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Authors: Gerritsen, Peter, and Wiersum, Freerk

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Peter Gerritsen and Freerk Wiersum

Farmer and Conventional Perspectives on Conservation in Western Mexico

Establishment of conservation areas has become a standard strategy for protecting biodiversity. Different categories are distinguished, such as those that aim at enhancing local participation. Although rapid evolution has taken place since the 1970s, stimulating participation still challenges conservationists. Understanding the complex issues impacting on participation is a first step in finding more effective methods of conservation. The present article addresses this issue by contrasting farmer and conventional perspectives on conservation. A differentiation between ecologically oriented biodiversity conservation perspectives and livelihood-oriented resource diversity perspectives is proposed. A case study from western Mexico illustrates both perspectives. The first perspective is based on a dichotomized view separating nature from land use. The second is related to the process of co-production between farmers and nature, which results in landscape diversity. Effective participation requires effective interfaces between both perspectives, recognizing farmers' creative capacities with reference to co-production of biodiversity.

Keywords: *Conservation; participation; farmers' perspective; conventional perspective; biosphere reserve; Mexico.*

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Introduction

Biodiversity conservation through establishment of protected areas has become a common policy measure. Two approaches can be distinguished: strict protection, and the conservation and development approach. In the first approach, specialized agencies achieve conservation, while the second approach stresses the need for local participation. The first approach has been the conventional strategy, but the second emerged in the late 20th century as a result of the recognition that the concept of conservation should be expanded beyond conservation reserves, and that grassroots development should be stimulated (Western and Wright 1994). Since the recognition that more attention needed to be given to local people's interests, there has been much focus on implementation of conservation and development projects and collaborative management schemes, based on the notion of cooperation between conservation agencies and local communities (Borrini-Feyerabend 1996). As these efforts have met with varied results, it has recently been argued that attention should again be given to strict protection (Wilshusen et al 2002). Advocates of this approach base their arguments in the incompatibility of livelihood strategies and conservation. However, they fail to grasp the anthropogenic factors that impact on conservation (Brechin et al 2002; Bengtsson et al 2003). Many inhabited regions contain impressive biodiversity, suggesting anthropogenic origins of these biodiversity hotspots (Posey 1999). Practical reasons also exist, such as the need not to neglect biodiversity outside protected areas (Swaminathan 2002). Finally, this approach ignores the negative impacts and even resentment that can be caused by externally enforced restrictions on resource use (Ghimire and Pimbert 1997).

These arguments underline the importance of collaborative approaches, even if adequate development of such approaches is still a challenge for professionals. This is due to the impact of a complex set of socioeconomic and political issues, such as value differences regarding biodiversity types, variations in institutional norms and property regimes, different knowledge systems, and differences in the impact of outside forces (Brechin et al 2002). There is still a need to develop better insight into such pluriformity in developing participatory conservation schemes.

The present article contributes to the above debate by looking primarily at the perspective of farmers (understood here as being involved not only in agricultural and cattle-raising, but also in forest management activities), and by comparing this view with conventional perspectives. It focuses on assessing the differences that exist in the perspectives of farmers and professional conservation authorities and their impacts on conservation options. A central issue is the notion of farmers as actors with specific natural resource management practices that result in a specific biodiversity constellation. We first contrast a livelihood-oriented perspective on resource diversity with an ecologically oriented biodiversity perspective. These theoretical constructs are then illustrated by a case study from the Sierra de Manantlán biosphere reserve in western Mexico.

Contrasting perspectives on biodiversity

In considering differences in perspectives on biodiversity, two main issues require attention: the various spatial dimensions of biodiversity at landscape, species and genetic levels, and the need to conserve biodiversity for present and future generations.

