


Nature–gender relations within a social-ecological perspective on European multifunctional agriculture: the case of agrobiodiversity

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Abstract We view agrobiodiversity as a social-ecological phenomenon and, therefore, an example of nature–gender relations within agrarian change, including social, economic, political and technical changes in agriculture and rural areas. As a result of the industrialization of agriculture, nature–gender relations in the field of agrobiodiversity have become characterized by separation processes such as conservation versus use or subsistence versus commodity production. We argue that the sustainable development paradigm, as currently implemented in European Common Agricultural Policy through the concept of multifunctionality, does not necessarily overcome separation tendencies and lead towards integration, despite its claim to bring together different ecological, economic and social needs. In our paper we critically reflect this observation and develop a theory-based analytical framework at the interface of nature and gender relations. For analytical purposes we distinguish between three different agrarian structures (pre-industrialized, industrialized and multifunctional) and focus on the development of two separation tendencies within them and their effects on agrobiodiversity. Concerning nature, we discuss the effects of separating agrobiodiversity conservation and use. With regard to gender, we discuss the separation of subsistence and commodity

production. Against this background, we claim for new rural economic rationalities characterized by processes whose qualitative, material and value dimensions maintain agrobiodiversity.

Keywords Multifunctionality · Agrobiodiversity · Societal relations to nature

Abbreviations

BMF	Bundesministerium der Finanzen (Federal Ministry of Finance)
CAP	Common Agricultural Policy
CBD	Convention on Biological Diversity
COP	Conference of the Parties
FAO	Food and Agriculture Organization of the United Nations
MEA	Millennium Ecosystem Assessment
OECD	Organisation for Economic Co-operation and Development
SCBD	Secretariat of the Convention on Biological Diversity
UNCED	United Nations Conference on Environment and Development

Introduction and background

Agrarian change shapes the complex and manifold relationships between (rural) societies and nature, an interrelation that becomes especially apparent when considering the agricultural development and the loss of agrobiodiversity. Although increases of agrobiodiversity were once a product of human agriculture, today's agricultural practices tend to lead towards its decline. Thus, loss of agrobiodiversity can be interpreted as an expression

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of contemporary social-ecological crises in agriculture (Wolff 2004). The idea of sustainable rural development seeks to frame such social-ecological crises in terms of their ecological, economic and social dimensions, while also including an emphasis on realizing gender equality.

To substantiate the notion of sustainability in rural development, this paper analyzes present crises and visions of human–nature relations, looking at the case of agrobiodiversity in the context of European agriculture. Loss of agrobiodiversity has been identified as a global challenge that needs to be addressed via agricultural policies (UNCED 1992: Chapter 14). The recent paradigm of multifunctional agriculture, as it has been implemented in European rural development policy since the 1990s, seems to be a promising means for the maintenance of agrobiodiversity through altering agricultural practices. Multifunctionality aims to strengthen the role of agriculture, not only for the production of food and fibres but also by acknowledging that agriculture can “shape the landscape, provide environmental benefits such as land conservation, the sustainable management of renewable natural resources and the preservation of biodiversity, and contribute to the socio-economic viability of many rural areas” (OECD 2001: 9). Hence, agricultural multifunctionality appears to be strongly linked to realizing sustainable rural development (Gafsi et al. 2006; Mölders et al. 2012; Mölders 2014). Integration of the two concepts multifunctionality and sustainable development into politics and scientific research represents a shift from sectoral policy and agricultural support to a more integrated territorial development approach (Gafsi et al. 2006; Hediger and Knickel 2009). Forwarding multifunctionality as a leading principle enables policies to simultaneously support European agriculture and farmers, in spite of the declining significance of agriculture as a productive use of rural areas, while at the same time meeting society’s increasing demand for non-commodity outputs from agricultural and rural areas as consumptive spaces (Durand and Van Huylenbroeck 2003: 1).

Against this background we question whether the sustainable development paradigm and its implementation in European agricultural policy through the concept of multifunctionality does result in integrative strategies and practices, such as those required for agrobiodiversity maintenance. For this purpose our aim is to develop a theory-based analytical framework for analyzing and discussing human–nature and gender relations. We theoretically frame the crises of societal relations with nature as crises of the reproductive sphere, which has been separated from the productive sphere. With regard to agrobiodiversity, we ask for the separation of conservation and use processes in relation to nature as well as for the separation of subsistence and commodity production in terms of

gender. We want to show that the kinds of realpolitik strategies and measures represented by the presently employed notion of multifunctionality actually tend to rather strengthen processes of separation between reproductive and productive spaces in rural development. We argue that it is not enough just to label multifunctionality as “sustainable”. What is rather needed is a substantial integration of reproductive and productive processes, which could lead to the development of sustainable use and commodity production.

Social ecology as conceptual framing

Social, economic, political and technical aspects of agrarian change and the associated debates, linking them to specific agrarian paradigms can also be seen as forms of renegotiating human–nature relations (Marsden 2003, 2006: 203ff.). Indeed, there are various approaches to describing the diverse and mutual relations between humans and nature. In the following, we focus on the social-ecological approach, pioneered in Germany to analyze human–nature relations as “societal relations to nature” (Becker and Jahn 2005; see also Jahn and Wehling 1998; Becker and Jahn 2006) and later linked to sustainability research and global change research in the international context (Becker and Jahn 2005: 3). The approach is based on two fundamental premises: (1) in analyzing the relationships between nature and society, various disciplinary perspectives need to be combined (interdisciplinarity) and (2) when addressing real-world problems, practical knowledge from stakeholders outside the scientific community is needed and has to be integrated (transdisciplinarity) into the research process and subsequent policy results.

The social-ecological concept of *societal relations to nature* is intended to aid the analysis of human–nature relations, both theoretically and empirically. Furthermore, from its beginnings the development of the social-ecological approach has been influenced by feminist perspectives, under the umbrella of gender and environment. Feminist researchers have posited that societal relations to nature are equivalent to gender relations. Thus, the two categories reflected upon in this paper—nature and gender—are highly significant within social ecology, defining and questioning the linkages between them as paralleling the relationship between reproduction and production.

Agrobiodiversity as societal relations to nature

Theoretical and empirical social-ecological research holds that nature should not be examined without also taking into consideration its relationship to society. The concept of

societal relations to nature is a framework for analyzing and describing human–nature relations, premised on three main assumptions:

First, the concept assumes that nature and society are not opposing entities but rather spheres that are closely linked to each other, have no fixed borders, and are subject to dynamic change over the course of history. Key here is that human action always takes place within the realm of nature. Thus, humans interact with nature in particular ways, with their perceptions and valuation of nature being constituted through this process, laying the ground for further interaction. Consequently, human–nature relations are comprised of diverse patterns of relationships along both the material and symbolic dimensions between nature, society and the individual (Görg 1999: 9f.; Becker and Jahn 2006: 174f.).

Second, the concept provides a critical perspective for the analysis of environmental and socio-economic problems. Based on the semantic context of criticism and crises, social ecology has been conceptualized as a “science of crises” (Becker and Jahn 1989, 2006) understanding the so-called ecological crisis rather as diverse social-ecological crises being a result of societal relations to nature (Becker and Jahn 2006: 53). There are, then, no longer any isolated environmental problems or ecological risks but rather these must be seen as resulting from problems internal to society. Critical are the economic, political, cultural and scientific and technological forms through which societies, in particular the highly industrialized ones, shape the environment, as such crises endanger the reproduction of nature and, thereby, the requirements for the production and lifestyles of industrial societies (Jahn and Wehling 1998: 80f.; Becker and Jahn 2005: 2f.).

