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Land-use changes, cultural ecosystem services, and environmental conflicts: Evidence from rural Bulgaria

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“People are very much attached spiritually to crops and to the land, to the mountains. It's not in books or in classrooms. You have to practice. You have to touch it with your hands, and you have to eat it. You have to be part of it. For us, that’s the way.”

“The best way to protect biodiversity is to have a healthy culture living inside that ecosystem, because they have been preserving it. It’s so fragile really in the end.”

If our culture disappears, that would be tragic for local people. More than anything, we want to save our customs, our wisdom, and our ancient rituals.

“If landscape of flowing rivers and glaciers fails, we will have social unrest, we’ll have unemployed people, we’ll have problems there.”

Sacred Land Film Project, 2015

For all those who struggle to resist the destruction of nature and culture.

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Summary

As a result of their interactions and interdependencies with people, agroecosystems contribute to the creation of cultural ecosystem services (CES) such as rural identity, traditional knowledge, and ceremonies related to cultivation. However, global agroecosystems are currently undergoing vast land-use changes –such as intensive agriculture, land abandonment, and urbanization– which are influenced by economic, policy, and market forces. Along with these trends, environmental conflicts are emerging between stakeholders with differing interests in land areas. This dissertation holistically examines CES by critically studying how CES, in the light of relational values, are influenced by land-use changes, and further identifying environmental conflicts arising from changes in CES. The study begins at the global level, then uses Bulgaria as a case study at both the regional level and community levels, with particular emphasis on rural policies. Results of the research indicate that agroecosystems provide multiple interrelated CES that constitute global agricultural heritage. Further, land-use changes have a significant impact on culture and tradition, mainly at the expense of farmers and rural communities, and therefore lead to open and latent forms of environmental conflict. In the Bulgarian case study, stakeholders' evaluation of CES at both regional and farm levels indicate CES evaluation is often disrupted due to land-use changes. Moreover, concerns about CES at the community level can emerge as environmental conflicts that are expressed openly thorough demonstrations or protests, provided the community's political power for environmental management is high. When the degree of power is low, such CES-related conflicts are latent, expressed with a high importance placed on rural identity. Indeed, this study shows environmental conflicts over agricultural land appropriation are intertwined with cultural forms of dispossession. On the basis of these findings, this dissertation argues global agricultural heritage is at risk of being lost due to land-use changes. More holistic land-use policies at different governance scales are needed that consider both the critical importance of local communities and the CES they co-create for preservation and nourishment of rural areas. Rural people and co-created CES play a fundamental role in defending ecosystem services distribution issues and promoting social, ecological, and economic well-being. Therefore, the participation of local stakeholders is important in land-use decision-making, and CES recognition in science and policy as pathways for the environmental preservation and social stability of marginalized rural areas.

Keywords: Cultural ecosystem services; Relational values; Land-use changes;

Environmental conflict; Bulgaria

Chapter 1

1. Introduction

Land-use changes drive transformations of rural areas at the global scale (Quintas-Soriano et al., 2016). Global croplands, pastures, plantations, and urban areas have expanded in recent decades, accompanied by large increases in energy, water, and fertilizer consumption, along with considerable losses of natural resources (Foley et al., 2005; Rasmussen et al., 2018). Such transformations threaten the capacity of rural areas to provide ecosystem services, understood here as the benefits co-produced by people and natural assets (Plieninger et al., 2014), including food and fiber provision, maintenance of soil fertility, recreation, and rural identity. The consequence are negative social, environmental, and economic consequences, especially for small-scale farmers and rural residents (Fredriksson et al., 2017; Pedroli et al., 2016).

The loss of ecosystem services is thereby increasingly fostering environmental conflicts and triggering a growing number of protests (Martinez-Alier et al., 2016). People concerned about environmental degradation and related social changes, call for access to natural resources and an equal distribution of ecosystems' goods and services (Martinez-Alier, 2014; Robbins et al., 2010). For instance, people protest against depletion of fresh water supplies, pollution of clean air, or degradation of land and habitat loss (Martinez-Alier et al., 2016). Environmental conflicts emerge especially because land-use changes unevenly shift the costs and benefits among different social groups and geographical regions (Martinez-Alier, 2014; Peluso and Lund, 2011), creating uneven and unjust distributions of environmental resources, its goods and services (Martinez-Alier, 2014; Martinez-Alier et al., 2016; O'Connor and Martinez-Alier, 1998).

For instance, environmental land-use conflicts are related to different interests in land areas between different land-use stakeholders. Access to and control of natural resources often cause conflicts (Brown and Raymond, 2014; Pacheco and Sanches Fernandes, 2016). According to Environmental Justice Atlas (EJ Atlas, 2019) there are 736 environmental conflicts reported at the global level, that include land acquisition conflicts; from which 426 cases include agriculture, land dispossession, and ecosystem services distribution issues. Environmental conflicts come in many forms, can involve many actors, are different in intensity, depend on the place and scale, can be latent

(without visible mobilizations), can involve mobilizations, or even violent events (Peluso and Lund, 2011; Temper et al., 2018).

Several recent studies highlighted that the loss of or shift of benefits and related environmental conflicts do not only affect material goods and services, but also and especially cultural ecosystem services (CES) (Hanaček and Rodríguez-Labajos, 2018), defined here as the non-material contributions people co-create with and obtain from ecosystems (Chan et al., 2012a; Hartel et al., 2014). This is especially critical since CES can be seen as the "glue" and identity of rural societies, which play a major role in motivating the maintenance of traditional agricultural practices (Langemeyer et al., 2018b). Traditional agricultural practices, again, are generally seen as fundamental for the stewardship of biodiversity and most other ecosystem services (Andersson et al., 2015), especially those not rendering revenues for their stewards.

Dominant land-use changes in rural areas transform traditional small-scale farms − the guarantees for the stewardship of cultural, social and environmental benefits − into mere economic assets (Foley et al., 2005). For example, agricultural intensification causes loss of people's connectedness to nature (e.g. land), negatively influences traditional knowledge (Gómez-Baggethun et al., 2010b), and endangers local varieties and breeds (Biasi et al., 2015). Land-use changes, including intensification practices and urbanization processes, which change the traditional customs related to land (Suh, 2018), are commonly fostered by rural development policies and programs.

Human cultures have shaped, and in turn, have been shaped by local ecosystems (Pretty, 2011). Agroecosystems in rural areas, thus, have always been closely connected to cultural and social structures that span belief systems, norms, stories, knowledge and languages (Pretty, 2002). In order to cope with a given environment and local natural resources, most rural communities have developed their cultural identity around farming activities (Hartel et al., 2014) and created rich, diverse, and carefully managed rural social-ecological farming systems (Adams, 2010). Small-scale farming systems are the interface between local nature and culture, tangible and intangible heritage, biological and cultural diversity reflected in unique local landscapes (Tengberg et al., 2012). The complex interaction between farming systems and societies, shaped by diverse cultures under diverse social-economic-environmental conditions, is of scientific and policy

interest, (Adams, 2010; Allan et al., 2015) as socio-ecological systems combine local techniques and practices that maintain food security and biodiversity (Nieto-Romero et al., 2014; Power, 2010; Swinton et al., 2007) for millions of people worldwide (Fischer and Eastwood, 2016; Plieninger et al., 2014; Ribeiro Palacios et al., 2013).

Globally, traditional farming systems are managed by an estimated 1.4 billion people, mostly small-scale family farmers, peasants and indigenous communities (Koohafkan and Altieri, 2011; Martinez-Alier, 2014). Traditional farming systems are adapted to the small-scale local environment and communities' economic, environmental and cultural well-being (Brown and MacLeod, 2011; Fredriksson et al., 2017). Small-scale traditional farms are in some senses more sustainable in terms of ES provisioning and economic productivity; and are supposed to be even more sustainable compared to larger high-input farms, because of their low use of chemical or technological inputs (Gorton, 2003; Plieninger et al., 2014; Tieskens et al., 2017). Resource-bases available for small-scale traditional farms are surrounding natural resources and traditional knowledge; including their own sources of economic income (Tudor, 2015). Thereby small-scale traditional farms are assumed to contribute to social, environmental, and economic sustainability at local, regional and global levels (Sumner et al., 2010).

However, agricultural production for global markets has modified smallholder livelihoods from being mostly self-sufficient and culturally rich, to becoming increasingly wage-labor oriented, intensified or abandoned (Ribeiro Palacios et al., 2013). Increasing trends of land privatization for exclusively private profits, economic development, involving land-use changes and rural landscape transformations, including traditional small-scale farming systems (Hibbard and Lurie, 2013; Lockie, 2013; Sorice et al., 2014).

Transformation processes also threaten the foundation of local rural culture and associated biodiversity of traditional farming practices (Biasi et al., 2015; Kleijn et al., 2009). Another set of issues relates to the erosion of rural values linked with rural migrations and loss of future traditional farmers generations, overexploitation of resources and expensive food imports, bio-genetic erosion and loss of local traditional knowledge systems (Barthel et al., 2013). These processes, further, have led to

marginalization of rural areas and people, increasing poverty, homogenization of landscapes, including a disappearance of a global bio-cultural diversity (IPBES, 2019).

Traditional agricultural practice that use natural resources in the context of sustainability and environmental limitations, while producing well-being from local people as well as for wider society; should not be overlooked by science and policy (Plieninger et al., 2014). For instance, local knowledges of nature, such as traditional, indigenous, local ecological knowledge and eco-literacy by place-based cultures are of precedent importance to guide actions towards agricultural sustainability (Paudyal et al., 2016; Pretty, 2011). More comprehensive research is required, including on CES from traditional agroecosystems, and such should be incorporated fully in land use and agricultural policy decisions (Adams and Morse, 2019).

At the same time, it has been argued that the provision of ecosystem services is highly politicized and that distributions of environmental benefits vary across different regions and social groups (Kull et al., 2015; Breslow, 2014). The most negatively impacted social groups, in terms of land-use decision making and ecosystem benefits distribution are rural communities (Martinez-Alier, 2014; Wieland et al., 2016). Major implications for policy should be identified at different levels of governance so that cultural dimensions are adequately considered (Carvalho-Ribeiro et al., 2016).

Policies counteracting traditional agricultural practices and thus the stewardship of ecosystem services are not only fostering environmental conflict locally but are undermining what has been defined as one of world's greatest challenges in the 21st century (Steffen et al., 2015) and one of the major objectives of the United Nations Sustainable Development Goals (UN, 2014b:15). Yet, as highlighted above, to date, critical insights about the interrelation between land-use changes, the changing provision of cultural ecosystem services and resulting environmental conflicts are widely lacking in the context or rural societies. This dissertation investigates how and why these interrelated processes advance accordingly. The dissertation aspires for global relevance, while using Bulgaria in Eastern Europe as a case study.

1.1. Research objectives

The overarching aim of this dissertation is to provide an enhanced understanding of the influence of land-use changes on cultural ecosystem services (CES) and related environmental conflicts in traditional farming systems. Within this general goal, three specific objectives motivate this study.

First, I seek to identify not only the land-use changes that influence CES in socio-ecological farming systems but also the environmental conflicts that emerge as the result of these changes at the global level. This first specific objective grew out of CES underrepresentation in both research and policy, as argued by the ES scholarship (e.g. Adams and Morse, 2019; Bernués et al., 2014; Chan et al., 2012a; Nahuelhual et al., 2014). At the same time, CES have a central role in shaping environmental attitudes and are important for people's cognitive and emotional well-being (Chiesura and De Groot, 2003). Since agricultural areas undergo land-use changes due to socio-economic and socio-political drivers disregarding CES and their interactions can result in significant consequences like power inequalities and environmental conflicts (Kull et al., 2015).

Second, I intend to trace relations between land-use changes and the importance of CES in small-scale farming systems at regional and community levels in rural Bulgaria, in order to emphasize the policy relevance of CES in agricultural land-use management. This specific objective arose out of the need to underline the important non-material benefits –CES– of small-scale farming systems. Currently, there is a lack of recognition for groups with different socio-demographic backgrounds in the development of sustainable land management strategies (Plieninger et al., 2013). Therefore, I also aim to highlight the importance of CES as society-nature bundles and a necessity for both land-use science and policy making (Plieninger et al., 2014; Plieninger and Bieling, 2012).

Third, I mean to examine the causes, consequences, and responses to open (visible mobilizations or protests) and latent (no visible mobilizations or protests) environmental conflicts around CES from traditionally managed agricultural land in rural Bulgaria. Political ecology scholarship highlights the absence of cultural dimensions in the environmental conflict studies (Escobar, 2011, 2008). This is especially the case for

latent forms of conflict (Escobar, 2008; Le Billon, 2015) and for rural economic development programs aimed at avoiding socio-environmental degradation (Muradian et al., 2003). Hence, I explore CES in latent and open forms of conflicts in environmental management, and thereby contribute to their early detection and potential avoidance.

1.2. Background

The dissertation encompasses concepts and approaches from environmental conflicts and ecosystem services scholarship and adopts them in the context of rural land-use changes.

Since the publication of *The value of world's ecosystems services and natural capital* by Costanza et al (1997), ecosystem services have emerged as a novel way of understanding ecosystem and landscape dynamics, including change, interactions and flows between human and natural systems (MEA, 2005). Following the Costanza et al. (1997) publication, a wide range of research for understanding the ecosystem dynamics, benefits, and values of ecosystem services have been achieved (Chan et al., 2012b; Gómez-Baggethun et al., 2017; Langemeyer et al., 2018b); including mechanisms of social, environmental, and economic disproportion (Fischer et al., 2015; Hartel et al., 2014). The ecosystem services framework reveals ecosystems' benefits to society, presents a natural resource management approach, and influences environmental policy (Matzdorf and Meyer, 2014). The framework also supports and promotes dialogue between science and policy, and provides empirical evidence to decision makers and land-use management about the value of natural capital (Braat, 2016; Matzdorf and Meyer, 2014).

The main idea of the ecosystem services concept is that ecosystems bring significant benefits to humans and contribute to their well-being (Jax et al., 2013). The ecosystem services framework is a valuable approach for studying relationships and interdependencies between people and ecosystems (Hartel et al., 2014). It also helps to better understand relationships between people, as service providers and beneficiaries (Barnaud et al., 2018). Beyond the simple identification of ecosystem services, the ecosystem services framework can detect issues around ecosystem benefits that concern different people or groups (Barnaud et al., 2018; Nieto-Romero et al., 2014).

Within the ecosystem services framework, however, there is an underrepresentation of diverging social concerns and opinions regarding human-nature relationship and decision making, especially about CES (De Vreese et al., 2019). Diverging social concerns are important for detecting those who are marginalized and therefore invisible

in the socially constructed benefits distribution issue processes (De Vreese et al., 2019; O'Connor and Martinez-Alier, 1998); but also for detecting causes of social and environmental conflicts and situations in a particular place (Jorda-Capdevila and Rodríguez-Labajos, 2014; Lele, 2013). The ecosystem services framework lacks a further conceptual expansion towards social-ecological interdependencies, a stronger focus on power relations, the questioning of who are the stewards of ecosystem services, who are the beneficiaries, and whose knowledge is taken into account when environmental decisions are made (Chan et al., 2012a; Fischer and Eastwood, 2016; Löfmarck and Lidskog, 2017).

Erosion of the traditional value systems threatens sustainability and people's livelihood and wellbeing (Horcea-Milcu et al., 2018). Therefore, how and why people relate to nature, are often the main reason for environmental conflicts (Kenter et al., 2019).

Traditionally, ecosystem service research has conceptualized CES as a separated ecosystem service category to understand the non-material benefits people derive from the environmental (Nieto-Romero et al., 2014). CES have been shown to present some of the most compelling motivations for ecosystem stewardship (Soy-Massoni et al., 2016) but he intangibility of CES constitutes an important barrier for their characterization and assessment, which in turn has led to an underrepresentation of CES in the ecosystem services research and practice (Daniel et al., 2012; Gómez-Baggethun et al., 2010a; Lele, 2013). Intangibility has its foundation in the diverse and complex forms of social organization, such as territoriality, settlement and group membership; culture and rural identity, believes, languages, and specific local knowledge of farming practices that determine the relationship with nature and co-creation of CES (Adams, 2010; Fish et al., 2016; Pretty, 2011).

Newer understanding of people's relationships with nature assume that CES rather permeate through and across all three ecosystem services groups: the provisioning, regulating and supporting. The notion of *nature's contributions to people* (NCP) emerged to emphasize that culture determines all the links between societies and their

surrounding nature. While building on the concept of ecosystem services, the NCP framework – The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) - advances the central role of different cultures and forms of knowledge (e.g. indigenous, local) in people-nature relationships (Díaz et al., 2018).

Within this line of thinking, the concept of relational values provides a language to describe human-nature relationships in terms of preferences, principles, and virtues (Chan et al., 2018). The relational values, hence, are non-instrumental values, where the relationship itself is a value (Himes and Muraca, 2018). Ives et al. (2017) define material, experiential, emotional, cognitive and philosophical dimensions of human-nature connectedness. These relational values have been traditionally approached within the CES concept (Chan et al., 2018).

Relational values provide a new way of articulating how and why people value nature, relate with nature, and build responsibilities towards nature (Muraca, 2016; Pascual et al., 2017). Relational values are associated with relationships and focus on relational constitution of individuals and communities (both human and non-human). Thus, relation values should be enhanced key components of the cultural context that gives meaning to both NCP and ecosystem services (Chan et al., 2018).

Relational values include conditions for the self-understanding of a community that embodies collective practices, rituals, and patterns of social and cultural relations (Muraca, 2016). Moreover, relational values all those relations and processes considered as necessary for living a *"good life"* as a collective project; but also include the self-understanding of a community and the common life (Muraca, 2016). Relational values emphasize people's relationships to environments in ways that challenge and exceed instrumental (social and economic) and intrinsic (ecological) values (Muraca, 2016; Tadaki et al., 2017). Human-nature relationships, therefore, can be defended without an exclusive appeal to economic valuation (Munda, 2008). In this regard, the languages of indigenous territorial rights, human rights, and cultural values, such as for example, sacredness and ceremonies related to ancestry or medicinal plants are considered in environmental decision-making, without being previously translated into a common monetized language (Martinez-Alier, 2002).

By focusing on participation much greater consideration is given to the cultural aspects that often influence the ability of those most marginalized to express their concerns about the environmental management issues affecting them (Christie et al., 2012; Tadaki et al., 2017). From a policy perspective, this can support involving local communities and create better understanding of the complex relationships between people and their environment. However, in the field of non-monetary ecological accounting, cultural ecosystem services, and socio-cultural valuation approaches, relational values and related participatory research methods are only recently gaining stronger attentions (Chan et al., 2018; Langemeyer et al., 2018a; Small et al., 2017).

This goes in line with concerns to stronger address environmental conflict emerging from environmental destruction, as well as societal and political constraints that limit people's access to ecosystems (Adams and Morse, 2019; Corbera et al., 2007; Peluso and Lund, 2011; Tekken et al., 2017).

Building on these novel understandings within ecosystem services scholarship, this dissertation further nutrients from political ecology approaches to understand power relations, and inequalities in access to and distribution of environmental benefits. The dissertation analyzes disruptions to the culture-environment relationship by studying environmental distribution conflicts (O'Connor and Martinez-Alier, 1998) and the theory of access to natural resources (Ribot and Peluso, 2003) – within the framework of rural political ecology – a well-established field to examine environmental conflicts (Robbins, 2012).

In combination with the assessment of CES this will help me to create a better understanding of environmental conflicts arising from land-use changes (Ernstson, 2013; O'Connor and Martinez-Alier, 1998).

In their work *Land degradation and society,* Blaikie and Brookfield (1986) found how changes in agricultural land patterns are also changes in social structures. The authors argue how processes are mainly driven by unsustainable development imposed by powerful actors and institutions that lead to impoverishment of peasantry and their marginalization.

This dissertation is built on the understanding of cultural dispossessions through power relations, appropriation and deprivation of people who shape, live, and carve their identities through traditionally managed agricultural land (Harvey, 2004; Le Billon, 2015). The dissertation, furthermore, addresses and draws upon the critical reflection of Escobar (2008) about economic development of the "peripheral" countries, in which the domination of the mainstream ideas and attitudes towards nature, diminish and neglect cultural differences and diversities. This is another topic which has been rather absent within the literature when explaining environmental conflicts regarding high levels of industrialization and urbanization, intensification of agriculture, rapid growth of industrialized agricultural production, and the widespread adoption of "modern" cultural values (Escobar, 2011).

This dissertation provides deeper insights into land-use changes in rural areas, CES co-creation and delivery disruption due to the changes, and identifies environmental conflicts that arise as a consequence of these changes (Fig. 1.1).

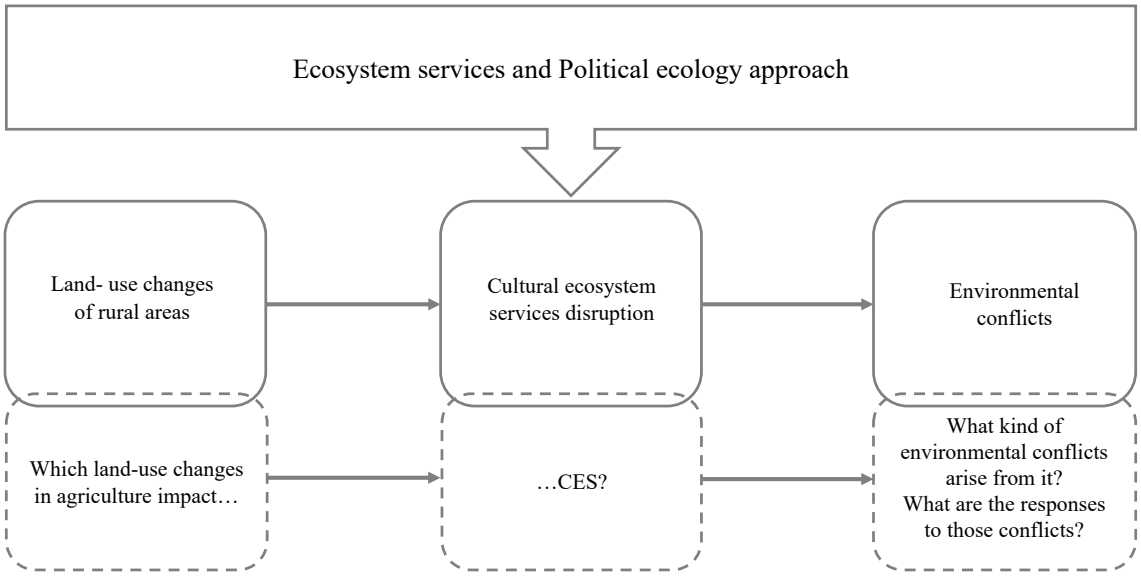

Fig. 1.1. Conceptual framework used in this dissertation. *Looking into land-use changes of rural areas, this dissertation studies impacts of the changes on cultural ecosystem services (CES), and environmental conflicts as a consequence of the changes in CES at the global level; and regional and community levels in Bulgaria.*

1.2.1. Cultural ecosystem services and social-ecological farming systems

Social-ecological systems are characterized by direct relationship between people and ecosystems, in which people modify natural resources, and in turn, obtain different benefits, e.g. ecosystem services (Bernués et al., 2016; Fischer et al., 2015; Hartel et al., 2014). Social-ecological farming systems are furthermore very complex systems and therefore characterized by various elements: heritage systems such as historic rural architecture; natural landscapes like water bodies and land resources; semi-natural landscapes such as agroforestry; and mosaic elements containing both grasslands and cultivated land (Loos et al., 2016). These elements sustain all ecosystem services including CES co-created with and obtained from the environment (Andersson et al., 2015).

Thus, farming systems are multifunctional (Allan et al., 2015; Fibrank et al., 2013; Pretty, 2003) and culturally shaped (Power, 2010). CES of farming systems may include traditional knowledge, cultural gatherings, recreation and seed exchange. Agricultural places and products are present in traditional rituals and customs that bond human communities (Power, 2010; Zorrilla-Miras et al., 2014). Knowledge about CES can be considered essential for understanding cultural identity, environmental sustainability and survival in different cultures (Brown and MacLeod, 2011; Tengberg et al., 2012).

While there is a growing interest in ecosystems services provided by agroecosystems (Calvet-Mir et al., 2012b; Milcu et al., 2013), CES until recently received little attention in empirical studies (Chan et al., 2012b; Schaich et al., 2015). The challenges of quantifying, valuing and mapping CES play against their effective integration in the assessments (Casalegno et al., 2013; Nahuelhual et al., 2014). In fact, based only on economic valuation of CES, the relationship people build with their environment is overlooked (Ruoso et al., 2015).

CES have an important role for communities' well-being and contribute to a responsible use and protection of the surrounding environment (Chan et al., 2012a). The joint creation of CES benefits a wider society as well, as it involves seed exchange, food security and diverse modes of knowledge (Calvet-Mir et al., 2012a; Ruiz et al., 2014).

Thus, culture determines all links between people and nature (Díaz et al., 2018). For instance, connectedness to nature is important to the extent of understanding human-nature relationship but also contributes to cognitive developments in humans (Berman et al., 2008; Oberkircher et al., 2011).