In the conventional approach based on the professional manager perspective, biodiversity conserva-

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tion is primarily related to 3 notions about the need for protection: maintenance of ecosystem integrity, conservation of threatened species, and preservation of biological resources for future use (Callicott and Mumford 1997). These ideas are reflected in practice by focusing on ecosystem conservation, endangered species biotope management, and natural resource conservation. These ideas are integrated de facto in the concept of biodiversity conservation. Biodiversity refers to the variety and diversity among living organisms and the ecological complexes in which they occur; this includes ecosystems, species, and genetic composition. However, in most conservation schemes the species level is the central focus of attention. This diversity is regarded as a major characteristic of ecosystems and essential for their ecological integrity. Moreover, species diversity has its own intrinsic value, and its decrease entails an essential loss in the overall constellation of nature.

Biological species are also regarded as being of value to humans as a resource with utilitarian or cultural functions. Biosphere reserves aim to integrate these 3 considerations. The assumption is that conservation should be based on clearly defining farmers' roles, effectively implementing zoning regulations, and strengthening a favorable institutional environment. Management is realized in terms of demarcating specific landscape units. The usual approach is differentiation between a core zone, where ecosystem processes proceed without human interference, and a buffer zone, including anthropogenic vegetation types with high biodiversity value (Batisse 1986).

Farmers are generally not versed in such considerations, which are grounded in ecological science. They value nature for concrete products and services that fulfill livelihood needs rather than for theoretically expressed reasons. On this basis, they often undertake conscious measures to safeguard their use of resources (Wiersum 1997). In many cases nature is not valued for its own sake, but for its specific components—so-called natural resources. Natural resources can be understood as reflecting the process of co-production between farmers and nature.

The term "co-production" refers to the ongoing interactions and mutual transformations of social and natural phenomena, in which farmers play a strategic role. During co-production, specific nature components are preferentially used and may therefore be consciously protected or resource-enriched. In this way, the diversity of natural resources is transformed, including restructuring of the dimensions of time (represented by natural cycles of crops and animals) and space (represented by different land use units that are created through specific forms of resource exploitation). We use the term "resource diversity" (Gerritsen 2002) to refer to diversity in natural resources that is co-produced.

Co-production and its effects on nature are directly related to farmers' strategies. Farming styles can be distinguished as the results of specific responses of farmers to their ecological, political, and socioeconomic environment (Van der Ploeg 1994). They can be considered as specific orderings of co-production. Different types of resource management activities are often combined in farming styles, eg agricultural cropping, livestock keeping, and resource extraction from natural areas. Consequently, the co-production process does not necessarily result in a uniform landscape, but rather in a diversified landscape consisting of different niches, each playing its own role in providing livelihoods. Such farmer-created landscapes may include consciously conserved patches of natural vegetation, patches of vegetation modified or transformed by human activity, and open fields (Wiersum 1997). Each niche offers its own potential for the conservation of specific natural resource types (Wiersum 2004).