Third, the concept implies a visionary perspective, grounded in normative orientation towards sustainable development. Based on the perspective’s understanding of crises, the overall question is how relations between nature and society can be transformed towards sustainable development (Becker and Jahn 2006: 57).

From the perspective of social-ecological research, the concept of societal relations to nature can provide an orientation for understanding and analyzing human–nature relations not only theoretically but also empirically (Becker and Jahn 2005: 4). How agrobiodiversity is approached, for example, including its concrete economies, politics as well as farming practices, can be seen as an area for empirical specification of this concept.

The convention on biological diversity regards agrobiodiversity as “a broad term that includes all components of biological diversity of relevance to food and agriculture, and all components of biological diversity that constitute the agro-ecosystem: the variety and variability of animals, plants and micro-organisms, at the genetic, species and ecosystem levels, which are necessary to sustain key

functions of the agro-ecosystem, its structure and processes.” (CBD 2000: COP 5 Decision V/5).

In addition, the Convention also emphasizes socio-economic and cultural dimensions, acknowledging that agrobiodiversity is largely shaped by human activities and management practices, involving many different actors, ranging from producers to consumers. These management systems are embedded into ecosystems in a variety of ways and with varying degrees of intensity (Brookfield 2001: 40f.; Cromwell 1999: 11f.).

Linking this understanding of agrobiodiversity to the concept of societal relations to nature (see Fig. 1), agrobiodiversity can then be seen as a typical social-ecological phenomenon (Padmanabhan 2011, 2016), expressing an intermediary relationship between nature and society (see also Montenegro de Wit 2016).

It may be said that agrobiodiversity results from the combination of both nature, in the form of “materials” such as plants and animals, on the one hand, and society or culture, in the form of human activities such as agriculture, on the other. This interaction of both spheres generates or reduces agrobiodiversity. Plants, for example, become crops by being cultivated. Animals become livestock by being raised. The diversity of productive livestock and crops is the result of centuries of human breeding efforts based on locally differentiated resources (Wolff 2004: 342). In this vein, Padmanabhan speaks about the “double identity of agrobiodiversity as a natural resource and simultaneously as a cultural asset with social characteristics” (2016: 14). In the following deliberations we focus on the species diversity of crops and livestock.

Agrobiodiversity as gender relations

The nexus of human–nature relations and gender relations is a core element of feminist theories in general and feminist environmental research in particular (Schultz 2003).

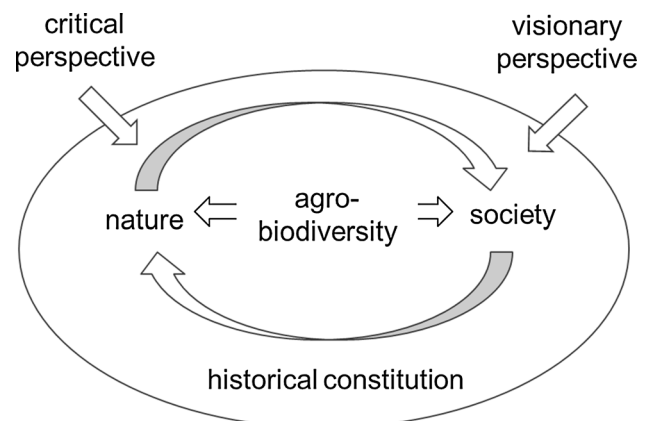


Fig. 1 Agrobiodiversity as an expression of societal relations to nature

By indicating the theoretical and empirical significance of gender perspectives within the debates on human–nature relations, a field of research has evolved within international feminist debates under the label *gender and environment*, uniting research that analyzes the intertwined relationships between gender, nature and society (Nightingale 2006; Hawkins and Ojeda 2011). Although there is no unique gender and environment theory, several common traits are identifiable. First, it is assumed that human–nature relations are both societal and gendered. Second, it is posited that relationships between gender, nature and society are relations of power. Finally, all approaches operating under this umbrella term aim to theorize these relationships and link them to sustainable human–nature relations and gender justice.

Coming out of this tradition the German social-ecological perspective has been accompanied by feminist research right from the start, holding that social-ecological crises also need to be analyzed as crises of gender relations (for an overview, see Schultz 2003).

It is consequently assumed that the differentiated categories through which modern Western societies are organized result in powerful, hierarchical and gendered dichotomies that are not equal: nature–culture, emotional–rational, private–public and—as we will discuss in detail later—conservation–use and subsistence–commodity production. More specifically for our purposes here, the perspective assumes that this process results in a reproductive (female) sphere dominated by a productive (male) sphere.

In order to operationalize these ideas taken from the gender and environment approach into specific research projects and questions, at least two specifications of the term gender are relevant. First, gender is understood theoretically as a structural and/or process category (Schultz 2003: 45), focusing on its function as a social channel determining how exclusions, marginalization and discrimination are organized with regard to biological females gender. Accordingly, gender appears as essential not only on the individual level of relations between women and men but also on the societal level, where it also determines the regulation of societal relations to nature. The understanding of gender as a process category enables investigation of these social interactions which continuously (re)create gender relations. In terms of “doing gender”, its individual, structural and symbolic aspects of gender are solidified or transformed through such social interactions.

Second, gender serves as an interdisciplinary and transdisciplinary category, seen from a problem-based orientation (Hummel and Schultz 2011: 219). The interdisciplinary function of gender within social ecology enables a broad spectrum of disciplines to communicate with each other, to combine and differentiate their contributions to the analysis of societal relations to nature, while

the transdisciplinary perspective enables integration of scientific and everyday (gendered) knowledge (Schultz et al. 2006: 230). Within social-ecological research, these gender-relevant understandings and functions may be combined or focused in various ways, with the main concern being to integrate gender as a vital dimension of societal relations to nature and, more specifically, to help us better understand various ways of dealing with, interests in and dependence on agrobiodiversity as an expression of such relations (Padmanabhan 2011).

Most gendered studies on agrobiodiversity consist of case studies situated in the Global South, focus on indigenous women (e.g. Howard 2003; Vazquez-Garcia 2008; Christinck and Padmanabhan 2013; see also Kunze; Schöley and Padmanabhan as well as Suma and Großmann in this issue) and are often related to development reports and training modules (e.g. FAO 2005, 2001). But the relevance of gender has, albeit to a lesser extent, also been formulated with regard to agrobiodiversity management in the northern hemisphere as well (Inheteven 2004; Becker 2004). In the majority of cases, gender is used as a structural category to analyze unequal access to resources, rights and entitlements, gendered division of work within agriculture and the resulting consequences of gendered knowledge regarding the environment (Schäfer et al. 2002; Sachs 2006). Furthermore, gender has also been employed in the sense of a process category which is produced in every encounter between private and public individuals and institutions in the field of agriculture (Padmanabhan 2016).

Synthesizing nature and gender

As we have outlined above, feminist gender and environment theories emphasize the nexus between nature and gender. For explanation and interpretation of aspects of this nexus, a closer look at the relation between production and reproduction is crucial.

According to the dominant understanding in capitalist societies, natural processes are mainly classified as being reproductive and, in general, solely regeneration processes are attributed to them, whereas processes of human production and consumption are mainly classified as being productive. But reproductive and productive processes in nature are inseparable from each other, because every regeneration process enables further production. With regard to society, the female gender is generally classified as being reproductive through female (biological) productivity and the social consequences which derived from this, especially including the expectation that females will perform all kinds of work, that are not paid. In contrast, the male gender is characterized through productive work and is normally expressed through gainful, and paid, employment. As with the reproductivity of nature, female

reproductive work enables the regeneration and restoration of human and nonhuman life and is, therefore, intrinsic to each process of commodity production. But both cases—the reproductivity of nature and (female) reproductive work—remain hidden within mainstream capitalist economics in contrast to human production, consumption and (male) productive work, leading to a problematic dichotomization between a devalued reproductive and a valued productive sphere. In this light, it can be said that current social-ecological crises are also crises of reproductivity (Biesecker and Hofmeister 2010).