However, CES are sometimes referred to as "additional" services (Swinton et al., 2007). CES of a community cannot be captured by economic analyses alone (Carrasco et al., 2014). The relationship between agricultural revenues or cultural services is more complex than contingent valuations can indicate (Ruijs et al., 2013). CES are strongly interrelated, so the decline of one CES and its value might influence the value of another CES (Tilliger et al., 2015). In addition, standardized measuring of landscapes aesthetic value is difficult, because every region differs in characteristics and culture (Kim, 2013). Thus, CES are closely linked to personal and local value systems (Nahuelhual et al., 2014).

In this respect, CES in agroecosystems remain largely unknown and under-appreciated (Aspe et al., 2016; Cerqueira et al., 2015), and have consequently been invisible in planning and management (Barrena et al., 2014). There is a need for better understanding of the ways in which societies use and shape ecosystems and relate it to cultural, spiritual and religious belief systems. Cultural rural landscapes are the place where culture and nature meet, such as centuries old tangible and intangible patrimony, cultural and biological diversity (Tengberg et al., 2012). Improving understanding of this linkage is still a key point of the agricultural and ecosystem services research agenda (Swinton et al., 2007).

The multiple ecosystem benefits people obtain from ecosystems, such as local food, herbs and medicine, even fertile soil and fresh water provision maintenance – is the result of the interaction between people and ecosystems (Fischer and Eastwood, 2016; Paudyal et al., 2017). Local cultural interactions are a constituent of traditionally managed agricultural practices (Adams, 2010; Hartel et al., 2014), where non-material cultural aspects people have with their land, co-create with, and obtain benefits from are experience through inspiration, traditional knowledge, social interaction, and identity (de Groot et al., 2010; Plieninger et al., 2014).

1.2.2. Land-use changes in traditional farming systems

Socio-economic influences are the underlaying drivers of land-use change of rural areas (Plieninger et al., 2016; Ravera et al., 2014), with climate change being one example of environmental changes (Levers et al., 2016; Martinez-Harms et al., 2017). These drivers are the outcome of a complex mixture of economic, policy, institutional and market forces (Munteanu et al., 2014; Zorrilla-Miras et al., 2014).

Land-use changes have a negative impact on agroecosystems' services delivery (Fu et al., 2017). For instance, a recent study in Chile showed how natural cycle fires have increased due to climate change, with a considerable impact on traditional vine production, and historical aesthetic beauty of the local vineyards (Martinez-Harms et al., 2017). Climate change has also a significant impact on spirituality and cultural identity of local communities, because the spiritual rituals are closely connected to glaciers and water sources in regions experiencing environmental change (Palomo et al., 2014).

Agricultural intensification, scale enlargement, and land abandonment lead to significant changes in landscapes (Pedroli et al., 2016). Main influences and drivers of land-use changes in general include decline in rural populations and migration from rural to urban areas; development and new agricultural techniques; regional, national, and international market forces; or regional and national governmental initiatives which subsidize monocultures and finance large scale infrastructure, such as irrigation systems; or effects of policies implementation, such as the Common Agricultural Policy (CAP) of the European Commission (García-Ruiz and Lana-Renault 2011). Agricultural land abandonment, for instance, is at present the major issue occurring in Europe (Tarolli et al., 2014; Zakkak et al., 2015).

Changes in agriculture go beyond crop management. A study on land use changes of wood-pasture landscapes of Northern Lesbos shows a shift from traditional grazing and terraced arable fields to a more intensified and pure livestock grazing system, leading to an abandonment of arable farming and to a sharp decline in cultivation patterns (Schaich et al., 2015).

Other land-use changes with impacts on CES occurring in the last decade are urban, as

well as rural development policy programs. Spain, for instance, experienced one of the most significant land-use changes in all of Europe, with enormous economic and socio-cultural consequences (Quintas-Soriano et al., 2016). Widely homogeneous agricultural landscapes lead to the cultural standardization imposed by global markets. As a result, many cropping systems of great ecological, historical and cultural value are under threat of vanishing (Guarino et al., 2017).

Human-environment relationship refers to a process where culture and identity are simultaneously shaped, but are under threat from land abandonment, intensification, and urbanization (Fernández-Giménez, 2015). Relatively little is known about how individuals in the system experience the changes or the impact on local culture (Fernández-Giménez, 2015). According to Quintas-Soriano et al. (2016) and Fernández-Giménez (2015) only a few studies have examined the impact of these changes on local communities and CES (e.g., Iniesta-Arandia et al., 2014; López-Santiago et al., 2014; Szücs et al., 2015). Thus, studies on how land use changes affect CES that are particularly vital to the maintenance of human well-being, are of great scientific importance (Quintas-Soriano et al., 2016).

1.2.3. Environmental conflicts

Environmental conflicts are often seen as a contention between different actors about natural resources, pollution and other environmental risks and harms. The narrative of an environmental conflict being just a confront of local or indigenous perspectives against scientists or conservationists positions on how to manage "scarce" or vulnerable resources, has been progressively challenged (Breslow, 2014). Nowadays, environmental conflicts are rather seen as *"related to the access and control over natural resources and territory, which suppose divergent interests and values between opposing parties, in the context of a great asymmetry of power"* (Svampa, 2015, p.68).

Environment is a primary source of livelihood for poor rural populations, whose values, interests and participation are often marginalized and neglected (Martinez-Alier, 2014).

Most of the cultural benefits provided by agroecosystems are seen as non-marketed externalities generated by land managers (De Groot, 2006). However, they are essential for communities' spiritual enrichment, rituals, or their cultural identity (Hobbs et al., 2014). Yet most studies on agroecosystem services do not involve stakeholders in the assessments of CES (Nieto-Romero et al., 2014).

In this respect, a study on agricultural intensification and expansion in Argentina concluded that ecosystem services research without effective stakeholder participation entails the risk of scientific information serving to legitimize policies with narrow consensus. This leads to poor compliance and powerful stakeholders may have more influence on land use policy decisions (Mastrangelo et al. 2015). Positions of ecosystem services research as highly political, calls for a close attention to cultural narratives, distribution of power and institutional barriers (Kull et al., 2015; Breslow, 2014). Equity is one of the most important elements in the implementation of ecosystem services related policies (Pascual et al., 2010; Corbera et al., 2007).

Environmental conflicts for accessing natural resources (e.g., land and water) or about the benefits people obtain from ecosystems may take different levels, forms and degrees of intensity. They do not necessarily always appear as an open direct clashes between different social groups, and often take the form of hidden conflicts or more latent tensions (Ariza-Montobbio and Lele, 2010; via Dahrendorf, 1958).

Conventional ecosystem services assessment, mainly based on biophysical modelling, mapping, and monetary valuation may not detect these type of tensions beyond the identification of trade-offs (De Groot, 2006; Fagerholm et al., 2016). There is an urgent need to include socio-cultural approaches in the land use conflicts and ecosystem services study (Plieninger et al., 2014). It is important that environmental conflict studies not only rely on open conflicts with visible mobilizations or protests, but latent with no visible mobilizations or protests also, because in that way we gain a deeper look into processes that are stopping social responses (Beltrán, 2015). Thus, conflicts – manifested or latent – are important considerations in future sustainable agroecosystems management practices (Ariza-Montobbio and Lele, 2010; Jose and Padmanabhan, 2016).

1.3. Methodological background

In this dissertation, three globally available literatures: land-use changes, CES and environmental conflicts in rural areas were firstly mapped, then evaluated, and connected to one another.

A qualitative in-depth systematic literature review allows thematic synthesis including three stages: the coding of text line-by-line; the development of descriptive themes; and the generation of analytical themes and their interrelations (Gibbs, 2004; Ritchie et al., 2003; Thomas and Harden, 2008). As such, it is an in depth study method (Fig. 1.2) that generates new interpretive processes, constructs and explores the interrelated character of each research question (Thomas and Harden, 2008), and allows for a synthesis of the main findings (Di Gregorio, 2000).

The inquiry of case studies in this dissertation, arrays four different regions and eleven comminutes (Fig. 1.2). It includes diverse social group actors, because there is sometimes conflicting nature of underlying assumptions about inherent qualities of a single case study method. Thus, the method allowed for understanding the meanings (actions, decisions, beliefs, values etc.) which people attach to land-use phenomena within the social components of a given place (Riviera et al., 2010). Furthermore, the qualitative content analysis was conducted through a participatory and multi-stakeholder workshop. The stakeholder groups included experts, policy makers, local ecologists, NGOs, farmers and rural residents. The case study methods examined the origin, history and development of cultivation culture and its associated ongoing land-use practices in Bulgaria (Loulanski and Loulanski, 2014).

However, only few cases are investigated in Eastern Europe, where in general, and Bulgaria in particular, undergoes a profound agrarian reform (Fredriksson et al., 2017), due to a transition from socialist to capitalist and neoliberal political and economic systems (Fredriksson et al., 2017). Agriculture that was formerly organized collectively, practiced on a common land with the existence of small family plots; however shifts to emerging neo-liberal production systems of large-scale production units, followed by many other land-use changes, including land privatization processes (Gutman and

Radeloff, 2017; Ricroch et al., 2015; Spoor, 2012). Traditions related to land, thus, are becoming increasingly loose in Bulgaria (Yarkova and Mutafov, 2017).

The case study methodology helped to obtain local actors' opinions and concerns about land-use issues, cultural ecosystem services and environmental conflicts in the studied communities and rural regions in the country. Through the workshop approach followed with told narratives, group discussion, region and communities visiting, and direct observations; a rich qualitative data was obtained for the Bulgarian case study, stressing the importance of thoroughness in data collection and analysis (Ritchie et al., 2003).

After the social conditions data collection established within the case study approach, by following Oberkircher et al. (2011) this dissertation also includes a quantitative-case study survey for subsequent modelling or statistical testing of the variables and their relationships (Larsson, 1993). The combination of qualitative and quantitative methods offers a different way of knowing about the studied phenomenon. Although qualitative and quantitative methods address the same research problem, both methods provide a different "reading" form of on the research, and the evidence generated from the two approaches do not replicate each other.

Instead, the purpose of interlocking qualitative and quantitative data is to achieve an extended understanding that neither method alone can achieve (Ritchie et al., 2003). In that regard, qualitative methods were used for the synthesis of the literature; gaps detection; building narratives of the problem investigated in the case study regions. Whereas quantitative methodological approach allowed for detection of positive or negative interrelated relationships of the variables, dependencies of the variables on different factors, and statistical significance testing of the obtained results.

After relations between studied variables are coded or measured, types of relations between variables can be further analyzed by using the Social Network Analysis (Butts, 2008). Such networks are formed on the basis of relations within the group in contrast to those outside, showing positions or roles in the network structure obtained (Butts, 2008). Networks are based on a mathematical model or abstraction of the relationships

between variables in order to identify the most influential among them and to examine network dynamics (Freeman et al., 2017).

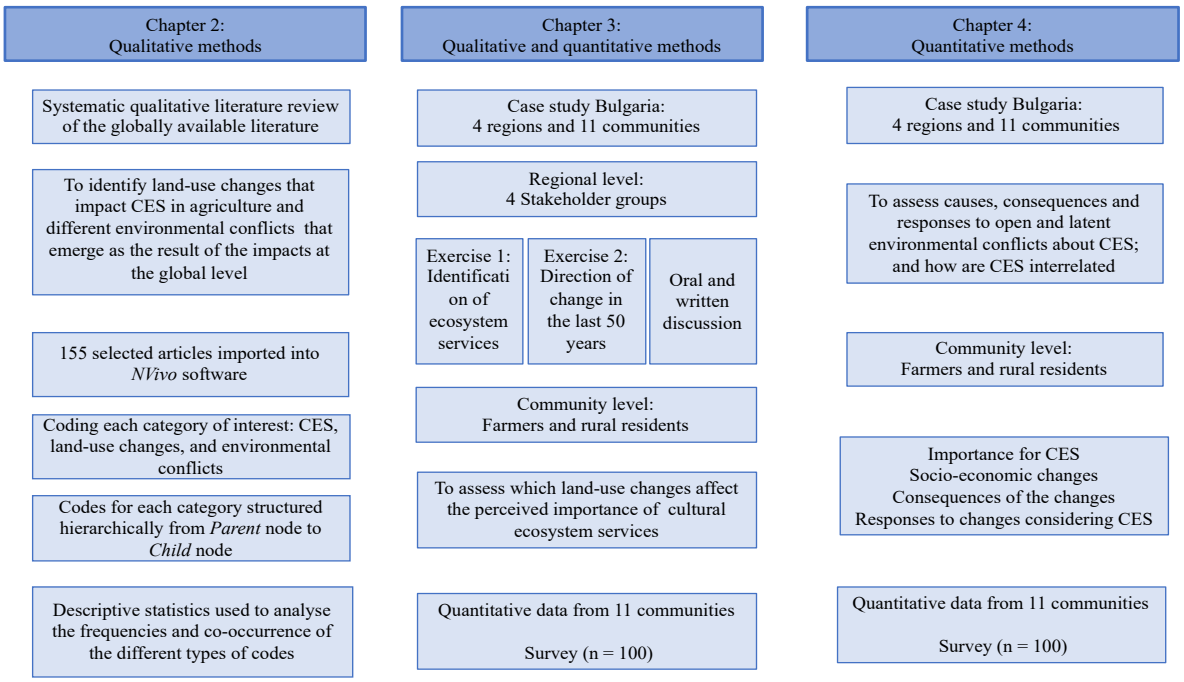

Fig. 1.2. Methodological outline of the dissertation.

1.4. Structure of the dissertation

After outlining the scientific relevance and background of the study in the chapter 1, this dissertation is structured according to the specific objectives. Chapter 2 addresses impacts of land-use changes on cultural ecosystem services in agriculture and environmental conflicts emerging at the global level, focusing on the first specific objective. In order to emphasize policy relevance of changes in land-use and CES, chapter 3 examines impacts of land-use changes on the perceived importance of CES at regional and community levels in Bulgaria, thereby addressing the second specific objective. Following the third specific objective, chapter 4 examine causes, consequences, and responses to open and latent environmental conflicts around CES from traditionally managed agricultural land at the community level in Bulgaria. Chapters 2, 3, and 4 are 'stand-alone' research papers that include introduction, material and methods, results, discussion, conclusion, and references cited. Chapter two has been

published in *Global Environmental Change* (Hanaček & Rodríguez-Labajos, 2018). Chapter 3 is under review in the journal of *Land Use Policy*. Chapter 4 is in final draft version to be submitted to the journal of *Ecological Economics* in October. Chapter 5 closes the dissertation with a general discussion and conclusion of the key findings. The final chapter also contains limitations of the study and prospects for future research (Table 1.1).

Table1.1. Structure of the dissertation

Chapters	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5
Title	General introduction	Impacts of Land-use and Management Changes on Cultural Agroecosystem Services and Environmental Conflicts – A Global Review	Evaluation of the perceived changes in land-use and cultural ecosystem services in rural Bulgaria and their policy implications	Understanding environmental conflicts through cultural ecosystem services - The case of rural Bulgaria	General discussion and conclusion
General objectives	Scientific relevance of the general research questions	To study how land-use changes influence CES in agroecosystems and what kind of conflicts are arising from these changes	To trace relations between land-use changes and the importance of CES in small-scale farming systems	To investigate causes, consequences and responses to environmental conflicts around CES from traditionally managed agricultural land	Summary of the significance of the results and conclusions about key findings for each general and specific objective
Specific objectives	Conceptual framework; Background of the main concepts; and Dissertation's structure	Categorize the CES related to agroecosystems; to analyze connections between CES, land-use changes and types of environmental conflicts in agricultural land-use and management	How CES are perceived and valued by local stakeholders, and how the perceived importance for CES is influenced by different, ongoing land-use changes	To examine both latent and open environmental conflicts for CES; causes, consequences and outcomes in open and latent forms of these conflicts	Limitations and prospects for future research
Methods	-	A comprehensive in-depth literature review	Multi-stakeholder workshop at the regional level Surveys at the community level	Multi-stakeholder workshop at the regional level Surveys at the community level	-
Level	Global and Eastern Europe	Global	Regional and community farm level in Bulgaria	Community farm level in rural Bulgaria	Global, 4 regions, and 11 communities in rural Bulgaria

Publications	-	Hanaček, K., Rodríguez-Labajos, B., 2018. Impacts of Land-use and Management Changes on Cultural Agroecosystem Services and Environmental Conflicts – A Global Review. Glob. Environ. Chang. 50, 41–59.	Land Use Policy, submitted (06/08/2019); Under review	Ecological Economics, submission forthcoming October 2019	-

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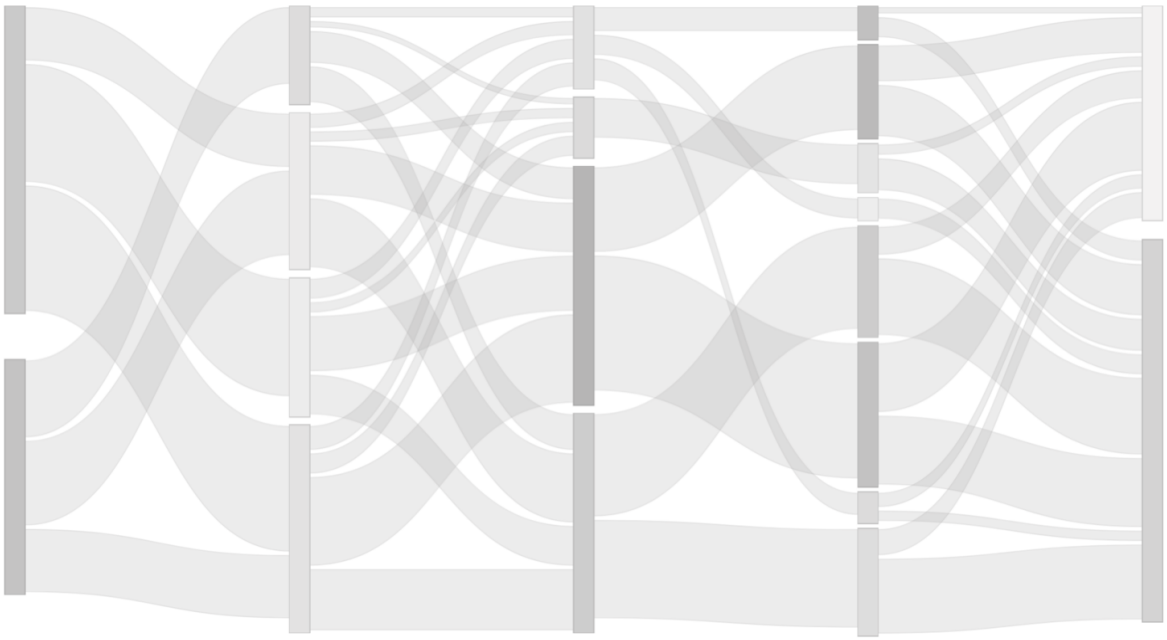
Chapter 2



2. Impacts of land-use and management changes on cultural agroecosystem services and environmental conflicts – A global review

Abstract

As an outcome of interactions and interdependencies with people, agroecosystems provide cultural ecosystem services (CES), such as traditional knowledge, recreation, and places for social gatherings. Today however, agroecosystems undergo biophysical changes because of land-use and management changes, such as intensive agriculture, urbanisation, and land abandonment. Typically, environmental conflicts emerge between stakeholders with differing interests in land areas around land-use changes. Cumulatively, these changes and conflicts have substantial influence on the CES appreciation of the farmland, triggering different types of responses, including social mobilisation and resistance.

A comprehensive analysis of these processes was missing in the literature. Here we present a systematic review of CES provided by agroecosystems at the global level, we explore their interconnections through network analysis, and analyse the interrelation between land-use changes, CES and environmental conflicts. The review includes 155 peer-reviewed articles, representing empirical data from 81 countries. Twenty main categories of CES and their subcategories delivered by agroecosystems are identified. Through the network analysis we demonstrate how CES are interrelated, with agricultural heritage as a connecting core. In a comprehensive map, we further identify which land-use change types have influence upon specific CES categories, and what are the causes, outcomes of, and responses to environmental conflicts that emerge from these processes. CES and agroecosystems cannot be seen separately from one another, as a reflection of secular or recently created relationships people have with their environments. While these relationships are dynamic, land-use changes may lead to their impairment or even loss, with ensuing impacts on biocultural diversity. The resulting environmental conflicts push most frequently for greater participation of actors involved in farming, and socio-cultural revalorisation of farmland activities and the promotion of multi-functionality.

Keywords: *Agroecosystem, Cultural ecosystem services, Land-use management changes, Environmental conflict*

2.1. Introduction

The social-ecological interactions in farming landscapes commonly result in agroecosystems with exceptional cultural benefits. These benefits are commonly referred as Cultural ecosystem services (CES) (Calvet-Mir et al., 2012b; Chan et al., 2012b; Plieninger et al., 2015; Zorrilla-Miras et al., 2014). While being associated to intangible values (e.g. Milcu et al., 2013), CES can involve several tangible, material values, such as the access to wild products or agrotourism development (Daugstad et al., 2006; Plieninger et al., 2015). While CES' potential role in enhancing ecosystem management is significant (Plieninger et al., 2015) their assessment and implementation into landscape planning is challenging (de Groot et al., 2010; Nieto-Romero et al., 2014; Satz et al., 2013).

CES in agricultural landscapes still poorly investigated in comparison to other ecosystem services (ES) categories (Dominati et al., 2014; Fagerholm et al., 2016; Milcu et al., 2013). Focusing on only provisioning or regulating services from agroecosystems and disregarding CES and their interactions carries consequences, such as inequalities in power relations (Kull et al., 2015; Breslow, 2014). CES may be strongly correlated with other ecosystem services categories in human modified landscapes (Reyes-García et al., 2015).

Many scholars argue however that CES may be undervalued or "invisible" (Aspe et al., 2016; Bernués et al., 2014; Bouahim et al., 2015; Chan et al., 2012b; Daniel et al., 2012; Frank et al., 2012; Grunewald et al., 2014; Nahuelhual et al., 2014), even within economic valuations. For example, existing economic valuations of CES often leave unnoticed the socio-cultural attachment people have with their environment. Consequently, this may underestimate the important contribution that CES make to total ecosystem services delivery (Van Berkel and Verburg, 2014). Indeed, human non-materialistic needs, and the cognitive and the emotional components of the relations with ecosystems have a central role in shaping environmental attitudes (Chiesura and De Groot, 2003; Costanza et al., 1997). Thus, their cultural value is of interest in science and policy (Merlín-Uribe Yair et al., 2012; Pretty, 2008).

Agricultural areas permanently undergo changes due to socio-economic and socio-political drivers, thus leading to coupled environmental and cultural transformations (Ribeiro Palacios et al., 2013). Both biophysical and cultural changes affect the CES delivery capacity of the farming landscape, and the CES appreciation by stakeholders. Changes in the biophysical and functional properties of agroecosystems (Pedroli et al., 2016) will in turn shape the capacity of these ecosystems to deliver CES for the human societies (Munteanu et al., 2014).

Land-use and management changes are one of the major causes of the biophysical changes of agroecosystems, typically through intensification and homogenization (Munteanu et al., 2014; Zorrilla-Miras et al., 2014). Since the structural heterogeneity of the landscape correlates with its aesthetic and recreational values (Hahn et al., 2017), a simplification of structure due to intensification may result in the decrease of the CES delivery of the farming landscapes (Pilgrim and Pretty, 2010).

The CES appreciation of the farming landscapes can also be influenced by the access to- and control of natural resources by different land users (Brown and Raymond, 2014; Kumar Paul and Røskaft, 2013; Pacheco and Sanches Fernandes, 2016; Svampa, 2015). Only a few academic articles based on ES framework have specifically stated how access to- and benefits from ES varies across space and different groups (Wieland et al., 2016). An inclusive view of stakeholders is important in the interests of social justice, because values and interest of the most vulnerable and powerless are often excluded from the environmental management decision making (Jorda-Capdevila and Rodríguez-Labajos, 2014; Martinez-Alier, 2014; M. S. Reed et al., 2009).

With this in mind, the major goal of this paper is to provide a comprehensive review on how land-use changes influences CES in agroecosystems and what conflicts are arising from these changes. As we analyse these connections, we also categorise the CES related to agroecosystems, as well as types of environmental conflicts in agricultural management, both topics of relevance that, so far, lack a systematic assessment at the global scale. The following sections outline the background of CES, land-use changes and conflicts. After that, we describe the methodology of the review and present and discuss the main results.

2.2. Methodology

2.2.1. Literature search and selection

We employed a systematic literature review with the aim of identifying, evaluating and interpreting the globally available research relevant to our research questions. Data mining of suitable references started from employing the search terms: “ecosystem service*” AND “agric*” AND “cultur*” AND “land use change” in the Scopus literature database (on 15/12/2016. The results obtained were 273 peer-reviewed articles spanning 1994–2016. Additionally, the literature on environmental conflicts related to CES in agroecosystems was scrutinised adding the search terms “cultural ecosystem service”, AND “agric*” AND “conflict*”. The results contained only 19 peer-reviewed articles, spanning 2010–2016. Furthermore, 4 relevant articles were published in the meantime, and included in the analysis. Only peer-reviewed papers, written in English, Spanish and Portuguese were included in this review. Selection and exclusion criteria included:

a) Papers that contained information about CES, agriculture and possible conflicts between different stakeholders driven by land use changes. Studies deemed eligible for inclusion were papers and book chapters which reported primary empirical data on cultural ecosystem services, agriculture, and related direct or indirect conflicts.

b) Articles and book chapters dealing only with coastal management and forestry were excluded. Agroforestry and wetlands were included only when they were closely related to traditional crops of the communities and related conflict, such as in traditional rice cultivation.