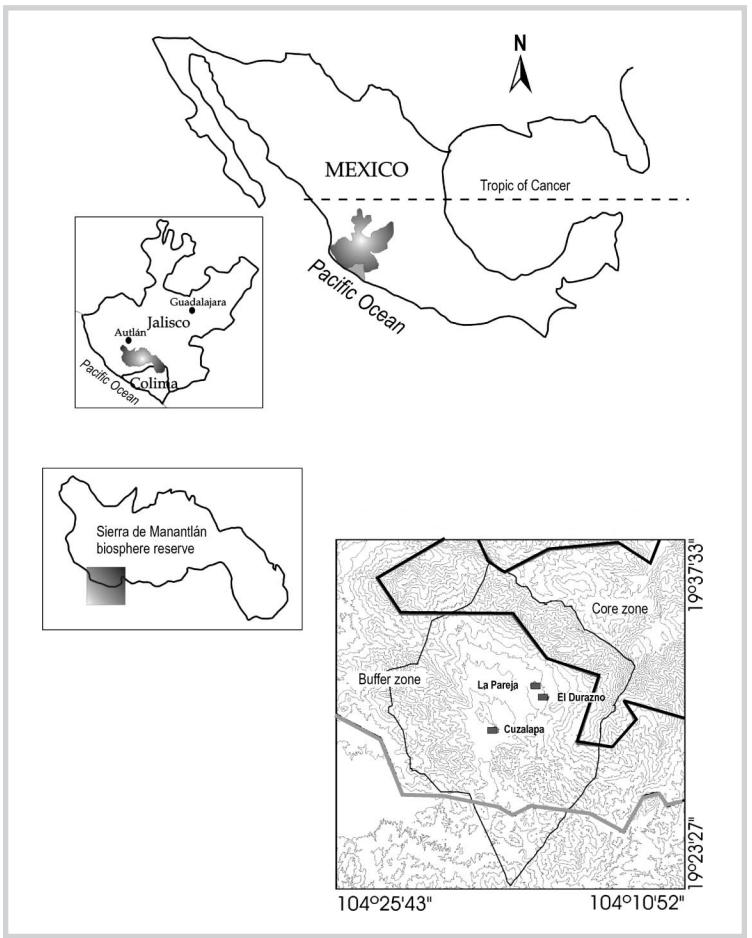
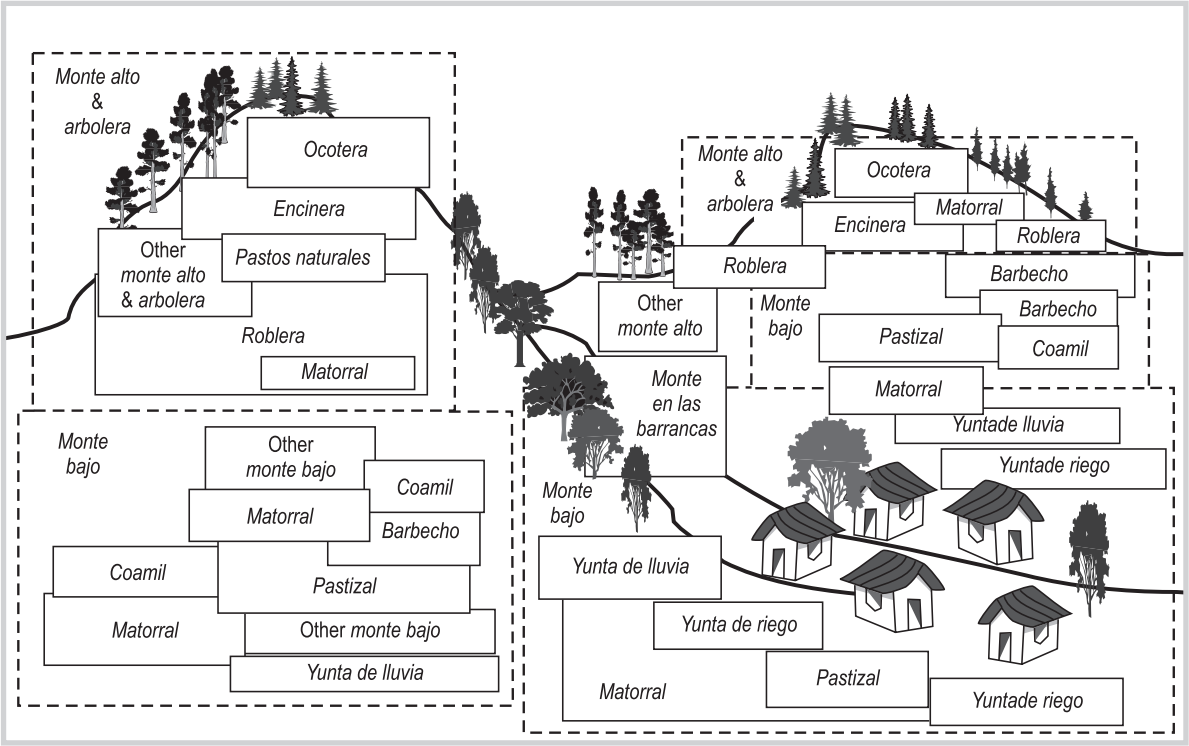


FIGURE 1 Location of the Sierra de Manantlán biosphere reserve and the community of Cuzalapa. (Map by SIIR, DERN-IMECBIO)

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FIGURE 2 Spatial distribution of resource units.