As this nature and gender dichotomization and hierarchization is tied to the processes of the capitalist economy, feminist reflections on the reproductivity of human–nature relations also tend to include criticism of economic theories and practices. With regard to social ecology, Biesecker and Hofmeister (2010) have pointed out that the contemporary crisis of nature, in the form of ecological crisis, and the social crisis, in terms of the crisis of reproductive work (Rodenstein et al. 1996), have the same origin, namely an economic rationality that is neither able nor willing to acknowledge the productivity of reproductive functions. But, at the same time, capitalist production for the market necessarily presupposes the reproductive activities or inputs provided by nature no less than by (female) reproductive work: “In the act of valuation, it externalizes what it fully internalizes in the act of valorization, namely the so-called reproductive activities of animate nature and human beings” (Biesecker and Hofmeister 2010: 1709).

Feminist engagement has led to a variety of proposals regarding how to tackle social-ecological crises. Broadly speaking, one may differentiate between the idea of commodification, of reproductive work, discussed as “wages for housework” during the women’s movement in the 1970s (Himmelweit and Mohun 1977), and the idea of revaluation of what is productive and what not (OECD 2001: 136f.), which is favored by Biesecker and Hofmeister (2010) and expressed in the concept of (re)productivity for a new kind of economic rationality. Within this new rationality, productivity and reproductivity are collapsed and become one, signaled by the single label attached to the new concept: (re)productivity. Biesecker and Hofmeister (2010) regard the (re)productive economy as one that will be sustainable, describing it as a “multiplicity of balanced and coordinated productive processes whose qualitative–material and value dimensions are determined on the basis of negotiating processes at all levels of social (re)production” (Biesecker and Hofmeister 2010: 1709).

The concept of (re)productivity can provide a framework (see Table 1) for analysis dedicated to critical investigation of social-ecological crises, because it discloses the separation and establishment of hierarchies

between the spheres of reproductivity and productivity. Unearthing of these often hidden relationships is necessary in order to understand the urgency of pursuing a visionary reconceptualization of societal relations to nature that would promote a shift towards sustainable development. In this process, introducing the idea of (re)productivity as a means of overcoming the separation of the two spheres into one could then act as a way towards creating a sustainable economy.

In the following, we apply the critical and the visionary perspectives, while investigating the social-ecological phenomenon of agrobiodiversity. For this purpose, we consider the introduced reproduction–production dichotomy in terms of the development of agrobiodiversity through human agricultural activities within processes of agrarian change in Europe. Regarding nature, this dichotomy is expressed in separation and integration processes between the (productive) use of agrobiodiversity, on the one hand, and its (reproductive) conservation on the other. Following the subsistence approach of some feminist scholars (e.g. Von Werlhof et al. 1983; for an overview, see Baier 2004) we differentiate separation and integration processes between productive commodity production, on the one hand, and (purportedly only) reproductive subsistence production on the other. According to theoretical and empirical work which has been done from a subsistence perspective, subsistence production includes those kinds of work which are focused on creating values in use (instead of capital value), aimed at the establishment and maintenance of life (e.g. domestic work in house and garden).

Findings on agrobiodiversity within the agrarian change in europe

Agrarian change can result in the emergence of different separation and integration processes. Here we examine (reproductive) conservation and (productive) use of agrobiodiversity as well as (reproductive) subsistence production and (productive) commodity production. There are considerable differences between reproductive and productive activities and functions with regard to agrobiodiversity under pre-industrialized, industrialized and multifunctional modes of agricultural production. Thus we differentiate broadly between these three historically

Table 1 Analytical framework for investigating nature–gender relations associated with agrobiodiversity

	Reproductive	Productive
Nature	Conservation	Use
Gender	Subsistence production	Commodity production

consecutive types of agrarian structures (Kuhnen 1982) but with the understanding that a great heterogeneity of farming styles exists within each structure (Van der Ploeg 2008; Langthaler 2012). In the present paper, we deliberately disregard this heterogeneity so as to better illustrate fundamental crises tendencies within these structures and to more generally derive possible options for sustainable rural development. Accordingly, we combine the analytic perspective developed above with the characteristics of these three agrarian structures. In doing so, first we explain our understanding of agrarian change as change of nature and gender relations and, second, discuss whether and how multifunctional agriculture actually leads to separation or enables integration of reproductive and productive processes while attempting to maintain agrobiodiversity.

Agrobiodiversity: between conservation and use

The analysis of agrobiodiversity as a way towards more specifically understanding societal relations to nature can be broken down into investigating activities of conservation and use, which express the relation between nature and society at a practical level, where “[t]he special nature of agricultural biodiversity” (CBD 1995: COP 2 Decision II/15) can become obvious in the intimate link between both activities. Although existing levels of agrobiodiversity rest on a natural basis, they have only evolved to this degree due to human agricultural practices and have been significantly shaped through them, making them necessary for continued evolution or even persistence. Consequently, agrobiodiversity has become impossible to maintain without human activities (Engels and Wood 1999: 355). Use of agrobiodiversity in agriculture is an essential requirement for its conservation but, seen the other way round, conservation is also an essential requirement for its continued use. As a consequence, conservation and use are not contradictory but rather mutually conditioning. Therefore, both processes need to be integrated—either “use it or lose it”, as Kotschi advises (Kotschi 2007: 99).

It thus seems worthwhile to look more closely at how agrobiodiversity has been conserved and used in past times and today, because in different agrarian structures conservation and use are related differently. In the following, we distinguish pre-industrial from industrialized and multifunctional forms of agriculture (see Fig. 2).

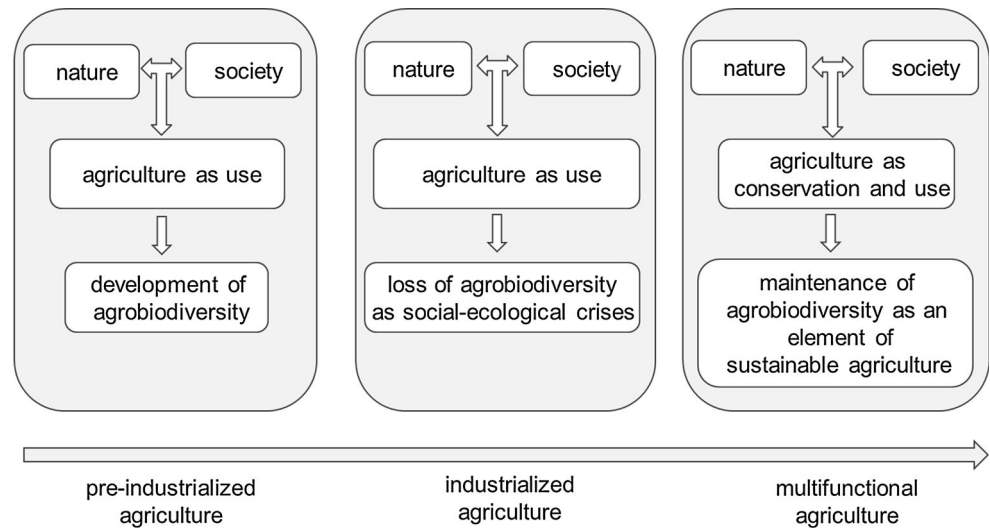
In the *pre-industrialized agrarian structure*, agricultural production for human use ended up leading to greater agrobiodiversity than beforehand. This form of agricultural activity was initiated 10,000 years ago, when developing agrarian societies tried to secure their food supplies. Wild plants and animals were, in the process, domesticated for this purpose. Over the course of thousands of years, through human selection and management various crops

and livestock animals became optimally adapted to their locations and environmental conditions, leading to considerably increased species and genetic diversity (Wood and Lenné 1999). Agricultural use during this period integrated reproductive and productive processes and established a broad agrobiodiversity spectrum. It has been claimed that the peak of genetic diversity and, thus, agrobiodiversity were achieved at the beginning of the nineteenth century (Brookfield 2001). At that time, the agrarian structure was characterized by a high degree of autonomy (Wolff 2004: 339).