Finally, 155 studies spanning 2003–2016 fulfilled the above eligibility criteria and were selected for the analysis (Appendix 2.A).

2.2.2. Data organization and analysis

Information from the included papers was extracted and organised in an Excel file within the following categories: authors, title, journal, document type, place, year of publication, CES in agroecosystems, description of conflicts either directly stated or latent, type of land use and land management changes, stakeholders' group involved in the process, and stakeholders impacted by the land-use changes in each one of the 155 selected papers.

The data thus organised was imported into the qualitative analysis software *NVivo (QSR, version 11.0)*, which was used to assist in coding and analysing each category of interest. Following Siccama and Penna (2008) the coding for each category was structured hierarchically. The general categories that were at the top included "conflict", "land use changes", "cultural ecosystem service", and "stakeholders" (Table 2.1). From then, specific categories, or child nodes, emerged below. Methods of descriptive statistics was used to analyse the frequencies and co-occurrence of the different types of codes. The complete outline of the methodology is presented in Fig. 2.1.

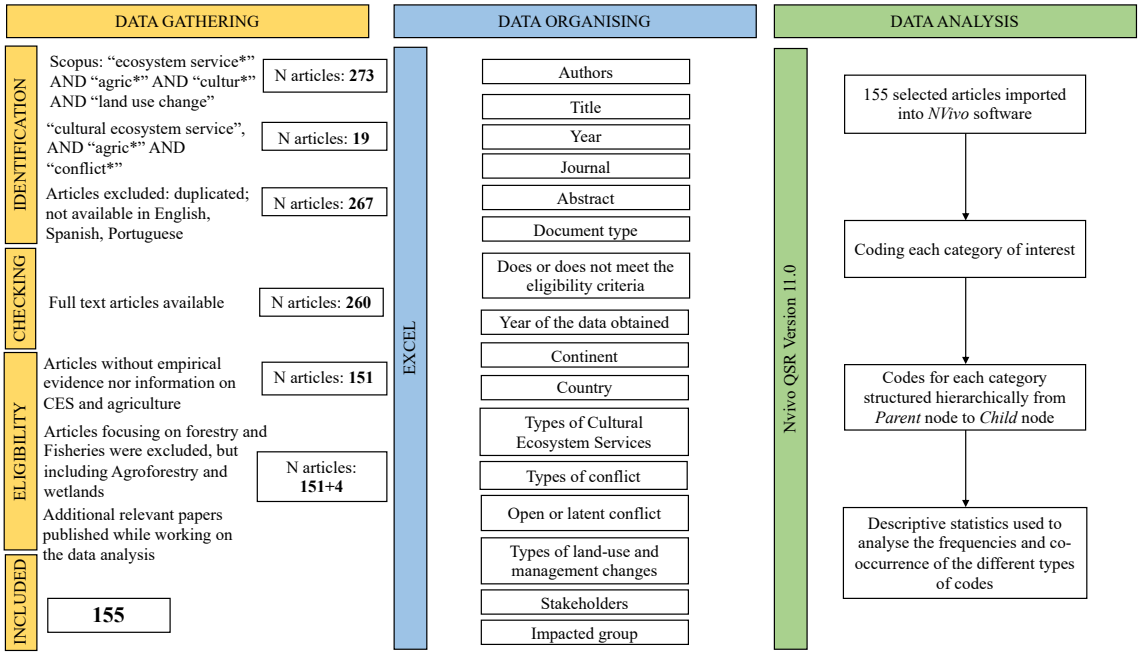


Fig. 2.1. Methodological stages of the research process.

Table 2.1. Structure of codes.

General category (Parent node)	Specific categories (Child node)	Number of codes in the selected papers
Place	Country Continent	174 271
Land use change	Types of land use change	348
Conflict	Causes of conflict Outcome of conflict Response	384 579 127
Stakeholders	Involved stakeholders Impacted groups	523 162
Cultural Ecosystem Service	Cultural agroecosystem services Service generating structures	1064 224

2.3. Results

2.3.1. Mapping the existing literature

A consistent increase in the number of publications is apparent since 2007 (Fig. 2.2), with a small peak in 2010, probably due to the influence of the Economics of Ecosystems and Biodiversity (TEEB) initiative. Alongside this, the Aichi Biodiversity Targets established in the tenth meeting of the Conference of the Parties of the Convention on Biological Diversity (CBD COP10) explicitly mentioned the role of agriculture in conservation, the relevance of culturally valuable species, and the respect to customary use of biological resources (The Convention on Biological Diversity, 2016).

The number of publications continued to increase from 2012, until peaking in 2014, when the work program of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) started. In 2015, when Sustainable Development Goals (SDGs) and the Nexus were adapted, there is a decrease in the number of CES publications. Nowadays, CES that agroecosystems provide are mentioned in a significant number of publications (Nieto-Romero et al., 2014).

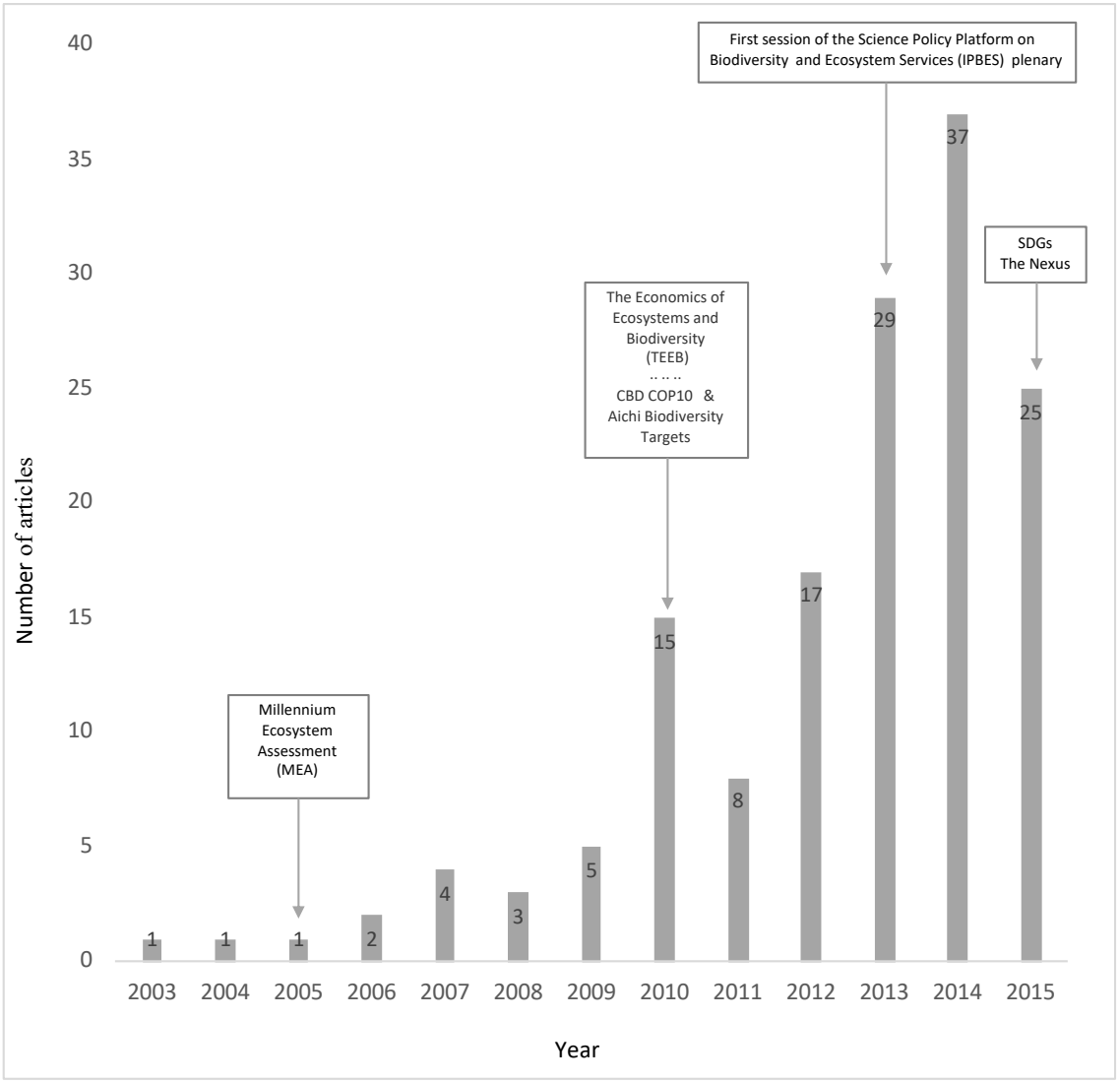


Fig. 2.2. Number of CES publications in agroecosystems per year (2003-2015).

The geographic span of the literature is global, but unevenly distributed (Fig. 2.3). CES in agriculture have been studied mostly in Western European countries, particularly in Spain, and North America, especially in the United States. China and Australia follow in number of publications. It is noteworthy that the regions that were given less attention within the literature include countries where the proportion of rural population is still high, and so is people's dependence on agroecosystems as a primary source of their livelihood. This encompasses large areas of Africa and Central Asia, and some parts of Central and South America, where we can presume that CES are of great importance. There are then differences in the state of publications between the Global North and the Global South (Milcu et al., 2013).

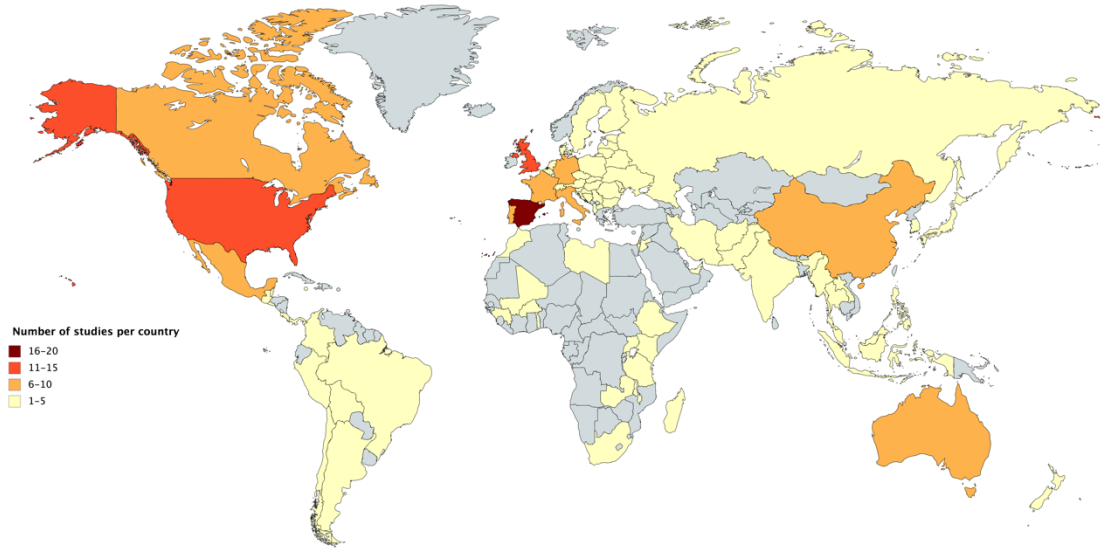


Fig. 2.3. Number of studies on CES in agriculture per country.

2.3.2. Land-use changes in agroecosystems

Some scholars argue that agroecosystems' capacity to deliver ecosystem services depends on the intensity of land use (e.g. Calvet-Mir et al., 2012). Against this, the main land use change reported in the reviewed literature is agricultural intensification, with 23% of all the coded changes in land use and land management. Also, of importance are urbanisation and agricultural expansion, promotion of monocultures, and land degradation and overuse, with 10%-11% of registered land-use changes. Land abandonment and conservation initiatives have similar percentages of 7%. The remaining 32% refer to diverse land-use change types reported in the literature, namely: deforestation, burning and logging; development of rural areas; intensified grazing; agricultural extensification; expansion of irrigation and hydraulic infrastructures or establishment of both renewable and conventional energy projects; mining; ecological intensification; tourism expansion; defence projects, transport; and climate change effects (Fig. 2.4).

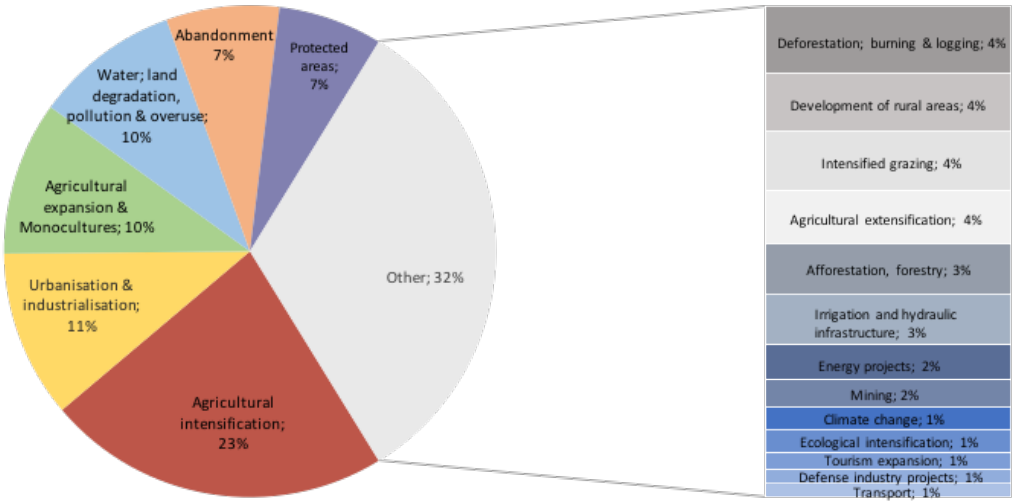


Fig. 2.4. Land-use and management changes affecting cultural ecosystem services in agroecosystems, as reported in the literature (percentage of times coded).

Focusing on the most frequent land-use changes, it is noted that urbanisation and industrialisation, agricultural intensification, water and land pollution and related overuse and degradation have tended to increase significantly since the year 2011 (Figure 2.5). Meanwhile, the increase of agricultural expansion and monocultures has drawn more attention from researchers since 2012, when the global land rush was denounced by activists and recognised by scientists (Cristina et al., 2012). Land abandonment and, to a lesser degree, conservation, have also increased markedly since 2012.

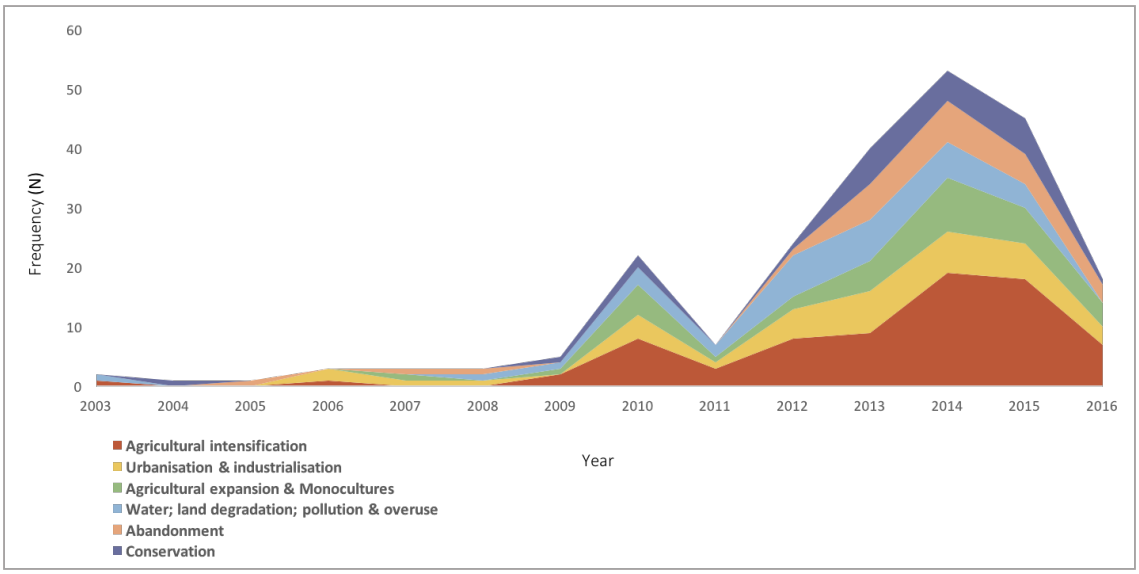


Fig. 2.5. Major land-use and management changes affecting cultural ecosystem services in agroecosystems, per year (number of times coded).

2.3.3. Cultural ecosystem services and service-generating structures

A first outcome of the review is a thorough scrutiny of different types of CES provided by agroecosystems, mentioned so far in the literature (Table 2.2). Since this is a bottom up identification of CES, the main categories (first column of the table) do not fully correspond with the standard classifications of CES (e.g. CICES, 2016). This allowed a flexible consideration of subcategories (second column) that gives an idea of the rich variety of CES involved in agroecosystems.

Table 2.2. The main cultural ecosystem services (CES) categories and their subcategories provided by agroecosystems identified in the reviewed literature.

Categories	*Subcategories*		
Aesthetics/Beauty	Beautiful scenery	Seasonal phenology	-
Artistic creation	Audio-visual/ Film making Carving Clothes and accessories making	Folklore Instruments playing and making	Photography Weaving Writing poetry
Traditional local varieties and breeds (Biocultural diversity)	Cultural diversity Erosion control techniques Fire use Food culture Food production methods	Food quality Food security Food sovereignty Hydrological function Natural capital conservation	Non-commodity food Poverty alleviation Natural hazards protection Soil fertility techniques Sustainable rural areas
Celebrations	Family	Traditional ceremonies	Traditional markets
Co-creation of ecological values (Health of the people, the soil and the environment)	Adaptability to the environment	Nature value	Sustainability awareness Water management
Connectedness to nature	Connection to land	Human-environment relation	Nature-culture relation
Sense of Place	Agricultural identity Body ornamentations Cultural and symbolic practices Cultural value	Local culture Moral value Norms-codes Pride	Rural identity Socio-cultural identity Traditional clothes making Traditional headdresses
Cultural transmission	Customary law Family farming	Traditions Way of life	Wisdom
Education	Scientific knowledge	Cognitive development	-
Heritage	Design and making of physical artefacts Agricultural landscape Centuries old trees Churches Furniture Gardens Historic rural architecture Irrigation canals	Paddy cultivation Paleo-environmental elements Stone walls and muds Terraces Villages and local houses Vine production Vineyards walls	Intangible patrimony Attachment to ancestor worship Ceremonies related to cultivation Family heritage Language creation Thousands of years of agricultural practices
History and historical memory	History of nature History of the place	Human history	Personal history
Inspiration	Intellectual	Spiritual	-
Outdoor recreation & Cultural hunting	Animal watching Enjoyment of the countryside	Fishing Hunting	Target practices Work on the farm as recreation
Physical, intellectual, emotional sustenance	Emotions Enjoyment Expression Freedom Harmony maintaining	Health and well-being Housing Memory Mental sustenance Personal satisfaction	Physical sustenance Serenity Therapeutic areas Work
Place shaping and attachment	Attachment to the landscape Landscape experience	Local environment shaping Place attachment	Place identity Sense of place
Social environment	Belonging Cohesion within community Community spirit Peasant's membership to the community	Secret meeting sites Seed exchange Shared land Shared water source	Shared water source Social construction Social practices Social relation
Spiritual enrichment	Beliefs Myths Religious beliefs	Rituals Sacred areas Spiritual connection with land	Spiritual sustenance Symbolic systems
Tourism	Agrotourism	Ecotourism	Rural tourism

	Coastal tourism	Game farming	
Traditional rural lifestyle and agricultural practices	Agrobiodiversity Cultural plants and animals Fruit and vegetable diversity Genetic diversity	Land cover diversity Low-input practices Pastoral nomadic culture Species diversity	Traditional pasture Traditional rural lifestyle Typical agricultural products Uniqueness of the landscape
Traditional knowledge	Forms of knowledge Ecosystem/Environmental knowledge Knowledge sharing Land ethics Skills Sustainable land management	Object of knowledge Crop varieties Food cultivation Fuel collection Land health	Local animal breeds Medicine Scents Species diversity

Besides offering a comprehensive – yet probably incomplete – list of CES, table 2.2 also suggests their connection. Only the most frequent interconnections with 20 or more links identified in the literature are represented in Fig. 2.6. The size of the circle indicates the frequency of appearance, and the width of the tie indicates the frequency of connection. Proximity between nodes indicates more frequent associations. The colour of the node corresponds to the CES classes in CICES (2016) and their hybrid.

The network clearly demonstrates how CES in agriculture are interrelated. Together they form a rich agricultural heritage. Two forms of agricultural heritage are recognised in the literature. The first one is the design and making of physical artefacts, such as the agricultural landscape itself, surrounded by historic rural architecture, including churches, and local houses. The second one is intangible forms of patrimony accrued during thousands of years of agricultural practices, attachment to ancestor worship, ceremonies related to cultivation, and languages. We observe that traditional agricultural practices relate closely to cultural identity, and both strongly relate to heritage. It is also directly connected to traditional knowledge. Those are later transmitted across generations.

Through co-creation of ecological values and connectedness to nature, people not only adapt to their surrounding environments, but also play an important role in conservation (of genetic resources, species-richness, and resources like water), which creates an awareness of nature value and again the traditional ecological knowledge.

People have left traces all over agricultural lands. Knowledge furthermore was shaped and maintained through traditional practices (e.g. Gómez-Baggethun et al., 2010). The social significance of traditional knowledge can be seen in the practices of sharing (e.g.

land and water sources) and exchanging (e.g. food and seeds) (Calvet-Mir et al., 2012a), and importantly in sense of attachment and belonging to a place. It is also highly related to community spirit and cohesion. Also, in the case of biocultural diversity, the way food is produced has a direct impact on food quality and security, as well as on cultural diversity. Further, food production plays an important role in celebrations, and agricultural and rural identity, manifested in traditional clothes and symbolic practices.

Besides providing a work and housing place, agroecosystems play an important role in people's physical, intellectual, and emotional sustenance (Milcu et al., 2013). Spiritual connection with land also creates sacred areas and religious beliefs. Those are closely connected to education, whereas agroecosystems also provide a base for scientific research and cognitive development of a given community. Still, the proximity of inspiration also indicates its importance in people's physical, intellectual, and emotional sustenance.

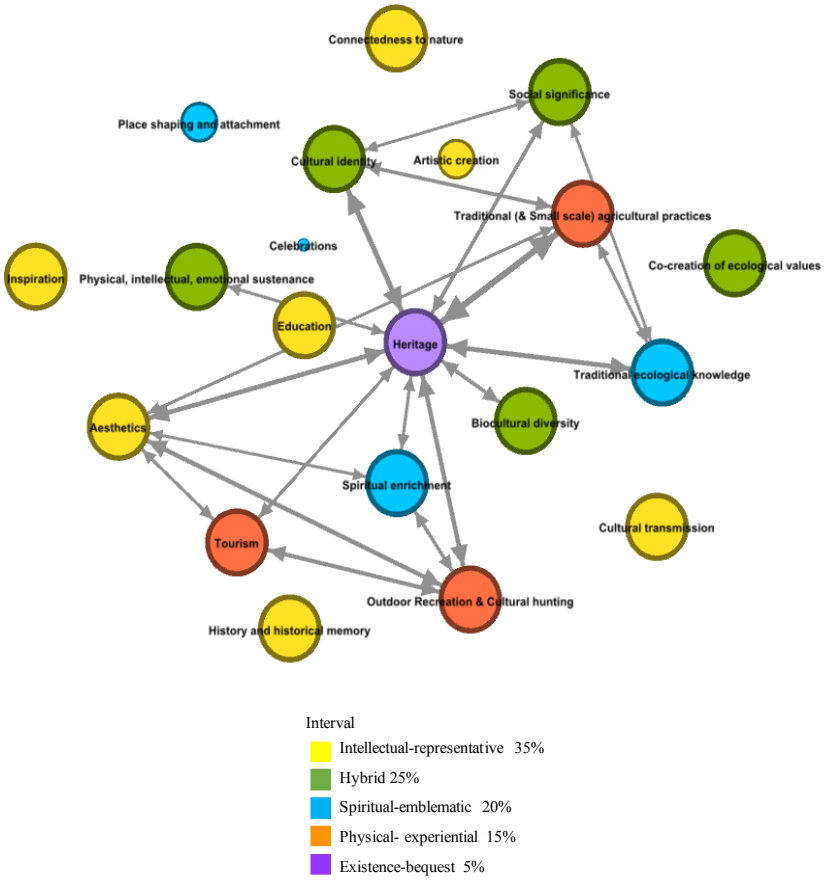


Fig. 2.6. CES interconnections with 20 or more links identified within the literature.