In considering the two different perspectives on biodiversity and what we call resource diversity, an important difference must be noted in the spatial and temporal scales involved. Although the concept of biodiversity is considered to include the variety and variability of different landscapes, in practice it is usually restricted to natural landscapes as derived from natural ecosystem processes. The modifying and dynamic influences of human beings on the landscape are usually considered detrimental, and are only taken into consideration in establishment of buffer zones. The case study at hand illustrates that the landscape zoning created by professional conservation agencies is far less diversified than that created through farmers' co-production processes. This may have important repercussions for the biodiversity that can be protected. Moreover, the landscape diversity system created by professional conservationists is not only rather elementary by comparison with the landscape diversity system created by farmers; it is also characterized by strict and static boundaries.

Methodology

The Sierra de Manantlán biosphere reserve is a highly bio-diverse region considered a success in terms of application of the biosphere reserve concept (Jardel et al 2004). It has been divided into 3 core zones and one buffer zone. The latter contains 32 agrarian communities, including the community of Cuzalapa; 1300 inhabitants live here in different hamlets, engaged in agriculture and livestock keeping (Figure 1).

Research and development activities were carried out in this community from 1993 to 2002 to stimulate participation. Among other things, a detailed study was made of farmers' strategies and their impact on biodiversity, including how the farmers' perspectives compared with those of the reserve authorities (Gerritsen 2002). Several methods were applied. The core of the study consisted of a series of semi-structured interviews with key informants, combined with case studies. The information on land use activities was checked and elaborated by transect walks and participatory mapping exercises. These data were compared with existing GIS maps with scientifically defined vegetation. In addition, the conventional perspective underlying biodiversity conservation was identified by studying official management plans.

Perspectives on biodiversity in Cuzalapa

Creation of resource diversity by farmers

Corn cultivation and cattle production are livelihood activities for Cuzalapa farmers. In carrying them out, the farmers create and use 3 different landscape components: home gardens, cultivated fields, and grazing

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lands. Agricultural use is more intensive in the lower parts, while cattle-raising also takes place at higher altitudes. Forests are not explicitly distinguished as a separate land use zone, but considered a part of grazing lands. Each of these land use zones has its own specific resource diversity, and by creating different land use types, farmers thus actively transform natural biodiversity into spatially diverse resource diversity.

Farmers' zoning reflects the land use potential, the site-specific ecological conditions, and the management practices applied. These factors also result in the formation of a number of land use subzones that may be characterized as specific resource units. For instance, farmers recognize different subdivisions of the grazing lands, according to field characteristics and existing vegetation.

Figure 2 schematically presents the resource units that Cuzalapa farmers distinguish, including the folk concepts that they use (Table 1). Folk concepts are used in the different figures and in Table 1 in order to stress the specificity of farmer perspectives and their differences in nature, as compared to ecological perspectives. Local perspectives are characterized by an empirical basis and are heavily intertwined with daily activities. They allude to tacit knowledge that is skillfully applied in the course of farmers' actions. The resource units may also be characterized as ecological units, as illustrated in the right column of Table 1. However, conventional perspectives such as these, which have a scientific basis, are far less integrated in local and specifically socioeconomic characteristics.

The folk concepts have spatial and temporal dimensions with reference to different landscape components and natural cycles. Resources are found in specific places in the landscape and can vary in nature during different seasons. Various succession relations can be distinguished between the different natural cycles underlying resource units (Figure 3). The exact nature of a succession relation depends on specific management practices and location-specific ecological conditions.