But agricultural use changed during the *industrialization* of agriculture, as agricultural production became more embedded within the industrial production system. During this process, farms have been transformed from integrated and relatively self-sufficient production entities to dependent elements within complex production networks in high-input production systems, and native varieties and breeds have been replaced by high-yielding crops and high-performing livestock. For industrial processing, agricultural practices are aimed at greater homogeneity through highly selective breeding methods (e.g. hybrid breeding; Wolff 2004: 339). This industrialized agricultural use of agrobiodiversity has resulted, on the one hand, in general disuse of the majority of previously existing crop varieties and livestock breeds—so to say, agrobiodiversity as such—and a severe overuse of a limited range of species on the other. Consequently, the intensively worked monocultural landscape, with relatively few species, has now been substituted for the previous state of agrobiological diversity (Thrupp 1998: 21ff., 2000; Cromwell 1999: 16; Kassam and Hodgkin 2009). Initial attempts to ameliorate the situation by seeking to conserve agrobiodiversity have begun (FAO 1983; CBD 1995), but a hierarchical dichotomization of conservation and use, resulting in low appreciation of agrobiodiversity conservation in comparison to industrialized agricultural use, is still quite evident. Together with a complex industrialized production system geared towards homogenization, industrial development of agriculture hardly offers any possibilities for supporting agrobiodiversity (Feindt 2007: 13; Swanson 1994; van Koppen 1997: 289ff.). In fact, such development is supported by agricultural policies oriented towards forms of competitive, liberalized agriculture that contribute towards further intensification (Feindt 2007: 13), leading to such a great loss of agrobiodiversity that we consider it to constitute a kind of social-ecological crises (Engels and Wood 1999: 358; Becker and Jahn 2005).

The third agrarian structure is characterized by *multifunctional* agriculture, which has been considered in various European agricultural policy documents to be a possible path towards sustainable development that can

Fig. 2 Conservation and use of agrobiodiversity within three agrarian structures



also enable the integration of agrobiodiversity use and conservation by recognizing that agriculture also provides non-commodity outputs, including environmental benefits such as sustainable management of renewable natural resources and preservation of biodiversity (OECD 2001: 9). The multifunctional approach also offers policy makers opportunities, mainly through agri-environmental measures, to economically support farmers aiming at agrobiodiversity conservation, which then becomes integrated into their agricultural work. Thus, agricultural production is seen from this perspective as a form of both conservation and use of agrobiodiversity, offering opportunities for its maintenance and enhancement as an element of sustainable agriculture. Interestingly, the measures being applied through such policies to conserve agrobiodiversity tend to be similar in manner to general agricultural activities in the pre-industrialized agrarian structure and are also in concord with the “use it or lose it” idea (Kotschi 2007: 99). Nevertheless, even 20 years after initial implementation of the multifunctionality paradigm in agricultural policies, declines in agrobiodiversity are still observable (MEA 2005: 4f.).

Agrobiodiversity: between subsistence and commodity production

Gender debates on agrobiodiversity have generally revolved around the differing kinds of access and responsibility men and women have to and for agriculturally used nature and its products within supply chains (Howard 2003). Within these debates, a crucial question has been whether work and, thus, also the responsibility for agrobiodiversity should be considered as part of commodity or subsistence production. While commodity production is part of the public, monetary market and is therefore

regarded as productive, subsistence production is more or less private and oriented towards satisfying one’s own individual or family’s needs and has, consequently, usually been regarded as reproductive (Von Werlhof et al. 1983). This has largely been seen as a gendered differentiation, with commodity production being associated with male agriculture and subsistence production strongly related to female agriculture (for Europe, see Baier et al. 2005: 91f.; Inhetveen and Schmitt 2004; for international debates, see Suma and Großmann in this issue). In order to create and maintain agrobiodiversity in sustainable agriculture, the attribution of work as being either part of subsistence or commodity production needs to be analyzed in terms of the specific qualities of these forms of production, whether their relationship to each other is equivalent or hierarchical, and how they are connected to the relationship between conservation and use.

As Brandth has argued, “[d]iscourses of gender in agriculture change as the structure of agriculture changes” (2002: 197; see also Shortall 2006; Jacobs 2010). However, depending on the size of farms and their management as part-time or full-time, the roles of women vary from being female farmers to farmer’s wives who might work on the farm or subsidize the family income by off-farm income (O’Hara 1994; Prügl 2004). Different constellations directly affect the organization and distribution of work between the genders and can influence the creation or loss of agrobiodiversity. Maintaining agrobiodiversity may either survive as an area of competence within farming or slip in the course of new divisions of responsibility and work. With this in mind, here we use the three agrarian structures discussed above to characterize gender regimes in agriculture (see Fig. 3).

In the *pre-industrial agrarian structure*, farms were organized in the sense of *oikos*. Within this economic and

social structure, both men and women took part in different activities, including what feminist scientists call “care work” (Jochimsen and Knobloch 1997 as well as Bellina and Gottschlich in this issue), “reproductive work” (Biesecker and Hofmeister 2010), “household production” (OECD 2001: 136f.) or “subsistence” (Werlhof et al. 1983) as well as productive agricultural work. These different types of work coexisted without being separated into female (reproductive) subsistence or male (productive) commodity production. Although there has been a traditional division of work between genders, women’s work was regarded as productive and economically profitable (e.g. cheese-making) and, vice versa, men also contributed to reproductive care work (e.g. children’s education). Basically, agricultural work as a whole could be characterized as subsistence in this system, for it was a form of integrated and relatively self-sufficient farming by peasants, located in locally-rooted economies. As stated above, this pre-industrial agricultural work contributed to the creation of agrobiodiversity as a human shaping of natural possibilities. Due to the gendered division of work, the responsibility for developing and preserving this agrobiodiversity (e.g. keeping seeds or home gardens) was mainly seen as the responsibility of women (Sachs 2006: 294ff.).

Today, in comparison to other economic sectors, agriculture is still characterized by a physical proximity of reproductive and productive work (Schmitt 1999: 180f.; Baier et al. 2005: 92; Whatmore 1991). But during the *industrialization of agriculture* a separation between reproductive work in terms of subsistence production and

productive work in terms of commodity production took place. This separation was gendered, as subsistence production turned into female and commodity production became male dimensions of agricultural work. These masculinization and feminization trends led to hierarchies, with male commodity production being seen as the one and only relevant kind of agricultural work, especially as addressed by agricultural policies (Prügl 2004). One consequence was the conceptualization of a male farm manager and breadwinner and the simultaneous creation of the female farmer as a “helping hand” as “women became flexible laborers on farms managed by their husbands” (Prügl 2010: 121). Hence, female subsistence work became devalued and equated with domestic work (Howard 2003: 6). Subsistence as well as care work became (economically) invisible. This separation of commodity and subsistence production led to a decline of agrobiodiversity, as the productivist commodity orientation within industrialized agriculture has not paid much attention to agrobiodiversity but rather focuses on high-performance species, varieties and breeds (Sachs 2006: 295). From a social-ecological perspective, this development can be interpreted as crises of societal relations to nature. Nevertheless, many women do maintain subsistence production on farms and, while doing so, become caretakers of agrobiodiversity. Notably, this development took place in the shadows of industrialized agriculture and has rarely been valued, either economically or politically (Howard 2003).