Agricultural landscapes are appreciated for their recreational qualities and tourism attraction (Plieninger et al., 2014). In our results, outdoor recreation, hunting, tourism and aesthetics had a significant correlation to each other. Those are the CES of agroecosystems that often generate market benefits, and therefore play a significant role of economic sustenance as well. In their diverse forms (e.g., agrotourism, ecotourism and game farming) these CES are directly connected to land management, either sustainable or not, of a specific area. However, they strongly correlate to the non-material spiritual enrichment benefits. The less frequent, but still with a significant association to other CES are peoples' attachment to their places, celebration and artistic creation. Those CES are next relatively associated to cultural identity.

Figure 2.7 shows the diverse CES types identified in the literature. The most recurrent ones were agricultural heritage, recreation, hunting and traditional knowledge. With similar percentage, traditional local varieties and breeds or biocultural diversity, the importance of social interactions between local people, their spiritual enrichment, and tourism follow. Less frequent were intangible CES, such as physical, intellectual and emotional nourishment, co-creation of ecological values or how agroecosystems help to care the health of the soil, the environment, and the people; then education, connectedness to nature, history and historical memory of a given place and their transmission between generations (e.g. Pretty, 2011). Celebrations, artistic creation, and inspiration had the lowest frequency. However, the literature addresses their importance, such as the role of poppy seeds cultivation in local celebrations, oral history and transmission, found in the study of Evered (2011).

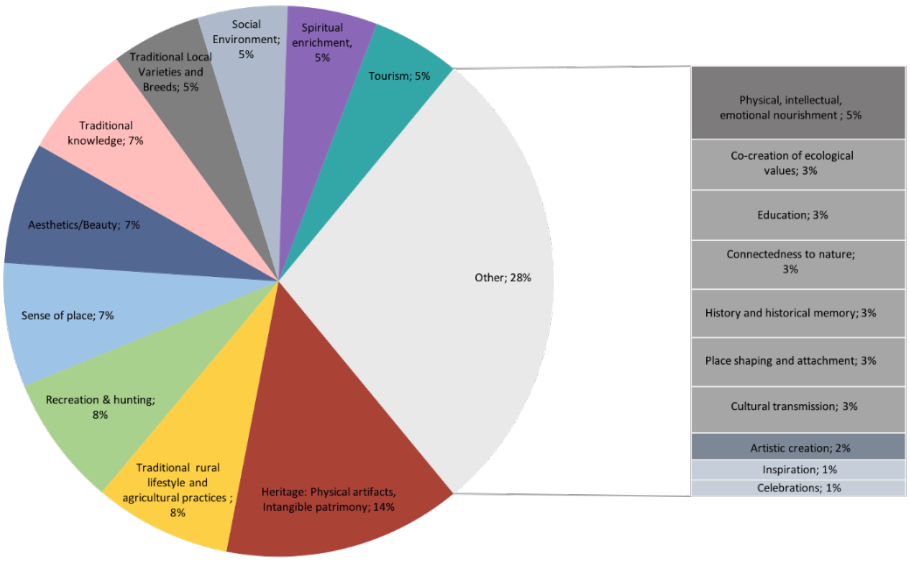


Fig. 2.7. Cultural ecosystem services in agroecosystems within the reviewed literature.

Here the notion of service-generating structures (Fischer and Eastwood, 2016) deserves some attention. With this we refer to the physical elements that, through human intervention and often involving the transformation of ecosystems, promote ES co-production. In agroecosystems, CES depend on humans, and in that way, are sustained and maintained. Figure 2.8 shows the types of structures used for that purpose and their relative importance in the revised literature. Rural landscapes have always been shaped by agriculture-based societies creating a build and nature-based heritage, as well as (agri)cultural and semi-natural landscapes. In turn, these become a means for CES generation and often for the provision of other types of ES. The protection and maintenance of these structures is therefore crucial for the multi-functionality of agroecosystems.

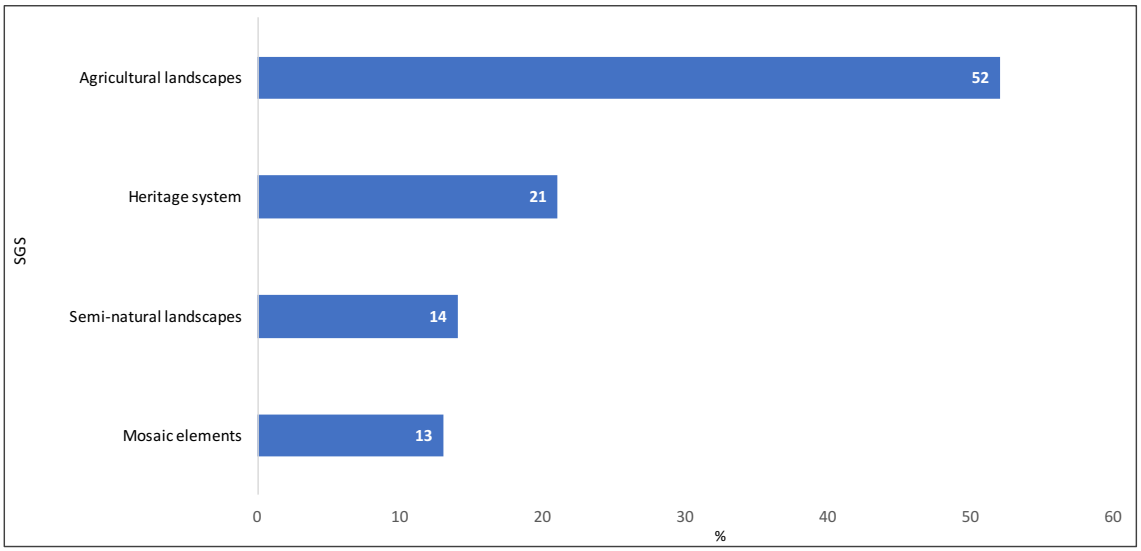


Fig. 2.8. Services-generating structures (SGS) appearance within the reviewed literature.

2.3.4. CES-related conflicts in agroecosystems

Tensions related to land use changes in agroecosystems and associated CES are manifold. Therefore, proposing a single typology of conflicts is challenging. In order to offer a complete understanding of the matter, this section traces three different stages that, together, configure each conflict: the *causes* of the conflicts, their effects or *outcomes* and the ensuing *responses*.

Figure 2.9 summarises the list and relative frequency of *causes*, or processes generating conflicts according to the reviewed literature. Each one, or a combination of them, accompanies a land use change that eventually entails negative effects for some actors. The most frequent process refers to market influences, sometimes related to tourism expansion. Tourism has a positive side in economic sustenance of the areas, but access to benefits is not for everyone, and it often causes a large rise in land and housing prices. Further to this, conflicts can arise when financial provisions are involved, such as micro finance schemes, payments for ecosystem services or subsidies, where the dominance of metric-based valuations, in which non-commodity values remain invisible when land use change decisions are made. For instance, (Kosoy and Corbera, 2010) argue how putting a price on ecosystem services through payments, makes human-

nature relation invisible and only one language of ES value, in this case the monetary value, dominates. A community may value a particular ecosystem for its historical socio-ecological relations. For instance, Jose and Padmanabhan (2016) in their study in India, showed how market-oriented development policies implementation do not consider historical values of traditional paddy rice cultivation. This led to cultural practices abandonment in rice cultivation, which historically has always served to prevent the exploitation of natural resources. Corbera et al. (2007) furthermore found that land-use change from maize cultivation to planting trees for carbon fixation, in Mexico, led to conflict between stakeholders who participated in the plantation and those who did not want to take part in the market for ecosystem services program.

Thus, socio-cultural or ecological conflicting values, interests and preferences, can often be a cause of conflict, or different value languages, such as in case of differences between scientific and local language. Further restrictions may emerge if nature conservation decisions are based mostly on agricultural greening policies, such as the promotion of renewable energy production (e.g. Kirchner et al., 2015).

Water, land and forest privatisation, or traditional territories enclosure –including fee payment systems such as case in Madagascar study (Brimont and Desbureaux, 2014) – prevent people from using resources they had been using before. Sometimes the land use is allowed, but conditioned to market share or productivity increase (Merlín-Uribe Yair et al., 2012). Generalisation of standardised agro-environmental measures causes conflicts, since measures might work in one place, but may not work in another (van Zanten et al., 2016).

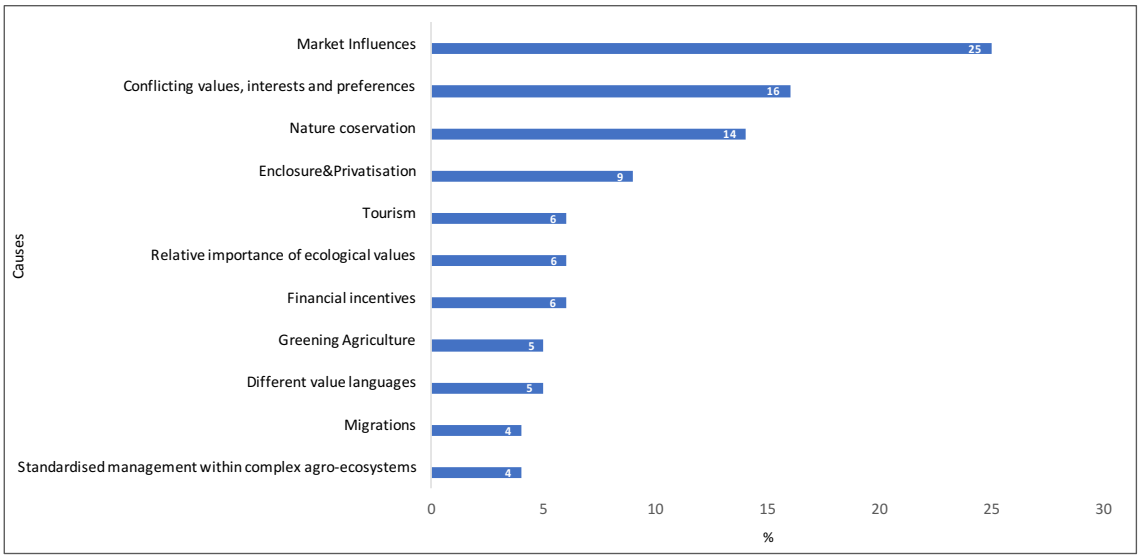


Fig. 2.9. Causes of CES-related environmental conflicts in agroecosystems.

Because of the land use changes induced by these causes several types of *outcomes* are reported in the literature (Fig. 2.10). The three most frequently addressed are impact on culture and nature-related traditions, resources degradation of previously existing forms of natural resources use (land, water, forests), and economic distribution issue, such as poverty or gentrification of rural areas. Follows value loss, either economic for rural sector, or environmental and social for rural communities. Different forms of exclusion are related to either vulnerable groups from decision making, environmental management, policy making or participation in scientific research. This is followed by marginalisation of rural communities.

In general, these outcomes point towards the lack of appreciation for farmers' work and recognition of the cultural value of farming. The literature also reports prejudices against artisanal and small-scale economies (e.g. Barthel et al., 2013), hand in hand with economic transformation of rural environments. The latter one includes agricultural development projects, agri-business and commodity crops, that concur with environmental pressures.

Access prohibition to traditional lands appears less frequently in the literature. For example, Brimont and Desbureaux, (2014) in their study in Madagascar found how protected areas initiatives exclude local communities in using traditional territories, and how fee payments were implemented to access these lands. It is however, the direct

result of the land enclosure and ensuing privatisation (Heynen and Robbins, 2005). Even less attention has been given to changes in power and responsibilities and breakdown of community structures. Smaller amount of papers reviewed addressed issues regarding autonomy loss, related to control of areas for example, and the impact on the labour market.

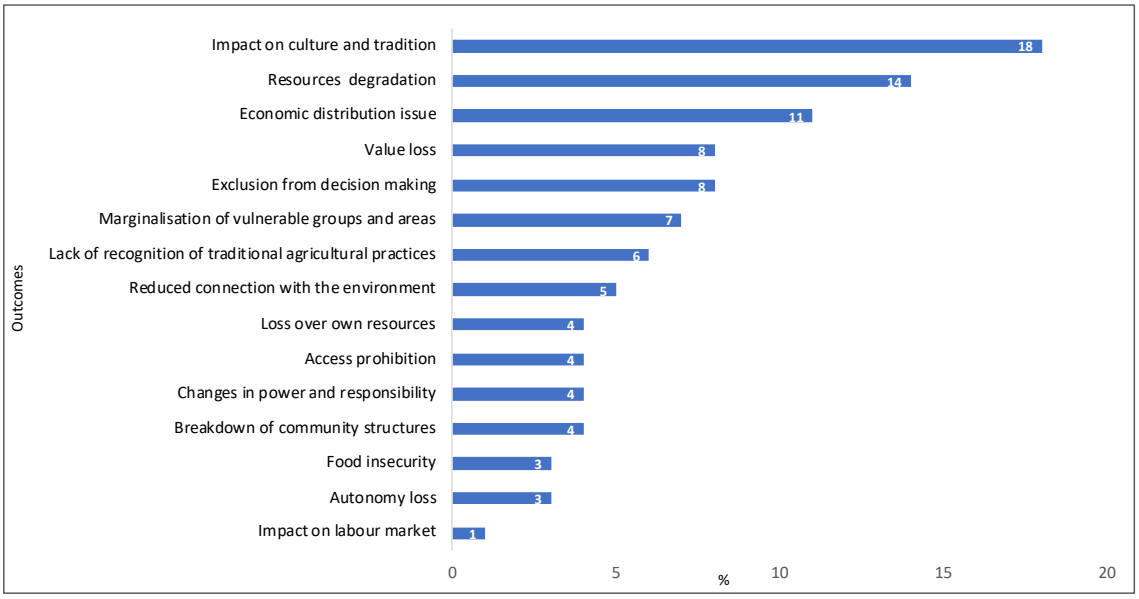


Fig. 2.10. Outcomes of CES-related environmental conflicts due to land use changes in agroecosystems.

When these types of negative outcomes appear, people do not remain passive and the literature reports this as well (Figure 2.11). The *responses* in the conflicts not only mean mobilisation and resistance, although this is indeed one of the reactions. Enhanced participation, in fact, is the most common situation mainly through recognition of traditional ecological knowledge. When there is resistance, in some cases tradition itself is mobilised through the defence of traditional cultivation, cultural and symbolic practices, or collective resource ownership. Agreements between the resisting actors, public authorities and private sector also occur, especially when ES-generating structures are taken into account and recognized in decision-making (e.g. Aspe et al., 2016). However, sometimes a political or economic 'solution' is simply imposed.

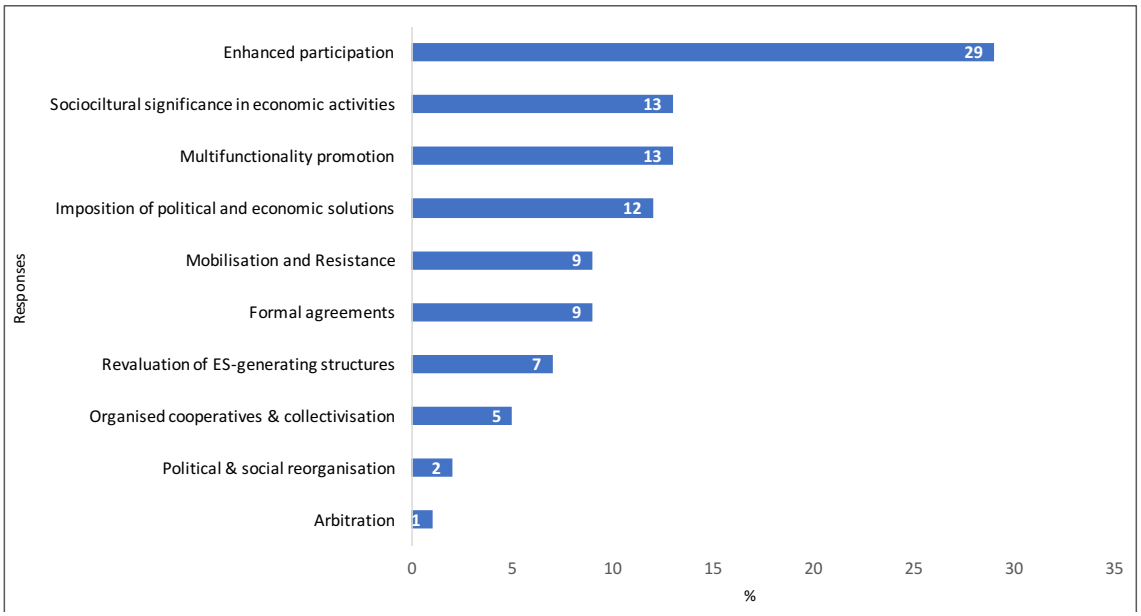


Fig. 2.11. Responses in CES-related environmental conflicts due to land-use changes in agroecosystems.

2.3.5. Stakeholders

Looking at the relative frequency of stakeholders (Fig. 2.12), the results indicate that different groups are involved in agroecosystem management and use, with authorities and farmers being the most common. The most impacted groups impacted by the land-use changes in agroecosystems seem to be the least powerful and with limited presence in environmental resources management decisions, such as farmers, rural residents, and women in-migrant labourers (Fig. 2.13). Authorities, experts and private companies, presumably more powerful, were not identified as being affected by land-use changes at any point.

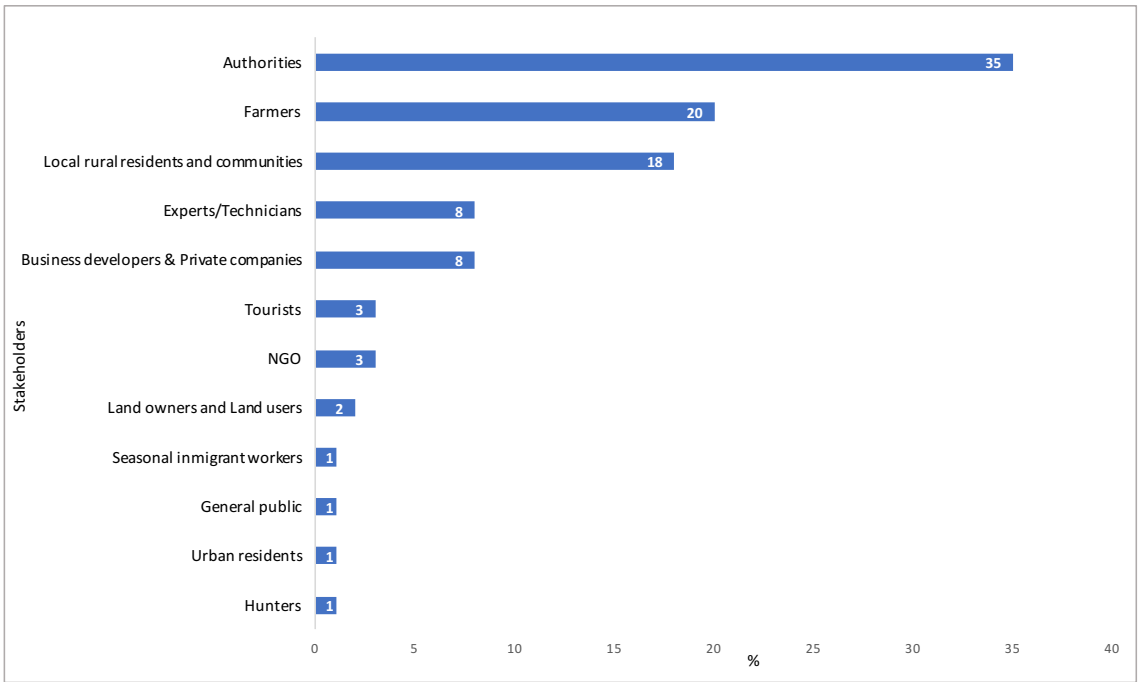


Fig. 2.12. Stakeholder groups in CES-related environmental conflicts in agroecosystems.

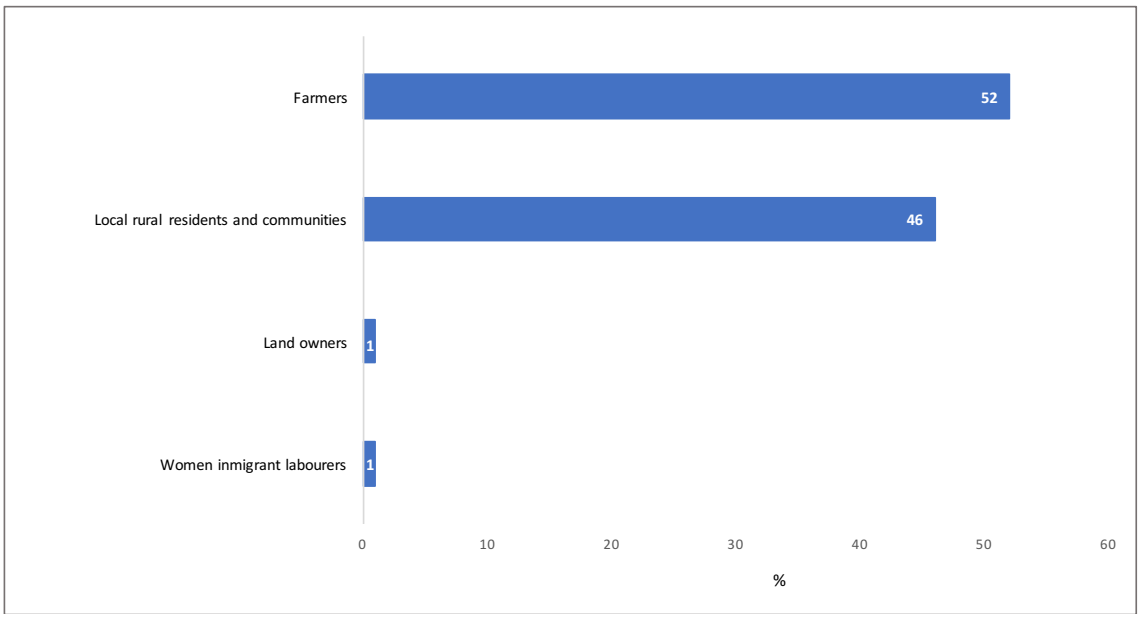


Fig. 2.13. Impacted stakeholder groups in CES-related environmental conflicts in agroecosystems.

2.3.6. Interrelation between land-use changes, cultural ecosystem services, and environmental conflicts in agriculture

Figure 2.14 shows the complex interrelation between land-use changes, CES, causes and outcomes of, and responses to environmental conflicts. The first left column of codes in the figure represents land-use changes marked in the salmon colour shades. The second column of codes represents CES categories provided by agroecosystems in turquoise shades. The third column represents the conflict causes -marked in the blue shades and conflict outcomes, marked in the green shades. In the fourth column conflict responses are presented in the violet shades. This figure only includes those variables and interactions that were mentioned most frequently and consistently within the literature - the first fifty percent of the most frequently coded relationship in each category. The thicker the connecting line, the stronger the relation between variables. The darker the node colour, the higher the frequency of appearance of the variable within the literature. The longer the vertical node, the higher the overall number of connections. Details on these relationships are presented in Figures 2.15 A-D.

