

Chapter 2

Introduction: Gender, Education and Ecology

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Throughout this volume, as we seek to think about new or enhanced ways in which ecology can be applied to address poverty, it is critical to consider the social, cultural, and economic traditions that may support or challenge the adoption of an ecologically based approach to development. Two key, interconnected areas in which societal norms are critical to furthering poverty reduction and sustainable natural resource management in developing countries include education and gender. Education is widely recognized as an important component in reducing poverty and a key to wealth creation (UNESCO 2003). While the rural poor in general lack access to formal education, women and girls have significantly fewer opportunities to access education than men and boys (UNESCO 2003). Education is not the only sphere in which gender inequalities exist. Women perform 66% of the world's work, produce 50% of the food, but earn 10% of the income and own 1% of the property (UNICEF 2007). Yet, improving the lives of women and girls can be an effective way to prevent disease, reduce hunger, and raise Gross Domestic Product (Kristof and WuDunn 2009). Increasing appreciation of the importance of education and gender equality in development initiatives is reflected in Millennium Development Goal (MDG) 2, which focuses on education, and MDG 3, which focuses on gender equality.

In this section, authors have considered how ecological science and tools might be related to the challenges of education and gender equality and how ecology can be better integrated into ongoing initiatives to address gender and education challenges. Both chapters in this section begin with the premise that the rural poor are heavily and directly dependent on functioning ecosystems for their well-being. A majority of these people lack formal education, yet, there is a wealth of local ecological information held by rural communities, and much of this information is gender specific. Understanding how rural communities perceive, understand, and

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interact with each other and the ecosystems in which they reside is critical to developing strategies for sustainable development. Towards this end, both chapters emphasize the importance of local context and “systems thinking” for developing sustainable development approaches.

For example, agro-ecologists have long been interested in understanding farmer perspectives regarding increasing tree densities and coffee- and pasture-based agroforestry systems of Mesoamerica. Interviews with rural farmers have demonstrated that, even without formal education or training, they may have a sophisticated understanding of the ecological traits for different species, understand the spatial dynamics of pests and diseases (particularly when their neighbors follow unsanitary crop management practices), and also integrate concepts of resource limitation into their management practices. During interviews with coffee farmers of Costa Rica, one farmer favored using laurel (*Cordia alliodora*) as a shade tree both because of its timber value and because of its synchronous flowering with coffee, thereby attracting pollinators. This farmer operates under the assumption that pollinators are scarce in coffee farms due to pollen limitation. Another farmer of the same region, however, stated that he does not include laurel in his coffee farms for exactly the opposite reason stating that laurel flowers at the same time as coffee, thereby reducing the number of flower visits because of pollinator scarcity. Thus, it is clear that both farmers managed pollination as an ecosystem service and both implemented farming practices based on the notion that managing flower resources could influence productivity.

Much ecological information is also gender based and complementary. In a project studying local knowledge of trees in silvopastoral systems of Nicaragua, interviews that include both the male and female heads of households yield more information than interviews with only one head of household. For example, women tended to possess in-depth information on the medicinal values of tree species, including veterinary uses, whereas, men tend to focus more on the production aspects of different species.

In the chapter on Education, Ecology, and Poverty Reduction, Sears and Steward point out that scientific ecological knowledge and local ecological knowledge share similar traits. Alone, neither is complete. Local ecological knowledge is essential from several points of view. First, as highlighted above, it is derived from the local environment, and therefore is highly context specific. Second, because it is embedded in community practices, it responds to the local needs of the population. Countless examples exist of development interventions that have failed after not taking into consideration this perspective. Finally, because it is multi-generational, local knowledge includes critical information on how societies have dealt with disturbances and other challenges in the past—information that may be critical for developing adaptation strategies for future perturbations. Local knowledge may not be sufficient alone to deal with exogenous, new challenges such as climate change and opportunities such as payments for ecosystem services—these may require additional capacity building. Training programs that are grounded in the local social and ecological context are more effective at equipping communities with the skills needed to adapt to changing environmental conditions and to fully engage in emerging environmental markets than programs that do not incorporate aspects of local

knowledge. However, as Sears and Steward discuss, retaining smart, highly skilled professionals in rural areas to work on these issues remains a challenge.

In the chapter on gender, Gutierrez-Montes et al. outline the importance of women in natural resource management and the different ways that men and women perceive and use natural resources, and propose ways in which women can be more fully integrated into natural resource management. The authors state that poverty reduction will require understanding the linkages among the social construction of gender, the context of local access and decision making over different natural assets, and the impacts of environmental change on those assets. Such information can be used to ensure that women more fully participate in decision making and project planning.

Sears and Steward, and Gutierrez et al. provide an illustration of several social barriers to effective ecological management as related to education and power. These chapters show that developing an understanding of the local social and ecological context and empowering people who hold valuable local knowledge to have a voice in natural resource management are important parts of implementing poverty reduction strategies that are grounded in the sustainable use of ecosystem services.

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