Within the *multifunctional agricultural paradigm*, another shift can be observed. Driven by the idea of sustainable agriculture, European policy makers have been

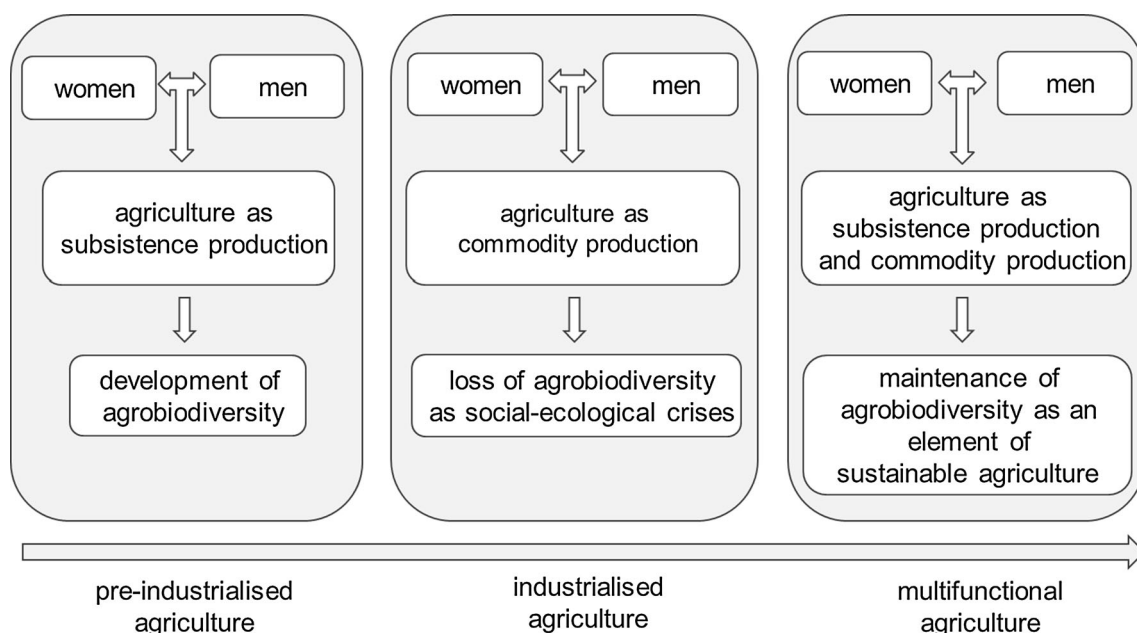


Fig. 3 Commodity and subsistence production within three agrarian structures

paying more and more attention to female farm practices (Inheteven and Schmitt 2004; Prügl 2004, 2010), especially the kinds of reproductive practices mainly incorporated into diversification measures in European agricultural policy that are strongly related to subsistence production as discussed here. Such measures are specifically addressing female fields of agricultural work through which women are identified as “change agents” towards sustainable agriculture and rural development (Inheteven and Schmitt 2004). As a result, subsistence practices are being commodified, and agricultural work is appearing as both subsistence and commodity production.

Discussion on agrobiodiversity in multifunctional agriculture: between separation and integration

In the last section, we have described the development of separation and integration tendencies within agrarian change in terms of agrobiodiversity. With regard to nature, we have connected these tendencies with conservation and use practices, whereas with regard to gender we have focused on the separation between commodity and subsistence production. Multifunctional agriculture is characterized as being committed to sustainable development, overcoming divided and parallel spheres of activity and pursuing their integration. However, at the same time, it has been observed that agrobiodiversity is nevertheless declining further (SCBD 2010: 51ff.). Thus, we believe it is worthwhile to take a closer look at multifunctional agriculture with regard to separation and integration tendencies.

Although multifunctional agriculture is currently the main determinant of European agricultural practices (Van Huylenbroeck and Durand 2003), the presence of elements from the other two agrarian structures can also be observed to some extent (Cromwell 1999: 15). Industrial agriculture is strongly connected to the liberalization paradigm now globally dominant and still central within European CAP (Van Huylenbroeck and Durand 2003). Remarkably, however, as we have already noted, multifunctional agricultural practices are in some pertinent ways similar to those of the pre-industrial agrarian structure, especially in that what is now called “conservation” within contemporary policies corresponds to what was originally, and quite simply, practical “use” within the pre-industrial agrarian structure. Consciously planned subsistence production activities within multifunctional agriculture is, in other words, equivalent to what was in practical terms the combination of reproductive and productive (farm) work within pre-industrial agriculture. Agrobiodiversity depends crucially on the relationship between the spheres of reproductivity and productivity, which can be exemplified by the identified separation and integration

activities of conservation and use as well as those of subsistence and commodity production. Our question is, therefore, whether the concept of multifunctionality in European agrarian policies allows for alternative social-ecological economies, meaning here (re)productive economies that can act as pathways towards sustainable maintenance of agrobiodiversity.

The concept of multifunctionality provides the potential to integrate reproductive and productive activities, as it strengthens the reproductive sphere by recognizing that agriculture contributes to human life beyond commodity outputs in that it can also generate non-commodity outputs that shape the landscape, provide environmental benefits and contribute to the socio-economic viability of many rural areas (OECD 2001: 9ff.). This can be seen as a rediscovery of the reproductive activities of nature conservation and subsistence production in agriculture. But this rediscovery has not automatically led to the integration of conservation and use or subsistence and commodity production. Thus, we doubt that the attempts of contemporary European agriculture policies to overcome the separation tendencies discussed here have helped to revalue reproductive economies, in particular nature conservation and subsistence production. We propose that, in its current form, instead of promoting sustainable rural development, the paradigm of multifunctional agriculture tends rather to stabilize the separation between reproductive and productive activities as parallel options.

Considering the relationship to nature expressed by such policies, for example, a clear separation and hierarchies between conservation efforts and industrial uses seems obvious. Measures to maintain agrobiodiversity are just one part of agri-environmental programs and are, in effect, separated from the competitive productive economy. This is reflected in the CAP’s two pillars: first, support for production and, second, rural development that primarily supports multifunctional agriculture. Regarding the first pillar, the focus is on supporting a form of commodity production that generally makes use of agrobiodiversity for its own capitalist purposes but does not really seek to conserve it. Meanwhile, the second pillar primarily consists of agri-environmental programs focusing on environmentally friendly agriculture, including measures to conserve agrobiodiversity. The existing hierarchical pattern in this separation is expressed, among other ways, in the resource allocation of funds from such policies (e.g. in 2012, €44 billion for the first and €15 billion for the second pillar; BMF 2012). Thus, the competitive economy dominates agriculture and, consequently, induces further loss of agrobiodiversity.

In terms of gender, we observe nearly the same pattern as, at the moment, the maintenance of agrobiodiversity is much more likely be realized by measures which support

diversification in rural areas than by those supporting industrialized agriculture. Diversification measures are part of the much less-funded second pillar of CAP support. Nevertheless, it has been said that such measures open up perspectives for rural women, and the “feminine entrepreneur” has emerged as a new type of rural economic actor (Prügl 2010: 126). However, we believe that there is a need to critically question whether this new feminization trend in agriculture actually amounts to an instrumental use of women, leading to exploitation and high work burdens while, at the same time, the first pillar of the CAP continues to promote the masculinization of agriculture.