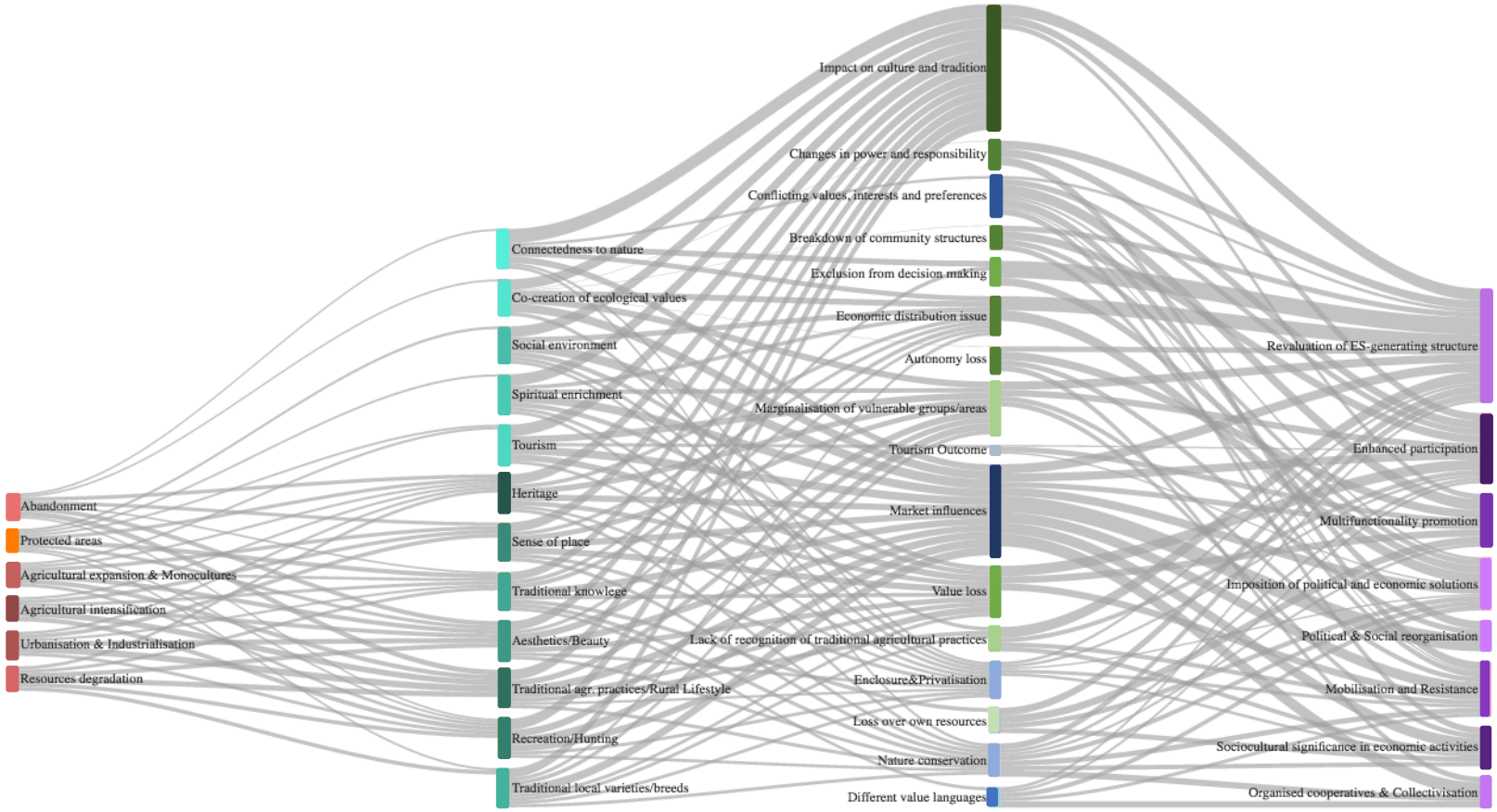


Fig. 2.14. Interrelation between land-use changes, CES, and environmental conflicts in agroecosystems.

Land abandonment is the driver of agroecosystem change with the major impact on CES, followed by agricultural expansion and monocultures. Intensive agriculture and urbanisation were equally addressed in the reviewed literature, and with a lower impact on CES. The most common impact of each of these land-use changes was on traditional agricultural practices, rural lifestyle, aesthetics and, to a lesser extent, on heritage and traditional knowledge. It is notable, how the impact of land-use changes on tangible CES seems to be more frequently reported than on the intangible CES, such as in the case of spiritual enrichment, sense of place, and connectedness to nature (Fig. 2.15 A).

In Fig. 2.15 B, market influences are the most frequent and the most significant conflict cause, in each one of the CES impacted by land-use changes. Enclosure and privatisation, as well as nature conservation initiatives, are related to all impacted CES, except traditional knowledge. Notwithstanding, impacts on traditional knowledge seem to be caused by different value languages. Meanwhile connectedness is rather originated from conflicting values, interests and preferences among different stakeholders. Nevertheless, we found tourism and protected areas to be both a land-use change and a conflict cause.

Figure 2.15 C, on outcome or consequences of environmental conflicts related to land-use changes, unveils the impacts on culture and nature-related traditions as the most commonly affected. This is followed by agroecosystems' value loss (i.e. economic, environmental and social) except in case of traditional local varieties and breed, connectedness to nature, and co-creation of ecological values. Instead, the more significant conflict outcome in this case were marginalisation of vulnerable groups, their poverty, and breakdown of community structures. Further, traditional knowledge and connectedness to nature occurs along with exclusion from agro-environment decision making and loss of access to natural resources. Social environment that people build around agroecosystems relate to lack of recognition of traditional practices.

Responses are the final component of environmental conflicts (Fig. 2.15 D). Frequent responses were mainly efforts to recognize ES-generating structures, i.e. the recognition of the importance people have in shaping thriving ecosystems. This response relates to exclusion from decision making, poverty, and especially to threats on culture and tradition. Communities' enhanced participation in agricultural management and

decision making was another frequent response. This was related to breakdown of community structures, marginalisation. A commonly reported response was also the increasing awareness and promotion of the multifunctional character agroecosystems, i.e. nutrient and water cycling, climate regulation, food provisioning, and remarkable cultural values. Multifunctionality promotion often appears when conflicting interests, values and preferences between different actors concur. Mobilisation and resistance, common events in environmental conflicts in general, appear relatively less frequently than other responses in our data. They seem to emerge from market influences, marginalisation of vulnerable groups and rural areas, as well as enclosure and privatisation of natural resources.

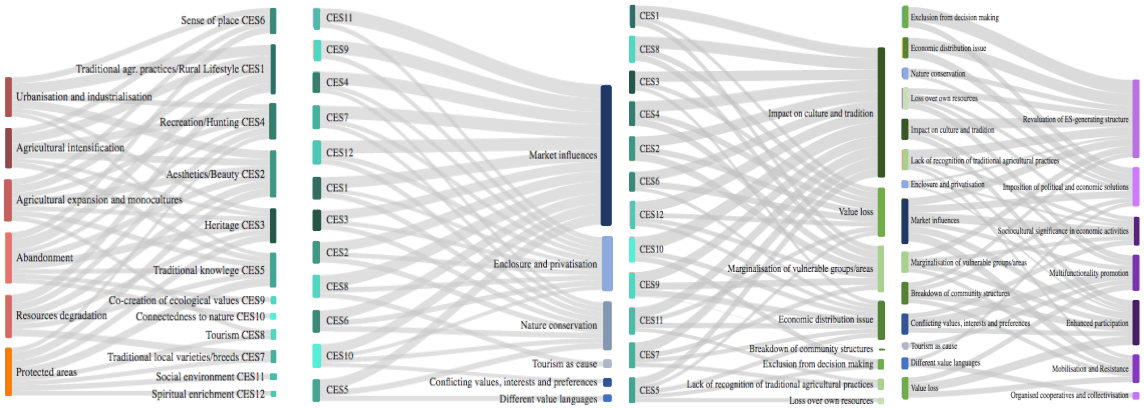


Fig. 2.15A Fig. 2.15B Fig. 2.15C Fig. 2.15D

Fig. 2.15. A detailed representation of land-use changes impacts on cultural ecosystem services (2.15A) and emerging conflict causes (2.15 B), outcomes (2.15C), and responses (2.15D).

2.4. Discussion

This review confirmed the important role agroecosystems play in providing rich and varied CES to societies, as argued in the work of Calvet-Mir et al., 2012; Lovell et al., 2010; Nieto-Romero et al., 2014. Our approach endorses and expands the recognition of CES categories and highlights their subcategories, based on the data at the global level.

2.4.1. Land-use changes in agriculture impact cultural ecosystem services from farming practices and lead to environmental conflicts

Our results also emphasize the interrelation of CES, and their tight connection with land management, a point already reported by Tilliger et al., (2015) and Van Berkel and Verburg, (2014). Agroecosystems thus, provide CES with different characteristics that are interdependent. In combination, they form tangible and intangible heritage in agricultural settings. That is especially visible in CES categories like biocultural diversity, co-creation of ecological values, traditional knowledge, and connectedness to nature. Our results additionally show that culturally and environmentally, traditional agricultural landscapes not only include croplands, vineyards, or flower-rich landscapes, but also traditional irrigation canals, water wells, and stone walls that surround them. Therefore, elaborating on Fischer and Eastwood, (2016), we argue that human activity and their cultural practices, are needed to sustain agroecosystems and the ecological processes therein.

In general, conflicts are very well studied in agriculture (e.g. Kumar Paul and Røskaft, 2013; Rótolo et al., 2014; Seghezzo et al., 2011), but how they relate to CES remained a gap within the literature. Plieninger et al., (2015) highlighted how CES play an important role in peoples' everyday lives, in maintaining further healthy agricultural management, and are appreciated by local communities. A key finding of this study is that when those relationships are broken or even lost, environmental conflicts emerge. Conflict is a process occurring through various stages, rather than only as the last stage manifestation of a discontent.

Our analysis elaborates the notion of environmental conflicts in agroecosystems, by identifying the link between land-use change types and specific CES categories. Throughout our review, and according to a study of Ruoso et al., (2015), we show that consequences or outcomes land-use changes have on CES in agriculture lead to significant impacts on culture and tradition in general, mainly at the expense of local rural communities and farmers.

Since CES connect to one another, land-use changes indirectly can have multiple and chained impacts on various CES. For instance, through agricultural intensification, landscape aesthetics changes, but also do change recreational activities and opportunities. Spiritual enrichment, closely tight to both aesthetics and recreation, is in turn influenced by agricultural intensification as well.

In fact, our analysis showed the crucial role agricultural intensification, expansion, monocultures, and urbanisation play in impact on CES related to agriculture. However, by analysing in depth the interaction between land-use changes and impacts on CES we observe that the relatively less researched issues of land abandonment and protected areas incentives have comparable if not higher impact on CES. Land abandonment has a significant impact on co-creation of ecological values – which is also less studied– and may result in the breakdown of community of structures.

2.4.2. Services generating structures sustain cultural ecosystem services

By stressing the relevance of service generating structures, such as stonewalls, terraces, secular trees, or other material heritage elements, our data challenges the "intangibility" of these CES class – as previously argued by (Chan et al., 2012b; Daniel et al., 2012). In order to be functional, these structures need to be properly nurtured. We even found that the most tangible CES, e.g. knowledge on traditional crop varieties, still dominate the cultural agroecosystem research. Admittedly, less tangible aspects, such as spiritual enrichment, connectedness to nature, and social interactions, remain untapped, as corroborated in the work of Bostrom et al., (2012), Nahuelhual et al., (2014), and Tengberg et al., (2012). Not only they deserve further attention, but we also found that

most conflict rising from the impact of land-use changes in agroecosystems is on these intangible elements. Hence, it is important to approach studies on land-use changes and CES as whole, considering both tangible and intangible elements in their interaction.

2.4.3. Environmental conflict as a process

A main point of this paper has been to develop and populate a framework that emphasizes the dynamic nature of environmental conflict by distinguishing the stages of causes, outcomes/consequences and responses. It endorses an idea of latent problems in agriculture as actual conflicts (Jose and Padmanabhan, 2016), and understands the conflict as a process rather than a mobilisation event. The conflicts analysed in the review are mainly driven by increased market influences, enclosure and privatisation of natural resources. An example of the latter are narrow conservation incentives, which may exclude local community participation, and involve conflicting value languages between scientists, managers and local people, as Mastrangelo et al., (2015) and Martinez-Alier (2014) argue.

2.4.4. Farmers and communities as impacted stakeholders

Existing power asymmetries among different stakeholders in agricultural management and decision making increase tensions or lead to latent conflicts (Jorda-Capdevila and Rodríguez-Labajos, 2014; Jose and Padmanabhan, 2016; Mastrangelo et al., 2015; M. Reed et al., 2009). According to this, when land-use changes modify CES, they tend to affect most vulnerable people living on and from agricultural lands, like farmers and local communities. Conflicts about CES, either manifest or latent, should be part of an open discussion on issues of recognition, and eventually on a link of CES analysis with environmental justice (Schlosberg, 2013).

2.4.5. Responses to conflicts are not limited to mobilisations

In this discussion, land-use changes threatening agricultural heritage have particular relevance. Our study underlines heritage as a key connector of different and interrelated CES. Together, they ensure people's involvement with their natural and cultural environments, and the articulation of responses in face of unwanted developments. Responses to those conflicts are not restricted to mobilisation and resistance. In fact, ecosystem services generating structures, communities' enhanced participation are the most common responses to these conflicts, or as well as active promotion of multi-functionality (e.g. Allan et al., 2015; Biasi et al., 2015; Fibrank et al., 2013).

2.5. Conclusion

This study undertook a comprehensive literature review to analyse how conflicts due to land-use and management changes are related to CES at the global level. We have firstly identified and analysed different categories of CES, developing and articulating its taxonomy. This has been the base for an analysis of the interrelation between land-use changes, CES and environmental conflicts, the main aim of this paper.

Agroecosystems provide multiple CES that are closely interrelated with one another. Therefore, land-use changes can directly or indirectly impact CES in agriculture. Changing markets influences, enclosure and privatisation of natural resources, and conservation incentives, that still exclude community participation, appear as drivers of CES change. Land-use changes have a significant impact on culture and tradition in general, mainly at the expense of the most vulnerable living on and from agricultural lands, such as farmers and local communities.

As a consequence of these complex economic, social and environmental processes, environmental conflicts arise. Our review classified these conflicts, according to the types of causes, consequences and responses around them. Responses to conflicts occur with mobilisation and resistance being one among many reactions. In fact, revaluation

of ES-generating structure, as well as communities' enhanced participation, are the most common responses reported in the literature.

The literature on CES explicitly addressing conflicts is still quite narrow, and offers ample possibilities for further research, both in geographic scope and thematically. This is certainly a limitation of the paper, as it has been restricted to knowledge already available in the scientific literature. In this respect, this review does not cover the whole spectrum of possible environmental conflicts related to CES in agroecosystems.

Still, we believe that insights here offered entail a contribution of ES research and a base for further investigations and findings on the practical level. First, it offers a global perspective on a topic that so far has been addressed mostly through case-studies. By providing a comprehensive map of what the literature achieved in relation to the effects of land-use changes in agriculture on CES and related conflicts, we also understand what it has failed to address so far- the complex relationship between land-use changes, CES and different stages of environmental conflicts.

In that way, we highlight the relevance of including conflicts into further ES research, and the need for better understanding existing power asymmetries among stakeholders. Such asymmetries generate conflict and stoke latent conflicts regarding CES and this issue should be further recognised in agricultural planning and management.

This is further important for understanding the complex social, ecological, and economic processes in agroecosystems behind land-use changes as drivers, with direct or indirect impact on CES, and environmental conflicts that might escalate between different stakeholders as consequences of these changes and inequities.

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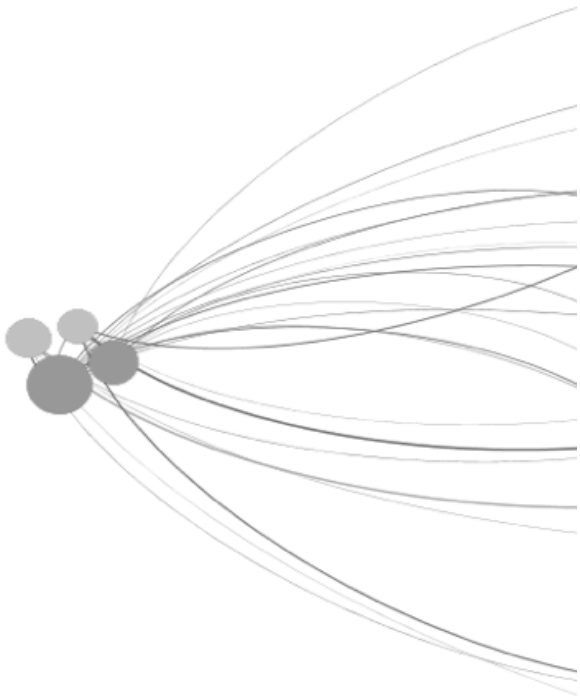
Chapter 3



3. Evaluation of perceived changes in land-use and cultural ecosystem services in rural Bulgaria and their policy implications

Abstract

Coupled social-ecological farming systems contribute to the creation of multiple cultural ecosystem services (CES) such as rural identity, belonging, connectedness to nature, and memories. Yet, cultural ecosystem services shaped by the interaction between farmers and their environment are becoming increasingly distorted due to accelerating land-use changes, including intensified agriculture, urbanization, and land abandonment. This study aims for a better understanding of the impacts of land-use changes on cultural ecosystem services to aid related policies. The study focuses on eleven rural communities in four regions in Bulgaria influenced by several policy programs affecting land use. The empirical evidence relies on a workshop with different stakeholder groups, followed by a survey with farmers and community residents. Results show perceived importance of cultural ecosystem services across stakeholders, especially in the form of traditional agricultural practices and knowledge associated with farming activities. Moreover, the perceived importance of these CES increased in the face of disruptive land-use changes like mining and urbanization. The research furthermore reveals an enhanced importance of rural identity and connectedness to nature by locals when agricultural intensification and development of rural areas occur. The study provides insights for more holistic land-use policies at different governance scales that consider the critical importance of CES for rural people and their livelihoods, preservation and nourishment of rural areas, and inclusive participation of local stakeholders in land-use decision-making.

Keywords: Social-ecological farming system; Cultural ecosystem services; Land-use change; Policy

3.1. Introduction

Small-scale farming systems represent a primary source for rural livelihood for billions of households worldwide (Hanspach et al., 2014; Plieninger et al., 2014; Sumner et al., 2010). In addition to being a cornerstone of global food security, small-scale farming systems play an essential role in providing economic, environmental, and cultural benefits that are crucial for human well-being (Häyhä and Franzese, 2014; Tancoigne et al., 2014). Such benefits –which include recreation, maintenance of soil fertility, and provision of food or fiber– are referred to as ecosystem services (MEA, 2005).

The ecosystem service framework has proven valuable for systematic assessments of the multifunctionality of farming systems (Allan et al., 2015; Ribeiro Palacios et al., 2013). Ecosystem service assessments support the integration of knowledge across scientific, local, and traditional domains (Daniel et al., 2012a; Gould and Lincoln, 2017; Lovell et al., 2010). The ecosystem service framework is also commonly used in collaborative and participatory investigations, as it facilitates common understanding of human-nature relations and differences in social preferences (Martín-López et al., 2012).

Accordingly, the framework can help to overcome social conflict and foster collaborative environmental policy design (Berthet et al., 2016; Langemeyer et al., 2018; Leventon et al., 2017; López-Santiago et al., 2014). The ecosystem service framework enhances coherence between land-use, spatial planning and policy making (Fürst et al., 2017). However, much of the existing analysis focuses on ecosystem services quantification and mapping (Fagerholm et al., 2016; Plieninger et al., 2013). Concrete mechanisms connecting ecosystem services with land-use change and its drivers are less studied (Tilliger et al., 2015), which may hinder the framework's potential for guiding policy making.

Ecosystem services are particularly relevant for traditionally managed small-scale farms, which are coupled social-ecological systems that involve strong relationships between people and the environment (Hartel et al., 2014). These farming systems play an important role in conserving rural traditions, promoting biodiversity, and creating unique landscapes (Fischer et al., 2012). In many parts of Europe, however, farming

systems are undergoing rapid land-use changes (Möckel, 2015; Turpin et al., 2017) that jeopardize the delivery of ecosystem services, resulting in negative impacts such as biodiversity loss, food insecurity, poverty, and marginalization of rural populations (Dorresteijn et al., 2015; Giannakis and Bruggeman, 2015; Lambin et al., 2001; Tieskens et al., 2017).

Furthermore, rapid changes in the environment erode the cultural bonds that tie rural communities to agricultural landscapes (Hilpold et al., 2018; López-Santiago et al., 2014; Mauerhofer et al., 2018; van Zanten et al., 2014b). This loosening of cultural bonds is associated with the loss of many cultural ecosystems services (CES), defined inclusively as ecosystems' contributions to the non-material benefits that arise from human–ecosystem relationships (Chan et al., 2012b).

CES are of significant importance for both science and policy (Gobattoni et al., 2015; Hartel et al., 2014). Firstly, CES may motivate environmental stewardship and engagement in traditional agricultural activities that, while rendering low economic return, sustain a variety of other ecosystem services for the wider society (Langemeyer et al., 2018; Soy-Massoni et al., 2016). Secondly, the loss of CES may reduce recreational opportunities, communities' place identity, as well as its emotional and intellectual sustenance (Chan and Satterfield, 2018; Gould et al., 2019; IPBS, 2018). CES delivery is therefore highly sensitive to the dynamics of land-use changes (Kristensen, 2016; Martín-López et al., 2012; Quétier et al., 2012; Rasmussen et al., 2018).

Land-use changes causing loss of ecosystem services include deforestation, intensified farmland production, or urban settlement expansion (Foley et al., 2005). Such changes are primarily driven by the short-term maximization of economic value (Daugstad et al., 2006; Pretty et al., 2010). Moreover, a combination of policies at different scales (regional, national, and European) incentivize changes like land abandonment and urbanization processes (de Groot et al., 2010; Gutman and Radeloff, 2017; Möckel, 2015; Turpin et al., 2017).

However, to date the influence of land-use policies on CES remains understudied (Carvalho-Ribeiro et al., 2016; Olmeda et al., 2014; Ribeiro et al., 2015; Fagerholm et

al., 2016; Pedroli et al., 2016; Quintas-Soriano et al., 2016), and only a few investigations report the extent to which these concepts are interrelated (e.g. Milcu et al., 2013; Tilliger et al., 2015). Furthermore, CES of farming systems are insufficiently recognized in general, which may result in policies that are unsuited to rural interests and needs (*cf.* Jones et al., 2016; Leventon et al., 2017; Martín-López et al., 2012).

In Eastern Europe broadly, and Bulgaria in particular, land-use changes often reflect the transition from socialist to post-socialist land-use policies (Donald et al., 2002). Driven by policies stemming from both the European Union and national governments, this transition has two distinct effects. On the one hand, the implementation of subsidies promotes economic efficiency of farms through cash crops but often fails to sustain diverse ecosystem services, resulting in increased land abandonment (Hartel et al., 2014; Levers et al., 2016). On the other hand, land privatization policies and the intensification of agricultural practices lead to more homogenous farming landscapes that adversely affect village life and erode the provision of CES (Davidova and Buckwell, 1994; Dobrev et al., 2014; Fredriksson et al., 2017; Todorova, 2016).

The overall aim of this study is to trace relations between land-use changes and the importance of CES in small-scale farming systems. Using the case of rural Bulgaria, we study (a) how CES are perceived and valued by local stakeholders, and (b) how the CES values are influenced by different land-use changes – related to different policy programs in the country.

The interrelation of rural land policies, land-use changes, and CES is relevant to land-use decision making in Eastern Europe and beyond. The paper thus contributes to discuss how the perspective and identity of local people support sustainable land-use and management practices, maintenance of local culture and traditions, and preservation of rural regions (Hartel et al., 2014). Ultimately, the paper situates CES as a strong element to be considered in land-use policy and planning (Fischer and Eastwood, 2016; Plieninger et al., 2013). The extent to which these land-use changes were detected by farmers and communities was not studied prior to this research.

3.2. Case study

3.2.1. Land use policies affecting rural Bulgaria

Bulgaria is rich in traditional farms and grazing lands, which were state-owned in socialist times and used as a common land until 1989 (Dobrev et al., 2014; Loulanski and Loulanski, 2014). Since 1991, when the Land Law was implemented in Bulgaria, traditional farm land has undergone processes of privatization, fragmentation, and trade liberalization (Rangelova and Vladimirova, 2017). The Land Law resulted in two contrasting uses of agricultural land: self-sufficiency small parcels of 1-2 ha, and highly intensive parcels of over 100 ha that produce mainly for the market (Bulgarian Government, 2002). As an outcome of the Land Law, large-scale farming expanded and agricultural practices intensified, resulting in the decline of traditional land-use practices and the abandonment of traditionally important land (Feranec et al., 2009; Gutman and Radeloff, 2017). Today, while only 1% of farms are large producer entities, these manage 70% of the total 'useable agricultural area'(Rangelova and Vladimirova, 2017).

Moreover, the Energy and Energy Efficiency Act (EEEA) was implemented in 1999, as a special strategy to ensure both the long-term ability of the economy to compete in international markets and to increase GDP (World Bank, 2005). This is why further market liberalization and reform in the energy and transport sectors were (and still are) of critical priority for Bulgarian economic development and growth (BMAFF, 2010). Land-use changes related to EEEA are mining activities, new power plants, and transport infrastructure (World Bank, 2005).

Following the national land reform and the EEEA, three main agricultural policy programs were implemented in Bulgaria (Table 3.1). The first is a pre-accession to the European Union program called Special Accession Program for Agriculture and Rural Development (SAPARD). SAPARD is based on investments in agricultural holdings, aimed at improving the processing and the marketing of agricultural products, and focused mainly on development and diversification of economic activities in rural areas (Rangelova and Vladimirova, 2017). Significant land-use changes proposed in SAPARD are renovation and further development of agriculture, including the

technological modernization of the agricultural and rural sector, particularly targeting small-scale farmers (BG, 2010; Rangelova and Vladimirova, 2017; SFA, 2019).

When Bulgaria joined the European Union (EU) in 2007, the second policy program implemented was the Common Agricultural Policy (CAP). CAP's first pillar is direct payments aimed at enhancing the competitiveness of agricultural products and increased food-safety and quality requirements. Payments in Bulgaria are based on hectares of cultivated land. In order to facilitate competitiveness, small-scale farmers were excluded from so-called "greening" rules, or the obligation to meet certain environmental standards designed to ensure that farms are managed in a sustainable way and help contribute to the EU's efforts to tackle climate change, biodiversity loss, and soil quality (BG, 2007; CAP, 2014). Thus, land-use changes associated with CAP's first pillar include agricultural intensification, homogenization, and extensification that –without the greening rules– can extend over grasslands, trees, and hedges that were beneficial for biodiversity conservation under traditional farming practices (EC, 2013).