Underlying farmers' differentiation among resource units is a vast body of ecological knowledge related to niche differentiation, species distribution and succession processes, species growth, and use characteristics, etc. This body of knowledge is embedded in the farming activities that have been developed as a repertoire of the farming style present in Cuzalapa.

Farmers' knowledge is bounded; this is reflected in resource values and becomes manifest in the co-production process. It is also influenced by prevalent land use rules and regulations, eg with respect to land distribution, including the impact of the establishment of the biosphere reserve.

TABLE 1 Resource units and their scientific equivalents.

Common name	Scientific equivalent
Barbecho	Natural regrowth on abandoned agricultural fields
Coamil	Shifting cultivation fields
Encinera	Oak forest (sub-deciduous, mesophytic, or with the presence of pine species)
Huertos solares	Home gardens
Matorral	Natural regrowth of shrub vegetation on fallow fields
Monte alto* and *arbolera	Woodland higher than 5 m
Monte alto/arbolera en las barrancas y los arroyos	Tropical deciduous forest or tropical sub-deciduous forest (including gallery forest)
Monte bajo	Woodland with a height up to 5 m
Ocotera	Pine forest or pine–oak forest
Other *monte alto* and *arbolera*	Tropical deciduous forest, tropical sub-deciduous forest (including river vegetation), or cloud forest
Other *monte bajo*	Different types of natural regrowth with a height up to 5 m
Pastizal/Pastos naturales	Fields with established or naturally growing pasture
Roblera	Oak forest (deciduous)
Yunta de lluvia	Field with rainfed cultivation
Yunta de riego	Field with irrigated cultivation

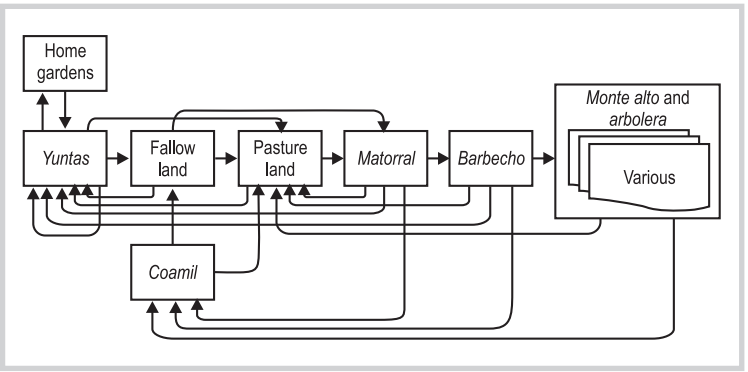
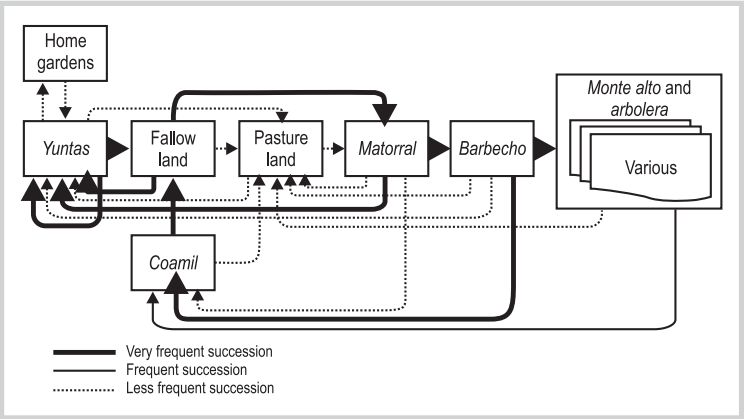


FIGURE 3 Possible succession relations of resource units.

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FIGURE 4 The dynamics of resource diversity in the late 1970s.