From a social-ecological perspective, such contradictory policies cannot be judged to be working towards sustainable development in general or the maintenance of agrobiodiversity in particular. In multifunctional agriculture as it is presently applied, reproductive processes of conservation and subsistence production end up serving to compensate unsustainable use and commodity production rather than to be merged into (re)productive economies (Biesecker and Hofmeister 2010: 1709).

This contradictory tendency towards separation among existing policies is facilitated by a pay-to- conserve logic (Brand and Vadrot 2013). This can be seen, for example, with the phenomenon of “re-resourcing rural areas” (Perkins 2006), which amounts to a kind of assimilation of reproductive activities which then become productive by means of commodification (e.g. payments for agri-environment measures like the preservation of landscape and historical features such as hedgerows, ditches and woods) and, thus, are subordinated to productive economic rationalities. Kosoy and Corbera (2010: 1229) critically describe such processes as being a form of “commodity fetishism”, which involves the “masking of the social relationships underlying the process of production” (see also Turnhout et al. 2013; Norgaard 2010; Jax et al. 2013). In the special case of agrobiodiversity and its commodification, agrobiodiversity has been turned into a kind of “currency” (Turnhout et al. 2013: 157) which can then enter the capitalist market economy (e.g. commodification of seeds through license fees of seed companies like Monsanto). But this can hardly be seen as being appropriate for maintaining agrobiodiversity, especially considering the ways in which the capitalist market economy has already induced such great loss of it.

Conclusions

In this article we developed a theory-based analytical framework to analyze and discuss human–nature and gender relations and applied this critical analytical

perspective on the social-ecological phenomenon of agrobiodiversity. We have assumed that, for the maintenance of agrobiodiversity, sustainable agriculture actually requires integration of (reproductive) conservation and (productive) use with regard to nature as well as integration of (reproductive) subsistence and (productive) commodity production with regard to gender.

At first glance the European multifunctional agriculture seems to be a promising approach towards integration, not only because of its claims to sustainability but also due to its rediscovery of reproductive activities that disappeared from attention within industrialized agriculture: the conservation of nature and subsistence production as female agricultural work. However, as we have argued, this rediscovery does not seem to be automatically leading to integration of the productive and reproductive spheres—neither in terms of nature nor gender. On the contrary, we have found separation to still be the dominant pattern, facilitated by a pay-to- conserve logic (Brand and Vadrot 2013). Although the reproductive functions of nature are being conserved to an extent and reproductive work is being integrated in certain ways, we conclude that the kind of realpolitik guiding current multifunctional agriculture policies in the European Union, which is mainly driven by a market-based economic rationality of production, is not able to integrate reproductive functions and activities without subordinating them under the productive sphere. Instead, these functions and activities must first be commodified in order to be valued. It does not—as Gafsi et al. (2006: 465) require—go “beyond marketplace logic”.

Summarizing we hold that present European multifunctional agriculture policies end up maintaining and stabilizing the hierarchies between reproductive and productive activities and continue to pave the way for social-ecological crises. Critically assessed, multifunctionality as a proclaimed way towards achieving sustainable agriculture must be seen as being ambivalent at best.

As Mölders (2014) has proposed, multifunctional agricultural policies need to become “transformative” rather than “adaptive” to foster (re)productive economies—an essential prerequisite for achieving sustainable agriculture and rural development. Against this background, we extend the discussion on how to operationalize and how to implement sustainability in the agrarian context (e.g. Gafsi et al. 2006) by advocating new rural economic rationalities that can enable the emergence of societal relations to nature which would be sustainable, being characterized by processes whose qualitative, material and value dimensions are determined on the basis of (re)production processes, in the sense proposed by Biesecker and Hofmeister (2010: 1709). In the case of agrobiodiversity, the qualities of use and commodity production related to agrobiodiversity would need to be changed such that conservation and

subsistence production would become integral components of the process. Such an economy would be able to link use and commodity production with the maintenance of the natural conditions upon which they are based and secure our livelihoods.