The CAP's second pillar is the Rural Development Program (RDP), involving both national and European legislations. RDP priorities are: to improve the competitiveness of the agricultural sector and farm viability, to ensure quality food production; to preserve ecosystems and the sustainable use of natural resources in agriculture, forestry, and food processing; to foster the economic and social development of rural areas by creating jobs through tourism, reducing poverty, and improving social inclusion and quality of life. Given the highly variable farm sizes in Bulgaria, a specific program was created to increase market competitiveness of the small farms (CAP, 2014).

Strongly associated with traditional farming, small-scale farms experience directly the effect of these land-use and management changes stemming from national and European policies (Gutman and Radeloff, 2017; Schröder, 2008). In combination, these policies imposed important pressures to small-scale farms and agricultural landscapes.

Table 3.1. Reforms, acts, agricultural policies and implications in land-use and management changes.

Year	Policy	Land-use changes implications
1991	Land Law	Land fragmentation and privatization; Land de-collectivization; Self-sufficiency mall parcels 0.1-2 ha; highly intensive parcels > 100 ha
1999	Energy and Energy Efficiency Act (EEEA)	Mining; New power plants; Transport infrastructure; Infrastructural facilities
2003-2006	Special Accession Program for Agriculture and Rural Development (SAPARD)	Development of rural areas; Afforestation/forestry; Preservation of tangible rural heritage; Tourism; Modernization of rural infrastructure; Protected areas; Intensification
2007-2013; 2014-2020	CAP first pillar Direct payments	Protected areas; Ecological intensification; Extensification; Intensification; Market oriented cash crops monoculture; Market land management orientation
2007-2013; 2014-2020	CAP second pillar Rural Development	Land management based on scientific knowledge; Land and forest preservation; Modernization; Forestation; Industrialization; Market land management orientation; Transport infrastructure; Construction and infrastructure; Use of technology; Transport and energy infrastructure; Rural heritage preservation; Engagement of local stakeholders in rural development programs

Source: Own elaboration based on policy documents from the Bulgarian State Fund Agriculture – Paying Agency, Information System for Management and Monitoring of EU funds in Bulgaria, and the World Bank (ISMM, 2019; SFA, 2019; World Bank, 2005).

3.2.2. Land use changes in the study regions and communities

In order to understand the relation between perceived land use changes and CES, this study focused on eleven communities in four Bulgarian regions (Fig. 3.1) characterized by actual land-use changes documented in official sources (Table 3.2).

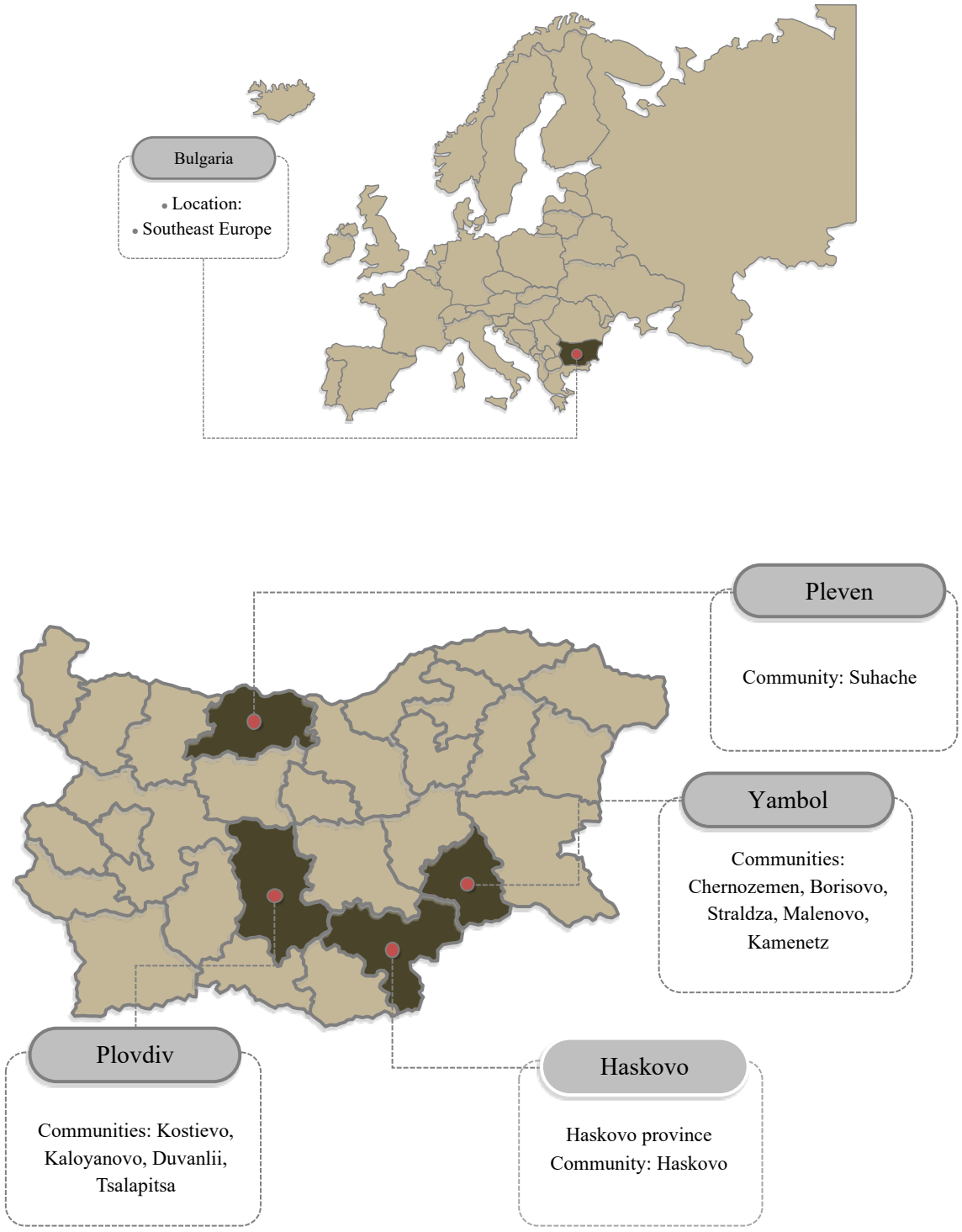


Fig. 3.1. Case study regions and communities in Bulgaria.

Table 3.2. Mayor agricultural and land-use changes characteristics.

Region	Municipality	Community	Farming systems	Land-use changes
Plovdiv	Maritsa	Kostievo	Crop fields, paddy fields, grasslands, traditional irrigation systems, historical sites	Urbanization, small-scale sand extraction
	Kaloyanovo	Kaloyanovo	Crop fields, mosaics	Advanced abandonment, development of rural areas
		Duvanlii	Crop fields, mosaics	Advanced abandonment, development of rural areas
	Rhodopi	Tsalapitsa	Diverse heterogeneity mosaics, grasslands, orchards, paddy fields, meadows	Disposal of waste materials
Haskovo	Haskovo	Haskovo	Crop fields	Advanced urbanization and transportation systems, large-scale mining
Yambol	Elhovo	Chernozem	Crop fields, grasslands, agroforestry	Afforestation, forestry, timber production, mining
		Borisovo	Crop fields, grasslands, fishponds	Forestry and afforestation
	Straldzha	Straldzha	Crop fields, grasslands	Intensive agriculture and grazing; ecological intensification, and increasing irrigation systems
		Malenovo	Crop fields, grasslands	Intensification, extensification, ecological intensification, irrigation systems
		Kamenets	Crop fields, grasslands, vineyards	Large-scale mining, dam construction
Pleven	Cherven Bryag	Suhache	Crop mosaic fields, semi-natural landscapes	Military base, tourism expansion

Own elaboration based on Bulgarian Cadastral Information System and Information System for Management and Monitoring of EU funds in Bulgaria (BCA IS, 2019; BME, 2014; SFA, 2019).

The first study area is the central part of the Plovdiv region. The region is characterized by agricultural plains and urban areas. Agriculture in the region comprises rice growing in the Maritsa municipality (BNSI, 2018a; Feranec et al., 2009). Within the region, the Kostievo community is characterized by land-use changes driven by urbanization and sand extraction activities. Widespread land abandonment is present in both Kaloyanovo and Duvanlii villages. In contrast, the Tsalapitsa community preserves diverse and small-scale traditional farms. However, a growing landfill for the disposal of waste materials, with 239,000 square meters, is situated in the Tsalapitsa village (BCA IS, 2019).

The second study area is the Yambol region. The fertile soils and mild climate sustain a long tradition of vine and fruit-growing in this region. Many traditional rituals and crafts are preserved, as expressed in traditional holidays, gatherings, and songs related

to harvesting (BNSI, 2018a; Bulgarian Government, 2018a). Within the region, Chernozem community is characterized by high-quality agricultural soils, while Borisovo village is characterized by small-scale farming plots, lakes, and fishponds. However, afforestation, timber extraction and mining have begun to dominate as an important economic activity of the region (BCA IS, 2019; BME, 2014). Elsewhere in the region, the Malenovo and Straldzha communities experience both agricultural intensification and expansion and ecological intensification. Irrigation infrastructure like the construction of water dams is also a common land-use change in communities such as Kamenetz village, where there is also a large-scale sand mine (BCA IS, 2019).

The third study area is the Pleven region, characterized by a predominantly traditional agricultural landscape. However, the area holds huge reserves of natural oil and gas that generate the largest economic income in this region due to petroleum extraction. Further, the village of Suhache has experienced increased tourism and is situated near a clay mine and a foreign military base (BCA IS, 2019; Bulgarian Government, 2018b).

The fourth study area is the region of Haskovo, which is crossed by the most important terrestrial transport route connecting Europe with Asia. Although, the main agricultural activity in Haskovo is tobacco growing, mining and chemical industries dominate the local economy (Bulgarian Government, 2018c). Although the Haskovo community still preserves traditional agricultural activities, it is characterized by advanced urbanization (BCA IS, 2019; BME, 2014).

3.3. Methodology

In order to study the perceived importance of CES due to land-use changes in social-ecological farming systems (Fig. 3.2), it is understood that social, environmental, and economic components are interrelated and shaped by different policies (Fischer et al., 2015; Hartel et al., 2014; Rega et al., 2019). Social-ecological systems are characterized by the direct relationship between people and ecosystems, in which people modify natural resources and in turn obtain different benefits, e.g. ecosystem services (Bernués et al., 2016; Fischer et al., 2015). Furthermore, social-ecological farming systems are

very complex and therefore characterized by numerous elements: low intensity traditional landscapes; heritage systems such as historic rural architecture; natural landscapes like water bodies and land resources; semi-natural landscapes such as agroforestry; and mosaic elements containing both grasslands and cultivated farmland (Hanaček and Rodríguez-Labajos, 2018; Loos et al., 2016). These elements sustain ecosystem services co-created with and obtained from the environment (Andersson et al., 2015).

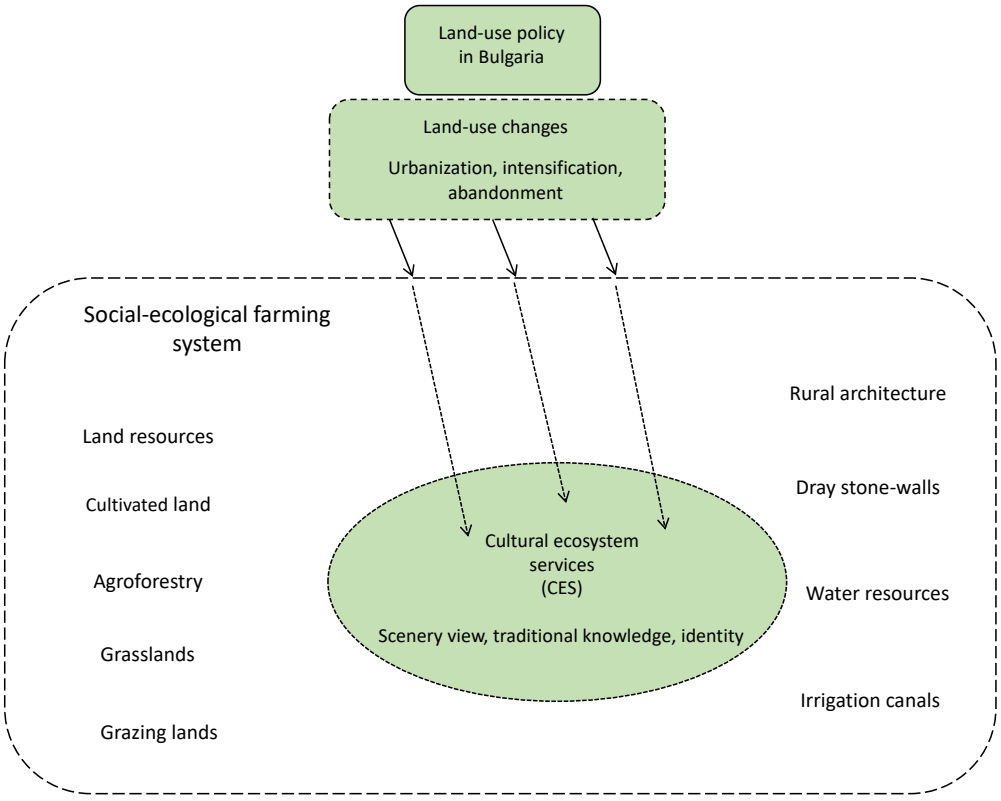


Fig. 3.2. Graphical representation of the conceptual framework used to assess local people´s attitude towards CES by linking the perceived changes in land-use and the perceived importance of CES; in order to emphasize human-nature interaction and the relevance of CES in policy designs.

3.3.1. Participatory workshop

A multi-stakeholder workshop approach (Leventon et al., 2017, 2016) was adapted to identify ecosystem services and the changes they were undergoing. The workshop addressed CES and their changes at the regional scale (Fig. 3.3).

Prior to conducting the workshop, stakeholders from the study regions with a broad perspective of developments at the Bulgarian level were identified based on an extensive review of grey literature review. Following the review, snowball sampling was performed. Initially identified stakeholders were asked to identify other relevant stakeholder groups and individuals living within the selected case study areas. All stakeholders were invited to attend the workshop. During the workshop itself, participants were divided into three main groups: ecologists and members of local NGOs (n=6); scientists, agricultural technicians, and governmental representatives (n=4); and local farmers and residents (n=5). The reason the participants were divided into groups was to maintain the workshop dynamics, timing, and to reduce the influence of power relationships between different participants on the study outcomes (Leventon et al., 2016).

The first goal of the workshop was to identify ecosystem services provided by the case study areas, using a structured exercise. To this end, participants were asked to reflect on how rural landscapes and farming systems contribute to their well-being and what benefits they obtain from rural landscapes and farming systems. In addition, stakeholders were given the opportunity to express their opinion in written form to enable the possibility for marginalized individuals or groups to indicate issues not otherwise stated. Written responses and notes taken during the discussion were used to code participant responses into general ecosystem services categories.

The second aim of the workshop was to identify how CES change. Using a list of 21 CES based on Hanaček and Rodríguez-Labajos (2018) (Table 3.4), each stakeholder group was asked to determine whether and how the significance of CES has changed over the last 50 years, according to their best knowledge. Consolidated opinions by each group were generalized on an ordinal scale (-3 = significant decrease, -2 = moderate decrease, -1 = slightly decrease; 0 = constant, 1= slight increase, 2 = moderate increase, 3 = significant increase). In addition, notes taken for each group captured the reasoning for the perceived changes.

All workshop data and observations were transcribed in Microsoft Word and translated from Bulgarian to English, while descriptive statistics were conducted in Microsoft Excel.

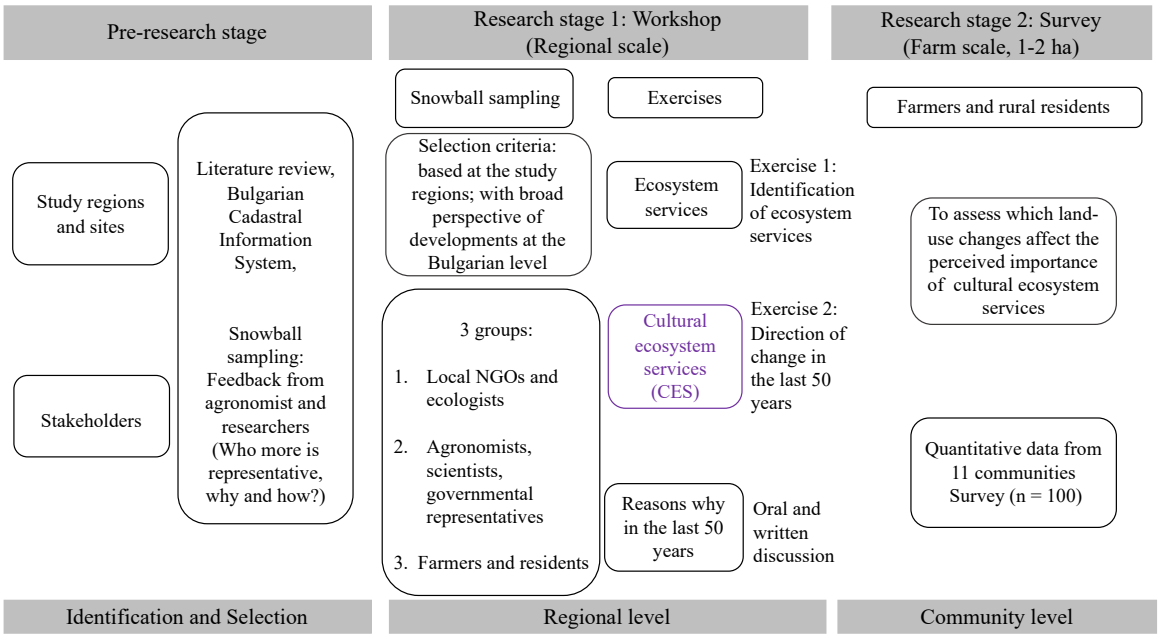


Fig. 3.3. Methodological outline. *Data was collected by means of a participatory workshop and a survey between October 2017 and April 2018.*

3.3.2. Survey

In order to identify land-use changes and related differences in the perceived importance of CES, a survey was conducted with local farmers in eleven communities across the case study regions (Figs. 3.1 and 3.3). Structured interviews were conducted in collaboration with a key stakeholder from each community. The respondents (n=100) were selected with regard to their engagement within small-size farms (1-2 ha) and included: i) farm holders or farmers with full-time employment on farms, ii) farmers' family members, iii) seasonal farm workers, and iv) residents for whom farming is their subsidiary occupation (Table 3.3). The age of interviewees ranged from 22 to 77 years (average 48), with approximately sixty percent men and forty percent women. The survey aimed to reveal the importance of both CES and ongoing land-use changes at the farm scale as perceived by respondents.

Table 3.3. Surveys conducted in 11 communities in Bulgaria and their social-agro-economic characteristics.

Municipality	Community	Total rural[1] population	Total number of farm units per size[2]	Total amount agricultural areas according to farm size[2]	N survey			Agricultural area covered by surveys farmers[3] only (ha)	Agricultural areas surveyed (%)
					F[3]	R[4]	Total		
South-Central: Plovdiv province									
Maritsa	Kostievo	1828	450	575.77	18	2	20	276	47.93
Kaloyanovo	Kaloyanovo	2275	46	81.88	4	1	5	68	83.04
	Duvanlii	762	11	20.59	6	0	6	10	48.56
Rhodopi	Tsalapitsa	3989	82	106.59	8	3	11	25	23.47
South-Central: Haskovo province									
Haskovo	Haskovo	8008	271	422.76	2	6	8	80	18.92
South-East: Yambol province									
Elhovo	Chernozem	94	257	362.66	10	0	10	152	41.91
	Borisovo	85	352	493.47	6	0	6	127	25.73
Straldzha	Straldzha	5720	1342	1948.58	6	2	8	64	3.28
	Malenovo	292	603	857.8	6	1	7	9	1.04
	Kamenets	421	431	607.11	6	0	6	39	6.42
North Central: Pleven province									
Cherven Bryag	Suhache	671	442	786.46	2	11	13	207	26.32

[1]Total of agricultural holders with full-time employment and residents that include family members, non-family members (e.g. seasonal farm workers), other residents with subsidiary farming occupation or supplementary related to farming activities (BMAFF, 2010; BNSI, 2018b)
[2]Only farm sizes according to our surveyed sample of 1-2 ha are listed (BCA IS, 2019; HRODA, 2019; PARO, 2019)
[3]Total holders/farmers
[4]Total residents

Respondents were first asked how they perceived the importance of specific CES, using a Likert-scale ranking from 1 (low) to 10 (high). As in the workshop, the structured survey used the list of 21 CES based on Hanaček and Rodríguez-Labajos (2018). To each of the CES on the list, a narrative was provided which explains each of the CES categories (Table 3.4). However, the descriptions used, have some limitations. For instance, other studies show how the category of aesthetics includes not just scenery, but pleasing animals, plants and objects. The word 'beautiful', tends to connote visual aesthetics, but also audio, and smells (Echeverri et al., 2019). Furthermore, some respondents might relate to "belonging", but others more to "attachment", "connection" to a village (Table 3.4; Q06, Q07, Q16). It should also be acknowledged that some terms used in the survey, such as "emotional bonds" or "spirituality" might have

different significance according to different geographical regions and social groups (e.g. peasants, farmers).

Table 3.4. List of 21 CES categories used in the survey.

Cultural ecosystem services (CES)	C	On a scale from 1-10, with **1 being not important** and **10 being very important**, please select if your farm and the surrounding area:	1	2	3	4	5	6	7	8	9	10
Aesthetics	01	Has beautiful scenery										
Artistic creation	02	Has appeared in paintings, movies, novels or other forms of popular or traditional art										
Traditional local varieties and breeds	03	Contributes to biological and cultural diversity of the place, such as genetically diverse crops and local languages										
Celebrations	04	Is a place for celebrations such as harvesting and food festivals, traditional ceremonies or religious events										
Co-creation of ecological values	05	Helps to care the health of the soil, the environment and the people										
Connectedness to nature	06	Helps you to build a relationship and connection to nature										
Sense of place - belonging (Identity)	07	Makes you feel belonging to the village										
Cultural transmission	08	Serves to sustain knowledge, values and believes between and within generations										
Education	09	Is a learning and teaching resource about land management and food production										
Heritage – tangible	10	Contains elements of historic rural architecture such as stone walls, traditional houses or churches										
Heritage – intangible	11	Is related to family traditions and/or maintaining oral traditions such as languages										
History and historical memory	12	Represents the history and historical memory of your place										
Inspiration	13	Inspires artistic creativity										
Outdoor Recreation & Cultural hunting	14	Is a place for recreation and/or hunting										
Physical, intellectual, emotional sustenance	15	Is a place for physical, emotional and intellectual nourishment for your body and mind										
Place shaping and attachment	16	Creates for you an emotional bond with your place										
Social interaction	17	Is a place for social interactions, which helps you to connect in a meaningful way with other people										
Spiritual enrichment	18	Is related to local stories, myths or any other believes, including spiritual ones										
Tourism	19	Is an agritourism attraction or visited by many tourists										
Traditional agricultural practices & Small-scale farming	20	Contributes to retain traditional rural lifestyle and agricultural practices										
Traditional knowledge	21	It is a place where traditional knowledge is maintained and shared										

A 10-point ranking was chosen in order to allow for sufficient variance and a high degree of measurement precision (Wittink and Bayer, 2003). Secondly, the respondents were invited to evaluate the occurrence of land-use changes, on a scale from 1 (low) to

5 (high), in the area where their farms are situated or in the area where they live. For this purpose, 19 categories of land-use changes were used, also based on Hanaček and Rodríguez-Labajos (2018) (Appendix 3.B).

Descriptive statistics summarizing the results of the survey provide a basis for sizing the relevance of CES and land-use changes perceived at the community level. In the results the presentation is combined with more qualitative impressions and comments about the same processes obtained during the workshop.

Linear regression analysis of the survey data determined which perceived land-use changes (the independent variables) had a significant association with the importance given to CES (the dependent variable). For the linear regression analysis, *IBM SPSS (version 25)* statistical software was applied.

In order to understand the relationships between perceived land-use changes and importance of CES of the survey data, social network analysis was applied using *Gephi (version 0.9.2)* software. Particularly, the network analysis included: coefficients, relationships (positive or negative), and a high significance (based on t value) obtained with the linear regression; measurement of influence of independent variables (land-use changes) on the dependent variables (importance of CES); measurement of centrality or the influence of land-use changes on importance of CES based on their position within the network; betweenness centrality measurement or how important land-use change variables are for CES variables traversing the network; modularity statistic that placed individual variables into an aggregated group or cluster based on the influence of land-use changes and the affected importance of CES; and average path length measurement that provided insight into the general structure and connectedness of the network involving the importance of CES and land-use changes.