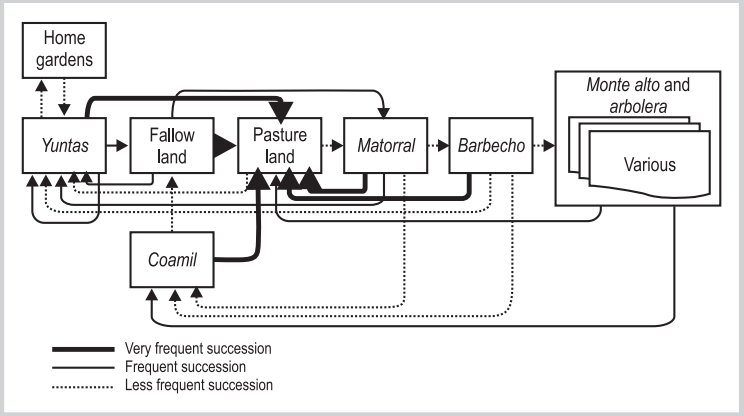


FIGURE 5 The dynamics of resource diversity in the late 1990s.

Dynamics in resource diversity

The farming style and its expression in resource diversity are dynamic. Since the 1970s, cattle production has been gaining prominence and resource diversity has been transformed to better meet farmers' needs. This process results in impoverishment of resource diversity, as several land use zones are being transformed into pasture land, and forest vegetation is being opened up to increase pasture availability. This trend might also have a negative effect on biodiversity distribution and composition.

Figures 4 and 5 illustrate these changes. They show the relative importance of the different resources, including the different succession relations. Figure 4 represents the land use dynamics centered around corn cultivation, while Figure 5 portrays land use in which cattle production has become dominant and pasture has become an important resource for farmers.

Biodiversity conservation through reserve management

The management objectives of the Sierra de Manantlán biosphere reserve are biodiversity maintenance through preservation of ecological integrity, and incorporation of communities in their strategy. To attain these objectives, management activities are guided by zoning regulations that prohibit all human activities in the core zones and restrict land use in the buffer zone. The underlying assumption is the need for strict conservation activities in the core zone, as well as a scaling down of management activities to community level and establishing local land use gradients in the buffer zone (IMECBIO 2000).

Local communities' participation has been strengthened by the creation of two advisory councils, implementation of a collaborative forest fire prevention and combat program, collaborative forest management plans, several small-scale development and conservation projects, and an extensive consultation process focusing on the management plan (Jardel et al 2004).

The management plan formalizes the conservation approach, based on formal legislation and scientifically generated information. The rules underlying the management plan induce reorganization of farming practices, more stringently in the core zones than the buffer zone. In the core zones, all farming activity is prohibited, while it has become difficult in the buffer zone to clear forests, practice shifting cultivation, or establish pastures. Thus farmers are forced to reorganize their activities. Such reorganization limits resource diversity and may threaten biodiversity, which is dependent on the co-production process. In some cases, the lack of attention to the link between farming activities and biodiversity has forced professional managers to imitate farmers' practices to assure the species and ecosystem survival so highly valued by conservationists in the core zones (Benz et al 1990).

Comparison of divergent perspectives on biodiversity

Cuzalapa farmers and professional managers both appreciate the value of diversity and the need to combine conservation with livelihood improvement. Cuzalapa farmers strategically combine different farming elements and create resource diversity in their landscape. The landscape configuration and the composition of resource diversity depend on farmers' strategic goals and the options for mobilizing resources. They also depend on site-specific ecological characteristics. As a result of the temporal variations in farming practices, resource diversity is not static but dynamic.

The professional perspective is based on different considerations. It is dominated by a vision of dichotomy between wilderness areas and anthropogenic landscapes. This vision results in formal land use zoning and measures to separate farming from conservation areas. Even though active collaboration is sought with farmers, in some cases, biodiversity loss can still result. The professional perspective limits development activities to specific land use zones and prohibits farmers' access to the strict conservation zones. This perspective limits

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rather than enhances farmers' participation in biodiversity conservation.