References

- Baier, A. 2004. Subsistenzansatz: Von der Hausarbeitsdebatte zur "Bielefelder Subsistenzperspektive". In *Handbuch Frauen- und Geschlechterforschung: Theorie, Methoden, Empirie*, ed. R. Becker, and B. Kortendiek, 72–77. Wiesbaden: VS Verlag für Sozialwissenschaften.
- Baier, A., V. Bennholdt-Thomson, and B. Holzer. 2005. *Ohne Menschen keine Wirtschaft: Oder: Wie gesellschaftlicher Reichtum entsteht*. München: Oekom Verlag.
- Becker, A. 2004. Vom Regenwald zum Schwarzwälder Hausgarten: Gender in der Biodiversitätsdebatte. *Politische Ökologie* 22(91–92): 66–68.
- Becker, E., and T. Jahn. 1989. *Soziale Ökologie als Krisenwissenschaft. Sozial-ökologische Arbeitspapiere Nr. 1*, 2nd ed. Frankfurt am Main: Verlag für Interkulturelle Kommunikation.
- Becker, E., and T. Jahn. 2005. Societal relations to nature: Outline of a critical theory in the ecological crisis. German edition published 2003 In *Kritische Theorie der Technik und der Natur*, eds. G. Böhme, and A. Manzei, 91–112. München: Wilhelm Fink. http://www.iso.de/ftp/darmstadttext_engl.pdf. Accessed 25 January 2016.
- Becker, E., and T. Jahn (eds.). 2006. *Soziale Ökologie: Grundzüge einer Wissenschaft von den gesellschaftlichen Naturverhältnissen*. Frankfurt am Main: Campus.
- Biesecker, A., and S. Hofmeister. 2010. Focus: (Re)productivity. Sustainable relations both between society and nature and between the genders. *Ecological Economics* 69(8): 1703–1712.
- BMF—Bundesministerium der Finanzen. 2012. EU-Agrarpolitik. Gemeinsame Agrarpolitik (GAP). http://www.bundesfinanzministerium.de/Web/DE/Themen/Europa/EU_auf_einen_Blick/Politikbereiche_der_EU/EU_Agrarpolitik/eu_agrarpolitik.html#doc167132bodyText5. Accessed 25 March 2014.
- Brand, U., and A.B.M. Vadrot. 2013. Epistemic selectivities and the valorisation of nature: The cases of the nagoya protocol and the intergovernmental science-policy platform for biodiversity and ecosystem services (IPBES). Special Issue on Fairness on Biodiversity Politics and the Law: Interrogating the Nagoya Protocol. *Law, Environment and Development Journal* 9(2): 202–220.
- Brandth, B. 2002. Gender identity in European family farming: A literature review. *Sociologia Ruralis* 42(3): 181–200. doi:10.1111/1467-9523.00210.
- Brookfield, H.C. 2001. *Exploring agrodiversity. Perspectives in biological diversity series*. New York: Columbia University Press.
- CBD—Convention on Biological Diversity. 1995. COP 2 decision II/15: FAO global system for the conservation and utilization of plant genetic resources for food and agriculture. <http://www.cbd.int/decision/cop/default.shtml?id=7088>. Accessed 12 January 2015.
- CBD—Convention on Biological Diversity. 2000. COP 5 decision V/5: Retired sections: Paragraphs 1-2, 8, 20–21 and 28–29. Agricultural biological diversity: Review of phase I of the programme of work and adoption of a multi-year work programme. <http://www.cbd.int/decision/cop/default.shtml?id=7147>. Accessed 22 December 2014.
- Christinck, A., and M. Padmanabhan (eds.). 2013. *Cultivate diversity! A handbook on transdisciplinary approaches to agrobiodiversity research*. Weikersheim: Margraf.
- Cromwell, E. 1999. Agriculture, biodiversity and livelihoods: Issues and entry points. <http://www.odi.org.uk/sites/odi.org.uk/files/odi-assets/publications-opinion-files/8286.pdf>. Accessed 31 July 2013.
- Durand, G., and G. Van Huylenbroeck. 2003. Multifunctionality and rural development: A general framework. In *Multifunctional agriculture: A new paradigm for European agriculture and rural development*, ed. G. Van Huylenbroeck, and G. Durand, 1–16. Aldershot Hampshire and Burlington: Ashgate.
- Engels, J.M.M., and D. Wood. 1999. Conservation of agrobiodiversity. In *Agrobiodiversity: Characterization, utilization and management*, ed. D. Wood, and J.M. Lenné, 355–386. Wallingford: CABI Pub.
- FAO—Food and Agriculture Organization of the United Nations. 1983. International undertaking on plant genetic resources for food and agriculture: Resolution 8/83.
- FAO—Food and Agriculture Organization of the United Nations. 2001. Women-users, Preservers and managers of agro-biodiversity. <http://www.fao.org/docrep/x0171e/x0171e03.htm>. Accessed 25 January 2016.
- FAO—Food and Agriculture Organization of the United Nations. 2005. Building on gender, agrobiodiversity and local knowledge: A training manual. <http://www.fao.org/docrep/009/y5956e/y5956e00.htm>. Accessed 9 January 2015.
- Feindt, P. H. 2007. Agrarpolitik im 21. Jahrhundert - Konflikte, Wahrnehmungen und Verständigungsbedarf. In *Agrarpolitik im 21. Jahrhundert: Wahrnehmungen, Konflikte, Verständigungsbedarf*, eds. P. H. Feindt, and J. Lange, 13–26.
- Gafsi, M., G. Nguyen, B. Legagneux, and P. Robin. 2006. Sustainability and multifunctionality in French farms: Analysis of the implementation of Territorial Farming Contracts. *Agriculture and Human Values* 23: 463–475.
- Görg, C. 1999. *Gesellschaftliche Naturverhältnisse*. Einstiege: Grundbegriffe der Sozialphilosophie und der Gesellschaftstheorie, 7. Münster: Westfälisches Dampfboot.
- Hawkins, R., and D. Ojeda. 2011. Gender and environment: Critical tradition and new challenges. *Environment and Planning D: Society and Space* 29(2): 237–253.
- Hediger, W., and K. Knickel. 2009. Multifunctionality and sustainability of agriculture and rural areas: A welfare economics perspective. *Journal of Environmental Policy & Planning* 11(4): 291–313.
- Himmelweit, S., and S. Mohun. 1977. Domestic labor and capital. *Cambridge Journal of Economics* 1(1): 15–31.
- Howard, P.L. 2003. *Women & plants: Gender relations in biodiversity management and conservation*. New York and Eschborn: Zed Books and Deutsche Gesellschaft für Technische Zusammenarbeit.
- Hummel, D., and I. Schultz. 2011. Geschlechterverhältnisse und gesellschaftliche Naturverhältnisse—Perspektiven Sozialer Ökologie in der transdisziplinären Wissensproduktion. In *Körper. Raum. Transformation.: Gender-Dimensionen von Natur und Materie*, eds. E. Scheich, and K. Wagels, 218–233. Forum Frauen- und Geschlechterforschung, 32. Münster: Westfälisches Dampfboot.
- Inhetveen, H., and M. Schmitt. 2004. Feminization trends in agriculture: Theoretical remarks and empirical findings from Germany. In *Women in the European countryside*, ed. H. Buller, and K. Hoggart, 83–102. Aldershot and Hants: Ashgate.
- Inhetveen, H. 2004. Nachhaltigkeit und Biodiversität im Land- und Gartenbau—geschlechtersensibel betrachtet. In *Gender Mainstreaming im Naturschutz*, eds. D. Hayn, and BfN—Bundesamt für Naturschutz, 67–81. Münster: BfN-Schriften-Vertrieb im Landwirtschaftsverlag.