3.4. Results

3.4.1. Importance for cultural ecosystem services and the direction of change

Regional stakeholders identified ecosystem services across all major categories, including cultural, provisioning, regulating, and supporting services. Stakeholders especially recognized CES such as aesthetics of traditional landscapes, motivation, language, community spirit, festivals, traditional poems and stories. Unsurprisingly, CES were particularly relevant for farmers and rural residents, but the importance given by agricultural technicians, scientists, and governmental representatives is noteworthy (Fig. 3.4). Ecologists and NGO representatives putting a stronger than emphasis on provisioning services.

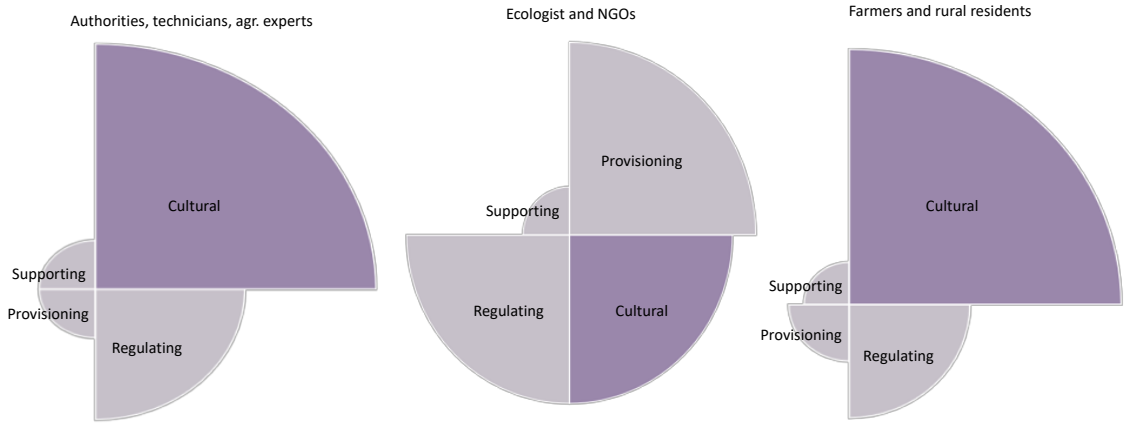


Fig. 3.4. The relevance of ecosystem services provided by social-ecological farming systems in Bulgaria. *Results articulated by different stakeholder groups during a participatory workshop conducted in 2017 and coded into general ecosystem services categories.*

The results of the survey suggest that place attachment, sense of place and belonging, connectedness to nature, and cultural transmission are the most important CES for small-scale farming systems (Fig. 3.5). Locals highlight the importance of traditional small-scale practices in relation to traditional knowledge, despite (or because of) the "modernization" processes within the post-socialist transition. Furthermore, local farmers and people living in the rural study areas strongly relate farming systems with enjoyment of beautiful scenery (aesthetics) and recreation. Along with social

interaction, traditional celebrations related to farming are also highly valued by rural communities.

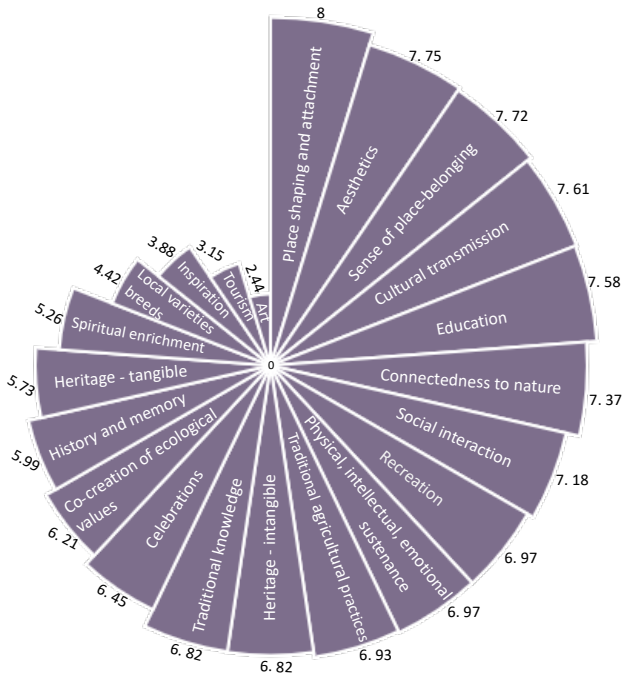


Fig. 3.5. The perceived importance of cultural ecosystem services provided by traditional small-scale farms. *Based on 1-10 Likert scale survey by respondents at the community farm level (2017/2018), where 1 means 'not important' and 10 means 'very important'. Results based on average values of ratings.*

The importance of these CES, though, is changing (Fig. 3.6). Stakeholders in the workshop were well-aware of the relevance of rural place-attachment, which is also the CES with the most significant increase in perceived importance. Rural residents explained this increase attachment along with shifting personal life patterns: *"Selo [village] is who we are* (identity)*. I work in the city, at the university, but I live in the village, I also work on the land and stay with my family [...]. Selo is a beautiful place to be and it is nice there* (rural nourishment and aesthetics)*."*

Similarly, a positive change in relevance was identified for celebrations, connectedness to nature, and history and memory of rural areas, in a context of declining opportunities to enjoy these benefits. Moderately positive changes were noted for physical, emotional, and intellectual sustenance; spiritual enrichment; and intangible heritage like oral traditions related to farming. Described in the words of a participant in the residents and

farmers group: *"I remember my grandfather growing tobacco in the mountains [near Rodhopi], and me playing and swimming in the river. We would go from our part of the mountain [Rodhopi] to another [Haskovo] by boat. Now, few tobacco* [traditional] *growers are left, and you have to pay to a private agency to enter the river."*

The most negative change in terms of CES relevance in Bulgarian farming systems was related to traditional agricultural practices, small-scale farming, and diverse forms of traditional knowledge related to farming activities. *"Regulations and subsidies do not improve the land; neither in terms of biodiversity nor socially. All has been abandoned. It is too much work and the land has been sold off for a couple of coins",* a representative of farmers said. A farmer connected this process with diminished decision power over land use: *"We do not decide how to manage the land anymore [...]. They own the land; farmers are just workers."* Furthermore, a representative of the group of ecologists and NGOs stated: *"We conduct research on bird nesting based on traditional rural roofs. Local people's knowledge has always contributed to biodiversity conservation. That should be recognized and encouraged*, *because it helps to recover local biodiversity loss."*

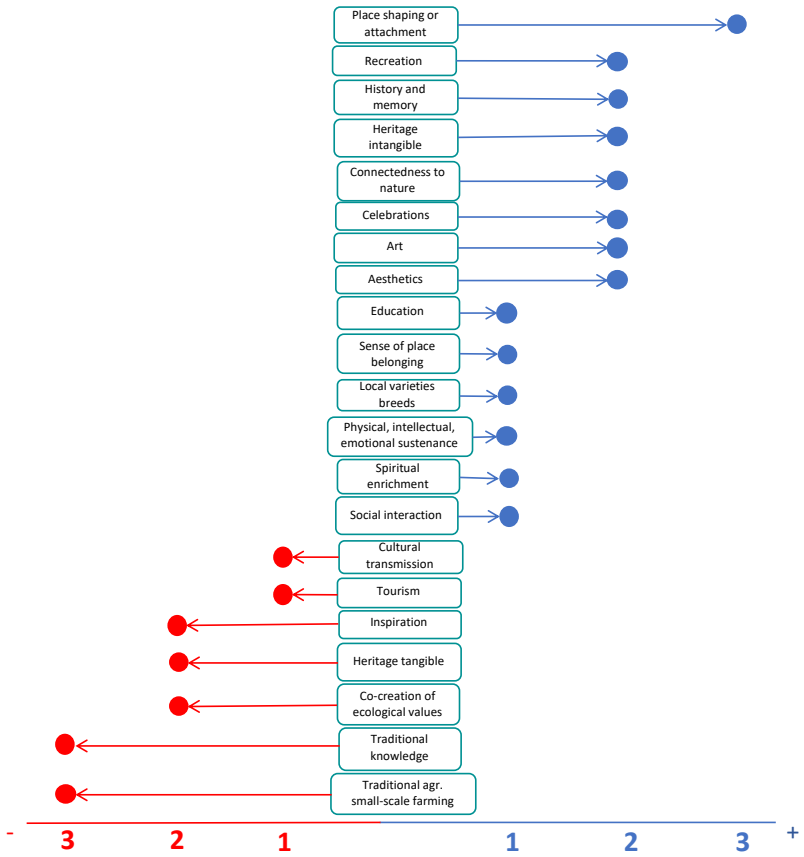


Fig. 3.6. Direction of changes in the relevance of cultural ecosystem services at the regional level. *Results based on the awareness articulated by different stakeholder groups during a participatory workshop conducted in 2017.*

3.4.2. Impacts of land-use changes on the perceived importance of cultural ecosystem services

Frequent land-use changes detected in the studied communities are agricultural intensification, expansion, and monocultures (Fig. 3.7). Few respondents reported changes in agricultural land-uses in relation to new transport infrastructure and mining activities.

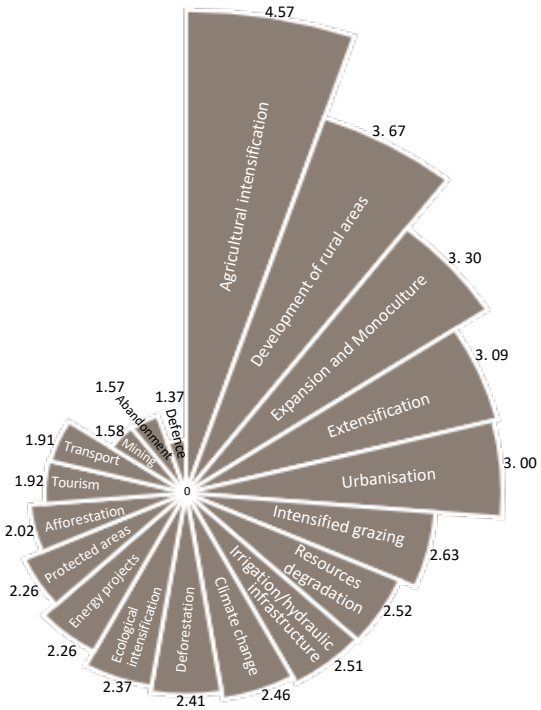


Fig. 3.7. Land-use and management changes perceived at the community level. *Based on 1-5 Likert scale by respondents at the community level (2017/2018), where 1 means 'not likely' and 5 means 'extremely likely' to be present in the whole landscape area where respondents' farm is situated or in the area where respondents live. Results based on average values of ratings.*

The network (Fig. 3.8) reveals two broad types of significant relationships and associations: land-use changes with all-encompassing effects on CES (in the center of the network), and land-use changes with effects in concrete CES domains (in the outside part).

Mining, an activity promoted by the Bulgarian EEEA since 1999, is the land-use change with the strongest influence on the perceived importance of CES. The importance or value for CES increases when degrading mining activities take place. Other land-use changes that positively correlate with the importance for CES are transport, the creation of protected areas, tourism expansion, energy projects, intensification of agricultural practices, the abandonment of farmland, and urbanization processes. These land-use changes were strongly promoted by SAPARD from 2003-2006, and today are especially promoted by CAP's second pillar or the rural development program. When these land-use changes occur, an increase in the importance of tangible and intangible agricultural

heritage, history and memory of rural areas, spirituality, recreation, traditional knowledge, and inspiring moments is observed.

Additionally, the importance of place shaping and attachment, small-scale farming agricultural practices, and sense of place and belonging are also positively correlated in the presence of monocultural expansion – a land-use change related to Common Agricultural Policy's market oriented and industrialized agricultural production. Meanwhile, aesthetical and overall physical, emotional and intellectual sustenance of rural communities are positively correlated to intensification – a keystone of the first pillar of the Common Agricultural Policy; through which economic agricultural development and payments schemes based on area of agricultural land are actively promoted. Similarly, a positive correlation of importance of connectedness to nature is identified with development and modernization of rural areas, which is a Common Agricultural Policy scheme designed for rural agri-business development.

Conversely, the importance of CES negatively correlates in association with military projects in the studied communities. Further, unlike intensified cultivation, intensified grazing is negatively associated with the perceived importance of place identity and sense of place or belonging. The importance for ecologically relevant CES, such as local varieties and breeds, and their transmission across generations negatively correlate with land abandonment, urbanization processes, and transport– a land-use change related to Common Agricultural Policy' schemes promoting improvements and building of rural transportation infrastructures. This latter land-use change, however, positively correlates with the perceived importance of place shaping and attachment and connectedness to nature. Another important factor that negatively correlates with the perceived importance of enjoyment of scenic qualities of rural landscape, is the degradation or overuse of natural resources such as land and water. Such resource degradation also negatively correlates with the importance of sense of place and belonging to place, understood here as the emotional bonds between individuals and the surrounding environment.

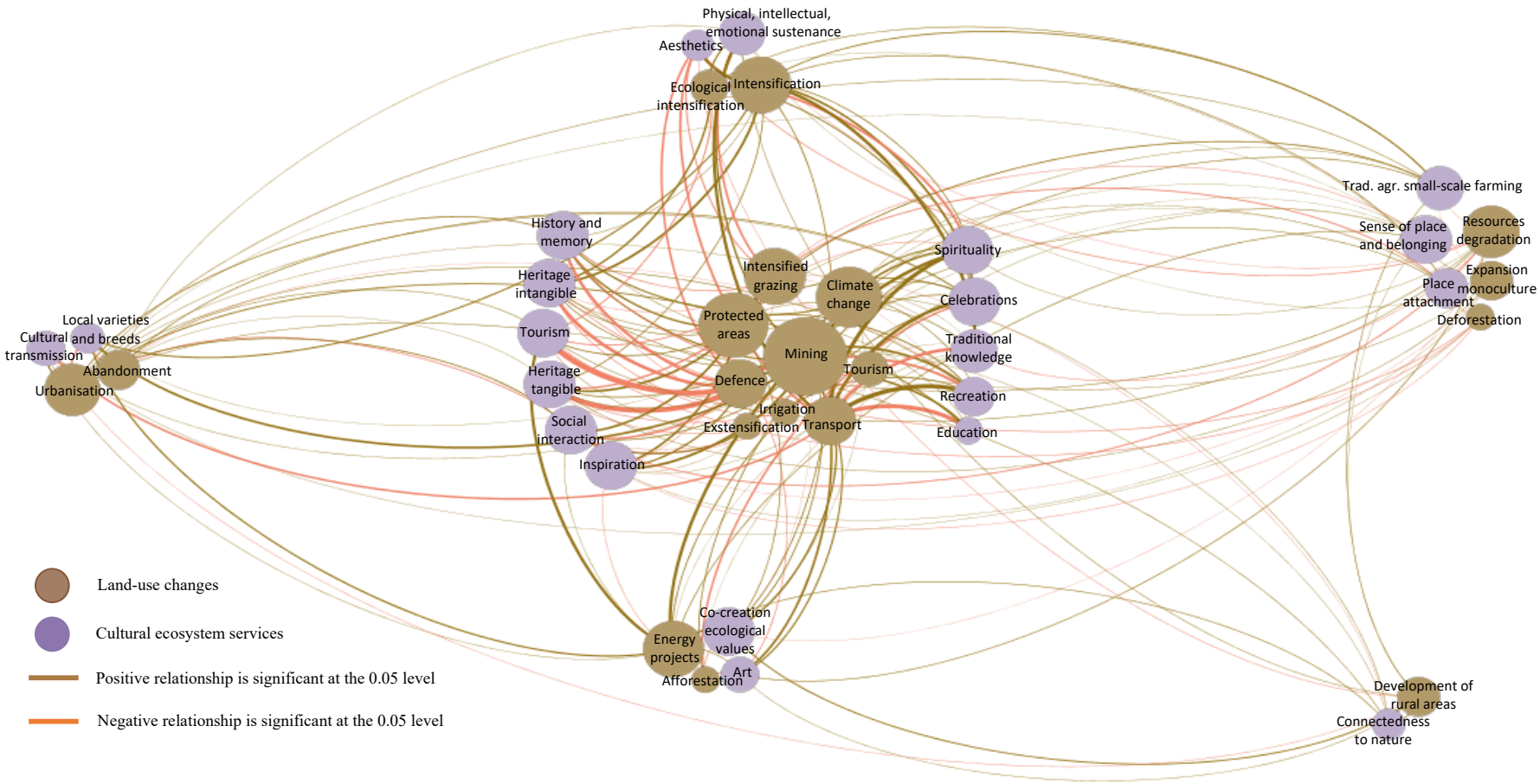


Fig. 3.8 Relationship network between perceived land-use changes and perceived importance for cultural ecosystem services. *Based on 1-5 Likert scale for land-use changes and 1-10 for cultural ecosystem services at the community level (2017/2018). The central and larger the land-use change circle, the stronger its overall impact on cultural ecosystem services. The larger the cultural ecosystem services circle, the stronger it is affected by closest land-use changes. The width of the arrow indicates the strength; and the color the direction of the relationship between land-use changes and the importance of cultural ecosystem services.*

3.5. Discussion

3.5.1. Policy, land-use changes, and the rising importance for cultural ecosystem services

Policy implicit land-use changes in Bulgaria influence the perceived importance of CES (Kristensen, 2016; Ramos et al., 2016). While some CES are perceived as important (e.g. place attachment), others are perceived as changing importance of CES (e.g. traditional knowledge), resulting from land-use changes. This shifts are important to be considered in land-use policy (Antonelli et al., 2015; Plieninger et al., 2015) because the overall CES' importance appears to rise with the intensity of land-use changes; indicating that people tend to value CES more strongly when they are at risk of being lost.

Consequently, the most radical changes like mining, urbanization, energy projects, or the creation of new protected areas are associated with the strongest increase in the importance of CES. This can be intuitively explained by the fact that these changes are most threatening to small-scale agricultural practices, and related CES are no longer taken for granted (Yarkova and Mutafov, 2017). Even if the extent of an abrupt change is small (for instance, mining activities compose a relatively minor part of the studied communities), impacts on the importance for CES can be strong. This can been seen in the case of Velicu (2019), where local communities, opposed to mining activities in Bulgaria, strongly defended socio-ecological conditions of life by protecting traditional means of economic production, knowledge, and wealth.

Gradual changes, such as resource degradation, land abandonment, and intensified grazing do not increase the importance for CES as drastically. For example, despite the fact that land abandonment is significant for the loss of ecological functions (Sidiropoulou et al., 2015; Zorrilla-Miras et al., 2014), these changes are not perceived as equally threatening to the importance to CES. Given that land abandonment is one of the critical drivers for the loss of traditional farming systems in Bulgaria (Gutman and Radeloff, 2017), gradual changes may require more specific attention in the design of land-use policies to avoid overlooking the loss of associated CES.

Interestingly, the relatively gradual phenomenon of climate change does not follow this pattern and correlates with increased CES importance similar to other, more radical transitions. While deserving further investigation, we assume this might be due to the fact that climate change manifests in extreme events –e.g. flooding, drought, or forest fires– which may radically impact land-use and related CES.

Remarkably, land-use changes that are promoted as green and sustainable solutions for rural marginalized communities (Thorn et al., 2015), including protected area initiatives and tourism (e.g. Gobattoni et al., 2015), may threaten CES as much as those that cause obvious environmental degradation. However, protected area initiatives can also encourage CES, such as local varieties and breeds and history and rural memory. Common to these cases is the separation of local people and traditional knowledge from the land management incentives (Barrington-Leigh and Galbraith, 2019). As Tilliger et al. (2015) highlighted, expansion of tourism and land abandonment particularly affect the maintenance of traditional agricultural practices. This study further demonstrates how such changes also affect the perceived significance of spirituality and inspiration for rural communities, as well as the traditional knowledge of rural people.

These insights are relevant to land-use policy; since CES require the active engagement of people with their surroundings, any exclusion from their traditional environment (even a well-intentioned protected area) is prone to create conflict (García-Llorente et al., 2018). In fact, from the policy programs, it is visible how there is a risk that land-use and management changes related to economic development, such as transport, energy projects and urbanization can dominate rural Bulgarian traditional farms and landscapes. For instance, the results of this study reveal how connectedness to nature and inspiring moments people experience surrounded by the landscape is more valued when rural development projects take place.

We agree with the findings of de Groot et al. (2010) that land-use changes appear in combination rather than one at the time. This study shows how socio-cultural relationships and practices nourish rural place histories, and how this process is affected by different land uses and management systems. Therefore, since all ecosystem services are interrelated with one another (Brondizio and Le Tourneau, 2016; Chan et al., 2012a; Comberti et al., 2015; Díaz et al., 2018), land-use changes can threaten not only CES,

but also the related provisioning, supporting, and regulating benefits associated with farming systems and rural landscapes formation.

3.5.2. The need to recognize cultural ecosystem services in land-use policies at different governance scales

CES are often characterized as intangible and subjective, and thus difficult to quantify (Satz et al., 2013). Yet, if policy-making around land-use is limited to the consideration of non-CES and economic efficiency, the importance of small-scale farming systems might be misrecognized (Fagerholm et al., 2016). Our study shows CES such as sense of place, belonging, connectedness to nature, and cultural transmission across generations are critically important for the wellbeing and livelihood of rural communities on both the regional and farm level (Lefebvre et al., 2015).

Our study further underlines the ubiquitous role CES play in defining links between people and nature (Díaz et al., 2018). Traditional ecological knowledge and its transmission across generations, for example, stress the importance of historic small-scale farming in sustaining agroecosystems. Our results oppose the notion of Kirchhoff (2012:3 146) about ecosystems consisting only of an ecological community and its abiotic environment, as a causally interacting components. In line with Daniel et al., (2012b), this paper argues that people's physical interaction with the ecological and abiotic environment is essential for many processes that characterize small-scale farming systems, define wider regional landscapes, and underlie the generation of ecosystem services.

In this context, CES play an important role in motivating engagement in small-scale farming and the stewardship of regulating, provisioning, and supporting services in situations where market revenues are limited (Langemeyer et al., 2018). CES provided to small-scale farmers can be understood as partly compensating monetary incentives, making them critical factors in the design of land-use policies.

EU's policies target economic growth and therefore shape land-use changes at both regional and local levels. Intensive farm land-use practices cannot preserve cultural and

natural heritage (Loos et al., 2016; van Zanten et al., 2014a). In Bulgaria, the SAPARD, the CAP, and its rural development measures are designed according to market logic, high competitiveness, development, and modernization. Design of these policies appears to underrepresent traditional farming, knowledge systems, and landscape preservation techniques, by representing them as backward and economically unproductive. The policy designs also disregard the importance of CES within local communities and individuals as they interact with surrounding ecosystems. From all the documented schemes in Bulgaria, only three mention traditional ways of farming and agricultural heritage preservations. Namely, only one scheme of the SAPARD and two of the RDP. Clearly, priority in the policy measures is given to economic development of rural areas (Bulgarian Government, 2002; CAP, 2014).

It is also worth mentioning how under both pillars of CAP, small-scale farmers are excluded from green measures in order to enhance their competitiveness on the market. From the start, this overlooks small-scale farms and the farms' environmental and cultural sustainability potential. Moreover, when policies neglect the importance of CES and farms are 'optimized' to produce commodities, the homogenization of landscapes is likely (Pretty, 2011). This can lead to people becoming more disconnected from the environment, thereby loosing relational values associated to nature (Chan et al., 2012b). Thus, disregarding the CES that small-scale farming systems provide will likely accelerate the social-ecological degradation of wider rural regions and their landscapes.

One way CES can achieve recognition in policymaking is through traditional farming systems preservation and cultural values support programs. CES has been shown to be effective framework in identifying changes in the perception of the landscape at the regional and community levels (Ode Sang et al., 2016). This helps to avoid overlooking the social dimensions of local farming that can occur when generalizing CES at different scales (Sharma et al., 2016). Indeed, the appreciation of CES varies from community to community and depends land-use practices (López-Santiago et al., 2014), a trend which was apparent even within the narrow geographical extent of our study.

3.5.3. The importance of traditional small-scale farming practices in Bulgaria

Traditional small-scale agricultural practices and their related modes of knowledge of resources management are diminishing in Bulgaria. However, similar to the study of Gómez-Baggethun et al. (2010), our results demonstrate that traditional agricultural practices and knowledge are critical for upholding farming systems (Burton and Riley, 2018; Gobattoni et al., 2015). The decline in traditional agricultural practices and knowledge therefore represents an issue for sustainable policymaking. This study agrees with Reyes-García et al. (2015) that traditional knowledge is one of the most important connection points between people and farming systems.

In line with findings by Plieninger et al. (2016) and van Vliet et al. (2015), our study shows how the meaning people hold for and experience with a certain place is impacted by land-use changes. In particular, the consequences of these land-use changes for both the natural environment and associated CES can undermine rural identities and traditional farming activities. This is proven in the case of intensification practices and intensified grazing of the common land in Bulgaria. *Selski meri*, the common and collectively used land of a village, combine small-scale agricultural production on small private plots with collective grazing on common lands and have traditionally been central to household economies. However, the introduction of *meri* land to global markets has led to its privatization and high commercialization (Hekimova et al., 2004). This has led to abandonment of communal land and intensified grazing, which this study demonstrates suppresses local engagement with the land. Both policy and science must recognize the social consequences of land-use change, since many phenomenons (like land abandonment) remain largely overlooked (Plieninger et al., 2016).

