive if it pays specific and sustained attention to gender needs, interests, and culturally specific dynamics and recognizes the disparities in opportunities, resources, and power that are organized by gender and that are pervasive, as described by Brisolara (2014). As a social construct, gender is both relational and culturally embedded (Butler, 2011), making generalizations about how men and women utilize ecosystem services across countries or regions difficult. Kelemen et al. (2016) argue that a gendered understanding of ecosystem services can create just, legitimate and effective policies, institutional arrangements and management interventions for ecosystems and biodiversity. The Millennium Development Goals (MDGs) explicitly stated that the goal to "*promote gender equality and empower women*" was considered only partially achieved through advances in gender parity in education and government (UN, 2015a). The three indicators used to measure gender parity under the MDGs (parity in education at all levels, in employment in non-agricultural jobs, and proportion of seats held by women in national parliaments) did not acknowledge gendered relationships with the environment. Moreover, none of the indicators used to measure "MDG 7: Ensure Environmental Sustainability" were gender-sensitive or gender-disaggregated.

The Sustainable Development Goals (SDGs) developed by the United Nations, with contributions from governments, businesses, and civil society, aim to mobilize efforts to end all forms of poverty, fight inequalities, and tackle climate change while ensuring that no one is left behind (UN, 2015b). The SDGs have not only generated stronger linkages between environmental and developmental outcomes but have also integrated gendered considerations for achieving the targets and goals. Unfortunately, comprehensive insights on gender-ecosystem service linkages in important goals, such as SDG2 on food, SDG6 on water or SDG15 on life on land have yet to be developed. Cruz-Garcia et al. (2016) argue that it is imperative for research on ecosystem services to incorporate a gender lens in order to achieve the SDGs. Similar studies that discuss the relationship between gender and environmental science have focused on specific aspects, such as water resources management (Rathgeber, 2003), land-use decision making (Villamor et al., 2014), and vulnerability and adaptation to climate change (Denton, 2002).

Gender research has a long history of developing gender analysis frameworks, with evolving philosophies regarding the role of women—and then gender—in development processes since the 1970s. Gender analysis frameworks are methods of research and planning for assessing and promoting gender issues in institutions (March et al., 1999). In chronological order, some examples of common gender analysis frameworks include the "Harvard Analytical Framework," one of the earliest frameworks that maps the work and resources of women and men in a community and highlights the main differences; and its modified version: "People-Oriented Planning" (POP, Overholt et al., 1985) that aims to reduce disparities between genders. The "Moser Gender Planning Framework" (Moser, 1993) aims to design programs that emancipate women from their subordination; the "Gender Analysis Matrix" (GAM, Parker, 1993) tries to determine the differential impacts development interventions have on women and men; the "Longwe Framework" (Longwe, 1995) seeks to enable women to take an equal place as men and participate equally in development projects; and the "Social Relations Framework" (Kabeer, 1994) analyzes existing gender inequalities and aims to enable women to be agents of their own development.

These frameworks concentrate on certain factors in women's and men's lives. The chosen focus reflects a set of values and assumptions on the part of the framework's designers. "Motives/Means and Opportunities" is a more recent framework aimed at capturing aspects of access to, control of, and motivations for exploiting resources; particularly as they pertain to women (Meinzen-Dick et al., 2014). The framework scope ranges from the intangible aspects contained in the ecofeminist literature, such as closeness to nature, to the tangible aspects discussed in the political ecology and natural resource management literature, such as access to financial resources and knowledge. With the exception of more recent frameworks, most of these frameworks were developed before the concept of ecosystem services was firmly established in the early 2000s. Thus, no explicit linkages between gender and ecosystem services are documented. However, several frameworks do consider "uses and management of natural resources" as one of their focus, or "means and opportunity to exploit resources (Meinzen-Dick et al., 2014)."

Recently, a growing number of scientific studies have used systems-based approaches to evaluate the relationship between gender and ecosystem services. These studies aim to bridge the research gap in understanding how women and men perceive ecosystem services in different cases. This paper provides a systematic review of how these studies have defined, operationalized and assessed gender differences in relation to ecosystem services. Based on the review, we have tentatively proposed a concept of an "ecosystem services-gender nexus" that attempts to describe gender differences in the perceived value, knowledge and importance of different ecosystem services. We also discuss how results of this review can complement existing gender analysis frameworks. This summary can frame further discussions on gender and ecosystem services, help craft gender-sensitive investments, and deepen practitioners' capability to better design conservation plans with financial and/or cultural incentives. The structure of this review paper is organized as follows: the methodology section introduces the materials and methodology used for this paper, the results' section presents the literature review, and the subsequent sections present our discussion and conclusions.

2. Methodology

Our review is based on articles published in the Institution for Scientific Information (ISI) Web of Knowledge database. First, we searched publications from 1900 until March of 2017 in the "TOPIC" section with the term "ecosystem service," which yielded 14,992 articles. Then, we searched publications with the same criteria, but using specifically gendered terms including {"ecosystem services" and gender}, {"ecosystem service" and gender}, {"ecosystem valuation" and gender}, {ecosystem services and gender},