- Jacobs, S. M. 2010. *Gender and agrarian reforms*, ed. J. Momsen, and J. Monk, Routledge international studies of women and place. 9. New York: Routledge.
- Jahn, T., and P. Wehling. 1998. Gesellschaftliche Naturverhältnisse—Konturen eines theoretischen Konzepts. In *Soziologie und Natur: Theoretische Perspektiven*, ed. K.-W. Brand, 75–93. Soziologie und Ökologie, 2. Opladen, New York: Leske + Budrich.
- Jax, K., D.N. Barton, K.M.A. Chan, R. de Groot, U. Doyle, U. Eser, C. Görg, E. Gómez-Baggethun, Y. Griewald, W. Haber, R. Haines-Young, U. Heink, T. Jahn, H. Joosten, L. Kerschbaum, H. Korn, G.W. Luck, B. Matzdorf, B. Muraca, C. Neßhöver, B. Norton, K. Ott, M. Potschin, F. Rauschmayer, C. von Haaren, and S. Wichmann. 2013. Ecosystem services and ethics. *Ecological Economics* 93: 260–268.
- Jochimsen, M., and U. Knobloch. 1997. Making the hidden visible: The importance of caring activities and their principles for any economy. *Ecological Economics* 20(2): 107–112.
- Kassam, A., and T. Hodgkin. 2009. Rethinking agriculture: Agrobiodiversity for sustainable production intensification. <http://agrobiodiversityplatform.org/climatechange/2009/05/14/rethinking-agriculture-agrobiodiversity-for-sustainable-production-intensification/>. Accessed 22 July 2015.
- Kosoy, N., and E. Corbera. 2010. Payments for ecosystem services as commodity fetishism. *Ecological Economics* 69(6): 1228–1236.
- Kotschi, J. 2007. Agricultural biodiversity is essential for adapting to climate change. *GAIA* 16(2): 98–101.
- Kuhnen, F. 1982. *Man and land. An introduction into the problems of agrarian structure and agrarian reform*. Saarbrücken: Breitenbach.
- Langthaler, E. 2012. Balancing Between Autonomy and Dependence Family Farming and Agrarian Change in Lower Austria, 1945–1980. In *Austrian Lives*, eds. G. Bischof, F. Plasser, and E. Maltchnig, 385–404. Contemporary Austrian studies. 21. Loccum Protokolle, 30/07. Rehburg-Loccum: Evangelische Akademie Loccum.
- Marsden, T. K. 2003. The condition of rural sustainability: Issues in the governance of rural space in Europe. In *The reform of the CAP and rural development in Southern Europe*, eds. C. Kasimis, and G. Stathakis, 19–38. Perspectives on Rural Policy and Planning. Aldershot: Ashgate.
- Marsden, T.K. 2006. The road towards sustainable rural development: Issues of theory, policy and practice in a European context. In *Handbook of rural studies*, ed. P. Cloke, T. Marsden, and P. Mooney, 201–212. London: Sage Publ.
- MEA – Millennium Ecosystem Assessment. 2005. *Ecosystems and human well-being: Biodiversity synthesis. The Millennium ecosystem assessment series*. Washington, DC: Island Press.
- Mölders, T., A. Burandt, and A. Szumelda. 2012. Herausforderung Nachhaltigkeit. Sozial-ökologische Orientierungen für die Entwicklung ländlicher Räume. *Europa Regional* 18(2/3): 95–106.
- Mölders, T. 2014. Multifunctional agricultural policies—pathways towards sustainable rural development? *International Journal of Sociology of Agriculture and Food* 21(1): 97–114.
- Montenegro de Wit, M. 2016. Are we losing diversity? Navigating ecological, political and epistemic dimensions of agrobiodiversity conservation. *Agriculture and Human Values* 33: 625–640.
- Nightingale, A. 2006. The nature of gender: Work, gender and environment. *Environment and Planning D: Society and Space* 24(2): 165–185.
- Norgaard, R.B. 2010. Ecosystem services: From eye-opener metaphor to complexity blinder. *Ecological Economics* 69(6): 1219–1227.
- O'Hara, P. 1994. Out of the shadows. Women on family farms and their contribution to agriculture and rural development. In *Rural gender studies in Europe*, eds. L. van der Plas, and M. Fonte, 50–65. European Perspectives on Rural Development. Assen: Van Gorcum.
- OECD—Organisation for Economic Co-operation and Development. 2001. Multifunctionality: Towards an analytical framework. <http://www.oecd.org/tad/agricultural-policies/40782727.pdf>. Accessed 25 January 2016.
- Padmanabhan, M. 2011. Women and men as conservers, users and managers of agrobiodiversity. A feminist social-ecological approach. *The Journal of Socio-Economics* 40: 968–976.
- Padmanabhan, M. 2016. Intraface: Negotiating gender-relations in agrobiodiversity. Special issue: (Bio-) Diversität, Geschlecht und Intersektionalität. *Freiburger Zeitschrift für GeschlechterStudien (fzg)*, vol. 22, ed. V. Kuni, M. Mangelsdorf, and M. Pregernig, 85–105.
- Perkins, H.C. 2006. Commodification: Re-resourcing rural areas. In *Handbook of rural studies*, ed. P. Cloke, T. Marsden, and P. Mooney, 243–257. London: Sage Publ.
- Prügl, E. 2004. Gender orders in German agriculture: From the patriarchal welfare state to liberal environmentalism. *Sociologia Ruralis* 44(4): 349–372. doi:10.1111/j.1467-9523.2004.00281.x.
- Prügl, E. 2010. Gendered knowledge in the postmodern state: The case of agricultural trade liberalization in Europe. In *Gender knowledge and knowledge networks in international political economy*, eds. B. Young, and C. Scherrer, 115–129. Feminist and Critical Political Economy. 3. Baden-Baden: Nomos.
- Rodenstein, M., S. Bock, and S. Heeg. 1996. Reproduktionsarbeitskrise und Stadtstruktur: Zur Entwicklung von Agglomerationsräumen aus feministischer Sicht. In *Agglomerationsräume in Deutschland: Ansichten, Einsichten, Aussichten*, ed. ARL—Akademie für Raumforschung und Landesplanung, 26–50. Forschungs- und Sitzungsberichte. 199. Hannover: Akademie für Raumforschung und Landesplanung.
- Sachs, C. 2006. Rural women and the environment. In *Rural gender relations: Issues and case studies*, ed. B.B. Bock, and S. Shortall, 288–302. Wallingford: CABI Pub.
- SCBD—Secretariat of the Convention on Biological Diversity. 2010. Global biodiversity: Outlook 3. Montréal. <http://www.cbd.int/doc/publications/gbo/gbo3-final-en.pdf>. Accessed 25 January 2016.
- Schäfer, C., M. Gutiérrez, L. Klemp, G. Henne, and A. Müller. 2002. *The convention on biological diversity: Ensuring gender-sensitive implementation*. Eschborn: GTZ.
- Schmitt, M. 1999. Geschlechtergrenzen in der Landwirtschaft. Alte Muster und neue Herausforderungen. *Zeitschrift für Agrargeschichte und Agrarsoziologie* 47(2): 175–186.
- Schultz, I. 2003. 'Gender & Environment'. A Look at the Debate in Germany. In *Dokumentation Wissenschaftliche Kolloquien 1999–2002*, eds. U. Paravicini, and M. Zempel-Gino, 43–55. Niedersächsischer Forschungsverbund für Frauen-, Geschlechterforschung in Naturwissenschaften, Technik und Medizin: Wissenschaftliche Reihe NFFG. 2. Norderstedt: Books on Demand GmbH.
- Schultz, I., D. Hummel, and D. Hayn. 2006. Geschlechterverhältnisse. In *Soziale Ökologie: Grundzüge einer Wissenschaft von den gesellschaftlichen Naturverhältnissen*, ed. E. Becker, and T. Jahn, 224–235. Frankfurt am Main and New York: Campus.
- Shortall, S. 2006. Gender and rural politics: An overview. In *Rural gender relations: Issues and case studies*, ed. B.B. Bock, and S. Shortall, 243–251. Wallingford: CABI Pub.
- Swanson, T.M. 1994. The economics of extinction revisited and revised: A generalised framework for the analysis of the problems of endangered species and biodiversity losses. *Oxford Economic Papers, Special Issue on Environmental Economics* 46: 800–821.
- Thrupp, L.A. 1998. *Cultivating diversity: Agrobiodiversity and food security*. Washington, DC: World Resources Institute.
- Thrupp, L.A. 2000. Linking agricultural biodiversity and food security: The valuable role of agrobiodiversity for sustainable agriculture. *International affairs* 76(2): 265–281.

- Turnhout, E., C. Waterton, K. Neves, and M. Buizer. 2013. Rethinking biodiversity: From goods and services to “living with”. *Conservation Letters* 6: 154–161.
- UNCED—United Nations Conference on Environment and Development. 1992. AGENDA 21. <http://www.un.org/esa/sustdev/documents/agenda21/english/Agenda21.pdf>. Accessed 25 January 2016.
- Van der Ploeg, J. D. 2008. *The new peasantries: Struggles for autonomy and sustainability in an era of empire and globalization*. London, Sterling, VA: Earthscan publishes in association with the International Institute for Environment and Development.
- Van Huylenbroeck, G., and G. Durand (eds.). 2003. *Multifunctional agriculture: A new paradigm for European agriculture and rural development*. Aldershot Hampshire, Burlington: Ashgate.
- Van Koppen, K. 1997. Claims of culture. Social representations of nature and their consequences for agriculture. In *Images and realities of rural life: Wageningen perspectives on rural transformations*, eds. H. de Hann, and N. Long, 287–305. Assen: Van Corcum.
- Vazquez-Garcia, V. 2008. Gender, ethnicity, and economic status in plant management: Uncultivated edible plants among the Nahuas and Popolucas of Veracruz. *Mexico. Agriculture and Human Values* 25(1): 65–77. doi:10.1007/s10460-007-9093-x.
- Von Werlhof, C., M. Mies, and V. Bennholdt-Thomsen. 1983. *Frauen, die letzte Kolonie: Zur Hausfrauisierung der Arbeit*. Reinbek: Rowohlt Taschenbuch.
- Whatmore, S. 1991. *Farming women: Gender, work, and family enterprise*. Houndmills: Macmillan Academic and Professional.
- Wolff, F. 2004. Industrial transformation and agriculture: Agrobiodiversity loss as sustainability problem. In *Governance for industrial transformation: Proceedings of the 2003 Berlin conference on the human dimensions of global environmental change*, eds. K. Jacob, M. Binder, and A. Wieczorek, 338–355. FFU report, 04–03. Berlin: Environmental Policy Research Centre.
- Wood, D., and J.M. Lenné. 1999. The origins of agrobiodiversity in agriculture. In *Agrobiodiversity: Characterization, utilization and management*, ed. D. Wood, and J.M. Lenné, 15–34. Wallingford: CABI Pub.

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