Our case study demonstrates that co-production can be regarded as one of the processes that influence biodiversity through transformation of resource diversity. Creation of the core zones has caused a separation of farming practice and biodiversity, which in the long term will negatively influence the composition and distribution of the latter, unless special measures are taken. These measures will have to be based on the process of co-production, or will have to imitate its effects.

The study also showed that human activities do not necessarily have a negative impact on landscape and species diversity; rather, human activities may enhance biodiversity. Although it cannot be disputed that the present dominant land use activity, ie the extension of cattle production, is resulting in gradual landscape homogenization and biodiversity loss, this does not mean that rural communities' activities are in essence a threat to biodiversity.

Conclusion: towards more effective interfaces

Our study showed that professional conservationists and farmers have different perspectives on the relevance of biodiversity. In order to characterize these differences, we propose an analytical differentiation in terms of an ecologically oriented biodiversity perspective and a livelihood-oriented resource diversity perspective. Biodiversity should not be conceived as a purely ecological phenomenon, but also as the outcome of a co-production process. The human impact on biodiversity should not only be considered detrimental due to overexploitation and habitat loss, but also seen as having a positive potential through creation of a differentiated landscape with different niches favoring specific forms of biodiversity. Such an approach is consistent with the recent call to complement static biosphere reserves with dynamic successional biosphere reserves that enable spatial resilience and ecosystem reorganization (Bengtsson et al 2003).

Basing biodiversity conservation on a landscape approach should include the notion of possible positive impacts of human-induced disturbances of the natural vegetation, rather than focus only on the negative impacts. Biodiversity conservation should therefore not only take the form of conscious efforts at *in situ* conservation in wilderness areas, but also concentrate on options to maintain landscape diversity and *in situ* conservation on farms (Swaminathan 2002). Such on-farm conservation should not be interpreted as referring to cultivated areas only, but to any landscape type subject to human influence. Chase (1989) proposed the term "domiculture" for anthropogenic creation of a series of localized areas (domuses) of interaction between people and resources, each characterized by a specific set of use and management activities. Subsequently, Wiersum (2004) proposed the term of *in domo* conservation of biodiversity for human-derived vegetation.

Paying attention to the overall diversity of landscape types and their role in biodiversity conservation not only provides a good basis for understanding the full range of human impacts on biodiversity, but also offers optimal scope for creating effective interfaces between the perspectives of farmers and professional managers. Our case study indicates that the presently dominant ecologically oriented perspectives among professional conservationists offer limited scope for collaborative management. The latter requires the reconciliation of different perspectives on the nature of biodiversity as a resource or as a component of ecological integrity, as well as on its perceived relevance for present and future generations.

A first step in bridging this gap is careful assessment of both perspectives, as well as the existing interfaces. A careful assessment of farmers' perspectives provides an insight into their perceptions and actions with regard to nature, its material forms, and the socio-material processes underlying their strategies. Such an assessment should be embedded in a conservation paradigm in which people are not regarded as external or even as a threat to nature, but are seen instead as one of the agents shaping landscapes and impacting either positively or negatively on species diversity. The development of such a paradigm should be based on recognition of the creative capacities of humans rather than a belief that people fall into two categories: a majority who cause biodiversity loss, and a small group of conservationists trying to protect biodiversity. This dichotomy still dominates the thinking of many conservationists, even though social reality is more complex.

AUTHORS

Peter Gerritsen
Department of Ecology and Natural Resources, University of Guadalajara, Centro Universitario de la Costa Sur (CUCSUR), Independencia Nacional 15, Apartado Postal 64, 48900 Autlán, Jalisco, Mexico.
petergerritsen@cucsur.udg.mx

Freerk Wiersum
Forest and Nature Conservation Policy Group, Wageningen University, P.O. Box 47, 6700AA Wageningen, The Netherlands.
Freerk.Wiersum@wur.nl

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