3.5.4. Advantages and disadvantages of an ecosystem service assessment to inform land-use policies

A more granular framework for farming systems analysis is needed to enable evidence-based decisions around land-use in European rural areas (Pinto-Correia et al., 2016). In that regard, the case of Bulgarian rural areas has helped produce a classification of both

land-use changes and CES at the regional and farm levels. Holistic ecosystem services assessment of multiple benefits (cultural or otherwise) can add credibility and legitimacy to land-use policies and make them more effective, especially if adapted to local environmental problems and preferences of different users (Jacobs et al., 2016). Bringing stakeholders groups together to exchange different views and opinions helps to enhance a mutual understanding of landscape complexity and rural identity (Geijzendorffer et al., 2017; Hilpold et al., 2018; Ramos et al., 2016).

Studying land-use and management changes and their perceived effect on CES (Pangelova and Rogan, 2006; Tengberg et al., 2012) can foster policy processes that benefit ecosystem stewardship and improve rural livelihoods (Kristensen et al., 2016; Mascarenhas et al., 2015; Metzger et al., 2006; Whitfield et al., 2011). Local assessments of CES can allow for a stronger recognition of people's and communities' cultural bonds with their environment and facilitate their inclusion within policy and planning.

Furthermore, by conducting the survey on the community level, this study strengthens arguments how farming systems and CES co-created with people cannot be studied separately from those very people living on the land. The study was only possible through a conceptual understanding of CES in farming systems that uses an interdisciplinary and transdisciplinary approach involving experts, NGOs, farmers, and residents (Ramos et al., 2016). Assessed collectively, the combined quantitative and qualitative research methods in this study allow for a better understanding of underlying processes that affect both environmental and socio-cultural well-being.

It must be noted that private entities acting on the selected areas and holding large farms did not participate in the workshop. Further, although the surveys distinguished farm holders from local residents (family members, seasonal workers, or neighbors) for classification purposes, there may be an overlap between these groups of respondents. This is because some Bulgarian farms are still used as a common land, especially by farmer cooperatives. Furthermore, a farm-holder does not explicitly refer to a landowner and one individual can be affiliated with multiple 1-2 ha farm units across public and private lands. Finally, the size and number of farm units may vary since Bulgaria faces a high rate of land abandonment (Dyulgerova et al., 2015), and experiences unregulated

fragmentation, privatization, and commercialization of small-sized farms and grazing lands (Fredriksson et al., 2017).

3.6. Conclusion

This paper analysed impacts of land-use changes on cultural ecosystem services (CES) in small-scale farming systems throughout four regions and eleven communities in Bulgaria. The study expands the understanding of rural CES by broadening the panel of stakeholder knowledge to include farmers and individuals living in the rural communities into agricultural policy decision-making at different governance scales.

Indeed, these stakeholders recognized the most relevant ecosystem services for small-scale farms are CES like aesthetics, motivation, and community cohesion at both the farmland and landscape level. Of these, place-attachment enjoyed the strongest increase in stakeholder importance, despite the many different land-use changes taking place in Bulgarian rural settlements.

According to stakeholders, the CES most negatively affected by policy-driven land-use changes at the regional scale were traditional agricultural practices, small-scale farming, and traditional knowledge related to farming. The perceived importance of these CES at the farm level was strongly correlated with activities such as mining, intensification, and urbanization. This indicates that people attach higher importance to cultural values when they are at evident risk of being lost.

Moreover, at the farmland scale the perceived importance of traditional knowledge increased with crop intensification, highlighting how agriculture policies can promote people's engagement with the land. Conversely, intensified grazing and abandonment was perceived to decrease the importance of physical, emotional, and intellectual contributions from farming systems, highlighting the importance of incorporating into policy the traditional practices that sustain environmental, socio-cultural and economic sustainability of rural areas.

CES are essential for personal, community, and societal well-being. Given the importance of CES for the protection of the cultural and natural environment, this paper supports the development of land-use policies that avoid negative land-use changes and put stronger emphasis on the maintenance of CES.

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Appendix 3.A. Three main agricultural policy programs in Bulgaria, their measures, and implications in land-use and management changes.

Year	Policy	Measures	Land-use changes and management implications
2003-2006	SAPARD	-Investments in agricultural holdings -Improving the processing and marketing of agricultural products -Development and diversification of economic activities, providing opportunities for multiple activities and alternative income -Provision of free financial aid to markets of	Development of rural areas Afforestation/forestry Preservation of tangible rural heritage Tourism Modernization of rural infrastructure

		manufacturers and marketplaces of fruit, vegetables, flowers -Forestry, afforestation of agricultural land, investment in forest holdings, processing and marketing of forest products -Renovation and development of villages, protection and conservation of rural heritage and cultural traditions -Development and improvement of rural infrastructure -Improvement of vocational training -Technical Assistance -Development of agricultural activities aimed at environmental protection	Protected areas Intensification
2007-2013 2014-2020	CAP first pillar Direct payments	-Agroecology and Climate: ecological values of grasslands, pastoralism, preservation of endangered traditional varieties and breeds -Organic plant growing, livestock breeding, and beekeeping -Natura 2000 payments and water framework directive and compensation for farmers' who are affected by the prohibitions and restrictions on farming set on the protected areas -The Law of Biological Diversity -Payment is based per ha of agricultural land -Special cotton payment -Protein crops payments -Greenhouse vegetables payments -Fruit and grapes payment -Scheme for buffalos -Scheme for goats under selective control -Scheme for beef meat production and cows under selective control -Scheme for dairy cows under selective control -Transitional National Aid Scheme for non-manufacturing tobacco -Scheme for transitional national aid for agricultural land per hectare cultivating tobacco and grapes, also granted to small-scale farmers -Small Farmers Scheme, where small-scale farmers are excluded from green direct payments -Green payments schemes (only large-size farms) where agricultural practices respect crops diversity, annual crop rotation and maintain 5% of arable land as ecologically targeted areas -Redistributive Payment Scheme for economically vulnerable small and medium-sized farms	Protected areas Ecological intensification Extensification Intensification Market oriented cash crops Monoculture Market land management orientation
2007-2013 2014-2020	CAP second pillar Rural Development	-Vocational training, information activities and dissemination of scientific knowledge -Use of advisory services by farmers and forest owners for maintaining the land in good agricultural and environmental condition -Modernization of agricultural holdings encouraging the use of new technology -Improving the economic value of forests -Adding value to agricultural and forestry products -Support for semi-subsistence farms undergoing economic restructuring	Land management based on scientific knowledge Land and forest preservation Modernization Forestation Industrialization Market land management orientation Transport infrastructure Construction and infrastructure Use of technology

		-Improving labor mobility and attractiveness for business development in rural areas by improving road infrastructure -Improving living conditions in rural areas by improving access to water and sewerage infrastructure -Improving the access of the rural population to cultural, sports, leisure, social, and leisure services -Improve access to information and communication technology services -Renovation and development of rural settlements -Inter-territorial and transnational cooperation of rural areas -Implementation for raising income in rural areas by diversifying economic activities, improving the competitiveness of local products -Preserving natural resources and the environment in rural areas -Forward to the heritage – "The territory unites us" program -Preservation and improvement of rural heritage -Encourage the involvement of local populations in the development and future implementation of local development strategies	Rural development Transport infrastructure Rural heritage preservation Engagement of local stakeholders in rural development programs

Appendix 3.B. List of the 19 different land-use changes identified in agricultural systems worldwide
based on Hanaček and Rodríguez-Labajos (2018)

Land-use changes	CODE	On a scale from 1-5, with 1 being not likely and 5 being extremely likely, please select the changes occurring in the area where your farm is situated or in the area where you live:	1	2	3	4	5
Intensification	01	Intensified farming has increased					
Urbanization	02	This area is becoming more urbanized and industrialized					
Expansion and Monoculture	03	The cultivation of a single crop (monoculture) is expanding					
Resource degradation, pollution, overuse	04	There are increasing problems of soil degradation (loss of nutrients, fertility decline, erosion), water pollution and its overuse					
Abandonment	05	A lot of agricultural lands have been abandoned					
Protected areas	06	Areas under natural protection or conservation are increasing					
Deforestation/ burning/logging	07	There are increasing deforestation and/or forest fires					
Development of rural areas	08	There are increasing development projects in the rural area					
Intensified grazing	09	Intensified grazing has increased					
Extensification	10	Agricultural production has been extensified: crop cultivation with small amounts of labor but a large area of land					
Afforestation/forestry	11	Planted tree areas have increased					

Irrigation/ hydraulic infrastructure	12	Irrigation projects increased					
Energy projects	13	There are new energy projects, either renewable or conventional					
Mining	14	There are increased activities of mineral extraction					
Climate change	15	The climate has perceivably changed or there are more weather extremes					
Ecological intensification	16	Areas under ecological/organic production have increased					
Tourism expansion	17	Tourism is expanding					
Defense projects	18	New areas are used for national defense purposes					
Transport	19	Transport infrastructure is expanding					

Appendix 3.C. Pre-research phase: Stakeholder identification based on the literature review and Bulgarian Cadastral Information System

Stakeholders identified on the regional level: Why are they important, how representative they are and who more might be important?

Type of organization	BU
Farming assoc.	4
Organic farming assoc.	1
Agrarian Cooperatives Fed.	11
Agribusiness companies	4
Organic agric. engineers - local varieties	3
Agricultural engineers	3
Agriculture dep. -extension / tech transfer	7
Consumers' organizations	2
Development NGOs	2
Environmental organization	4
Farmers union	7
Green Party	1
Organic agric. certification bodies	6
Public research institutions	6
Agribusiness companies	4
Private research Institutions	-
Programs/Platforms	1
Total	**66**

Other important representors?

Individual farmers (holders, owners) and rural residents living or spending time around small-scale farms	1-2 ha (BCA IS)

Chapter 4

4. Understanding environmental conflicts through cultural ecosystem services - The case of rural Bulgaria

Abstract

Cultural ecosystem services (CES) that people co-create with agroecosystems, such as cultural identity and traditional knowledge, are declining in rural areas undergoing abrupt economic, environmental, and social changes. As a result, environmental conflicts arise. This article investigates causes, consequences, and responses to open and latent environmental conflicts surrounding CES in the light of relational values in rural Bulgaria. The study uses political ecology and ecosystem services frameworks and traces the causes of conflicts in processes of land enclosure and privatization through green development and payment programs. The study is based on surveys with local farmers and rural residents. Eroded traditional knowledge, identity, and social interaction are the main affected CES. This generates a stress on culture and traditions related to farming activities, further impairs access to land, and influences the disconnectedness of people with the environment. While some communities respond with calls to open mobilization, a more common response is to use culture itself and rural identity as forms of latent resistance to the changes in rural areas. The paper connects these findings with the notion of latency and resistance in silenced conflicts due to uneven power relations. The study argues how environmental conflicts over agricultural land appropriation are intertwined with cultural forms of dispossession unveiled through CES analysis.

Keywords: Cultural ecosystem services; Relational values; Environmental conflict; Latent conflict; Bulgaria

4.1. Introduction

Cultural ecosystem services (CES)–or the non-material contributions, such as rural identity and traditional knowledge, that people co-create with and derive from agroecosystems (Chan et al., 2012b; Hartel et al., 2014)–are declining due to vast economic, social, and environmental changes in rural areas (Fischer and Eastwood, 2016; Plieninger et al., 2015; Ryfield et al., 2019). Such changes influence and dispose traditional practices and the ways through which communities manage and relate to agricultural land (Chapman et al., 2019; Zheng et al., 2015). Relational values as preferences, principles and virtues about human-nature relationships, may include deeply intertwined but still distinct: held, assigned, instrumental, moral, shared, social, and non-material values (Chan et al., 2018). The decline of CES affects individual social groups differently, with some better off than others, thereby creating the base for environmental conflict in latent or open forms (Beltrán, 2015; Hanaček and Rodríguez-Labajos, 2018).

For this study, environmental conflicts are understood as multi-stage processes focused on natural resources use and management (Cazals et al., 2015). These conflicts often involve multiple factors that are closely interrelated (Kull et al., 2015), such as power asymmetries between different actors, divergent values people attach to nature, or unevenly distributed access to environmental benefits (O'Connor and Martinez-Alier, 1998). Access to natural resources often mediates "who" benefits from nature (Ribot and Peluso, 2003). For instance, benefits are frequently shifted through privatization processes, power relations, and control over natural resources (Wieland et al., 2016). When there is unequal access to natural resources among different social groups and uneven distribution of the benefits ecosystems provide, environmental conflicts are likely to ensue (Martinez-Alier, 2014; O'Connor and Martinez-Alier, 1998).

However, conflicts do not always appear as a direct mobilization or a protest. If conflicts are not visible, it does not necessary mean that they are not present (Temper et al., 2018). Thus, not all conflicts are open struggles or have successfully egalitarian outcomes (Beltrán, 2015). It is important to recognize a broader definition of conflict and different expressions of struggle, which better capture the unfair or tense character of certain social relations, and the associated processes of resistance (Le Billon, 2015).

When conflicts are "invisible" or latent (Ariza-Montobbio and Lele, 2010; Beltrán, 2015), then they refer to the not (yet) openly manifested conflicts, or to silenced concerns and issues about natural resources and its benefits (Ariza-Montobbio and Lele, 2010; O'Connor and Martinez-Alier, 1998). For instance, conflicts can be silenced by more powerful actors or through different institutions that use the power of knowledge (Beltrán, 2015) or violence against those expressing concerns about environmental exploitations and degradation (Hanson et al., 2006; Martinez-Alier et al., 2016; Martinez-Alier and Roy, 2019).

Research on environmental conflict has mainly focused on the (re-)distribution of material benefits, such as water and land, which in an ecosystem service framework can be assessed as conflicts over regulating and provisioning services (Pacheco and Sanches Fernandes, 2016). However, conflicts can equally be grounded in less tangible benefits relating to non-material CES (Milcu et al., 2013; Zheng et al., 2015). Indeed, previous research suggests that many environmental conflicts are primarily about CES (Hanaček and Rodríguez-Labajos, 2018).

Nevertheless, CES have so far –at best– played a secondary role in the examination of environmental conflict (Small et al., 2017). Consequently, studies about CES and latent environmental conflicts that include social, political, economic, and environmental elements still lack empirical evidence within the literature (Lele, 2013). In line with Hanaček and Rodríguez-Labajos (2018), examining non-material contributions – i.e. CES – can broaden the general understanding of environmental conflicts. If an open conflict has not yet emerged or if conflict is in its beginning phase, actions can be taken to detect reasons behind it, minimize its potential, or even prevent it (Brahm, 2003; Hanson et al., 2006). A better understanding of environmental conflict at a latent stage might thus allow for a mitigation measures and avoid a shift from latent to open conflict (Ariza-Montobbio and Lele, 2010; Brahm, 2003).

This study aims at detecting open and latent conflict about CES that people co-create with traditionally managed agricultural land in Bulgaria. The study examines the importance farmers and rural residents hold for CES in relation to: (i) *causes* or socio-economic and environmental changes currently taking place in the studied communities;

(ii) *outcomes* or consequences of the pursuing changes on their culture and livelihoods; and (iii) *responses* or concerns about the changes in either open protest or a latent form.

4.2. Background

It has been argued that all environmental conflicts are inherently social (Le Billon, 2015). Indeed, many environmental conflicts emerge from the depletion of resources through social processes of land enclosure and privatization, services distribution issues, and loss of livelihoods –what Harvey (2004) calls *accumulation by dispossession*– at the expense of the most marginalized social groups such as rural, indigenous, and female communities (Martinez-Alier, 2014; Perkins et al., 2005).

The causes of environmental conflicts also include land-use policies and programs designed and implemented to foster rural development, including mining and energy production as well as conservation initiatives (Hanson et al., 2006; Pérez-Rincón et al., 2019). As a consequence, these programs can ironically lead to limited access to natural resources, and impoverishment of rural populations, rather than to their wealth and environmental well-being (Corbera et al., 2007; Jose and Padmanabhan, 2016; McAfee, 1999). Such well-intentioned policies can, therefore, promote destructive tendencies, rather than constructive social and environmental behaviors (Heynen and Robbins, 2005; Kosoy and Corbera, 2010).

Poorly designed environmental practices that include resources extraction, overuse, and degradation, consequentially embroil local communities and call for the recognition of groups identities and culture related to nature (Martinez-Alier et al., 2016). This is especially true because cultural dimensions are important for community capabilities and functioning (Schlosberg and Carruthers, 2010).

Causes that lead to changes in surrounding environment and community culture can be of economic, ecological, and social character (Loos et al., 2016). For example, causes include land privatization, urban and infrastructure development, intensive agricultural production, subsidies, large scale resources extraction, land abandonment, displacement,

and migration (Pilgrim and Pretty, 2010). Currently, industrial farms and resources exploitation especially dominate rural areas (Fischer et al., 2015), presenting a stark contrast to traditional small-scale farms (Quintas-Soriano et al., 2016).

Economic development and interests consequently imply a major reshaping of landscapes and dispossession of resources for "traditional" way of living and livelihoods (Escobar, 2011, 2008; Kirchner et al., 2015). From an environmental conflict point of view, what is at stake is a redefinition of production and the economy in line with both the ecological and cultural dimensions of the environment (Breslow, 2014a; Le Billon, 2015). Environmental conflicts are therefore inescapably cultural in nature, concerning worldviews and representations but also bearing significant implications for material or natural resources (Le Billon, 2015).

Responses to disruption in human-nature relations do not always evolve into open or predictable protests, but rather coevolve in a complex culturally bounded manner. Expression of cultural bonds in environmental conflict shifts toward a new value system in modern industrialized societies that assigns greater importance to "quality-of-life" and environmental destruction avoidance (Chan et al., 2016; Muradian et al., 2003).

This study uses ecosystem services framework to enrich the analytical approaches of environmental conflict theories of political ecology. The ecosystem services framework largely addresses the links of environmental destruction, societal concerns, and political issues around provisioning benefits and human well-being (Adams and Morse, 2019; Corbera et al., 2007; Tekken et al., 2017). Beyond the simple identification of ecosystem services, the ecosystem services framework can detect issues around ecosystem benefits that concern different people, including their culture related to the surrounding environment (Barnaud et al., 2018; Nieto-Romero et al., 2014).

The ecosystem services framework brings together ecosystem services, social interdependencies, collective action thinking, power relations, who manages land, and who benefits from natural resources (Chan et al., 2012a; Fischer and Eastwood, 2016; Plieninger et al., 2015). The framework is thus a valuable approach for studying relationships and interdependencies between people and ecosystems (Chan et al., 2018; Hartel et al., 2014). The framework also helps to foster relationships between different

social groups (Barnaud et al., 2018) and trade-offs in the distribution of environmental benefits (Turkelboom et al., 2018).

Nevertheless, within much ecosystem services literature there is an underrepresentation of diverging socio-cultural aspects and concerns of marginalized actors who are invisible in the socially-constructed processes of an uneven environmental benefits distribution (De Vreese et al., 2019; O'Connor and Martinez-Alier, 1998). There is also lack of studies on cultural benefits in the environmental conflict processes of a particular place (Jorda-Capdevila and Rodríguez-Labajos, 2014; Lele, 2013).

Rural communities and their traditional farming activities are often the most marginalized in terms of land-use management and decision-making (van Kerkhoff and Pilbeam, 2017). However, communities and their traditions create and preserve non-material cultural values and benefits – i.e. CES – such as identify, social cohesion, place attachment, and traditional knowledge (Chan et al., 2012a; Reyes-García, 2015; Tengberg et al., 2012).

Further, CES are centrally important for people to express their relationship with nature, under the concept of relational values (Chan et al., 2018, 2016). Ryfield et al. (2019) explain how CES reveal the understanding of different relationships to nature, that reflect the values and histories people share, different material and symbolic practices people engage in, and the places they inhabit. CES categories are also mutually interrelated, suggesting that decline in one CES may reduce other (Brondizio and Le Tourneau, 2016; Chan et al., 2012a; Comberti et al., 2015; Díaz et al., 2018). Reduction or even disappearance of local culture related to land management, changes the surrounding environment and profoundly affects the historic connections between humans and nature (Zheng et al., 2015).

Accordingly, there is an urgent need to incorporate political factors into ecosystem services framework with a place-based empirical evidence around different CES (Breslow, 2014b); whether and how different groups culturally engage with and benefit from ecosystems; how these engagements are influenced by social, economic, and environmental changes (Kumar Paul and Røskaft, 2013; Lozada Ordóñez et al., 2018);

and how environmental conflict processes develop in that regard (Le Billon, 2015; Ungaro et al., 2016). This study is concentrated around these questions.

4.3. Case study

Bulgaria, although a European Union member state, is situated at the periphery of the Western European economic core (Roncevic, 2002). Currently, rural areas in Bulgaria encounter commercialization, privatization, and development of traditional land, as the country experiences a transition from socialist to neoliberal socio-economic system (Fredriksson et al., 2017).

However, Bulgarian traditional lands contain significant sites of natural and agricultural heritage (Borisova et al., 2015) on which local populations are highly dependent for livelihoods and well-being (Bachev, 2018). These sites are, for example, under the influence of intensive economic development proceeding at an extremely rapid pace and which have a lasting negative effect on the agricultural heritage (Borisova et al., 2015; Spoor, 2012). Consequently, traditional land is being degraded from the intensification and expansion of farming, grazing, and logging (Borisova et al., 2015). In addition, there has been a major drop in the use of traditional agricultural land, particularly apparent in the north of the country (Fredriksson et al., 2017).

As a result, there has been a consolidation of agricultural holdings, with 82% of the cultivated land in Bulgaria being farms of over 100 ha (Fig. 4.1) (Eurostat, 2012; Medarov, 2013). The combined effect of the increased agricultural area and the decreased number of small-holdings is a growth of the average size of farms, more than double since 2003, particularly in the northern, southern, and eastern parts of the country (Fig. 4.2) (Eurostat, 2012).

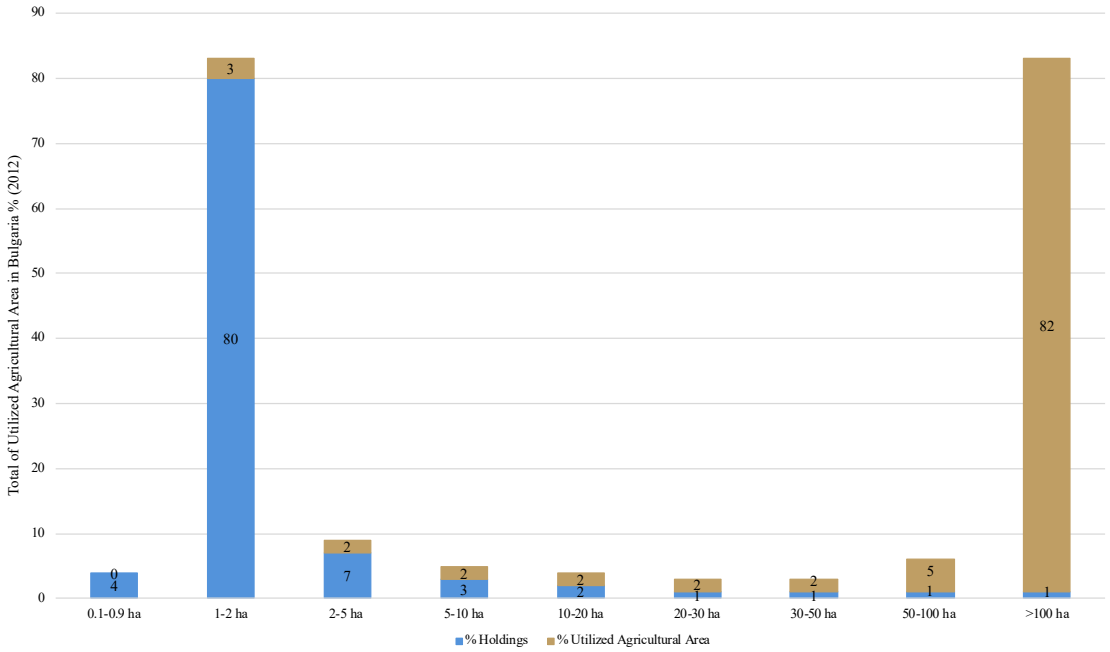


Fig. 4.1. Total Utilized Agricultural Area (UAA) in Bulgaria. *Although 80% of farms are small-scale holdings (1-2 ha), they only utilize 3% of total agricultural area. In contrast, there are 1% of agricultural holdings >100 ha that utilize 82% of total agricultural area in the country.* Source: Eurostat, 2012.

For example, in the North-Central region the average farm size was 4.4 ha in 2003 but grew to 16.6 ha in 2010, accounting for a remarkable increase of 144% (Fig. 4.2). Likewise, the South-East region saw an increase in average farm size of 121% during that same period, from 5.8 ha to 12.8 ha. In South-Central region, there is a similar increase in farm size for 110%; from 1.9 ha in 2003 to 5 ha on average in 2010 (Eurostat, 2012).

Although there has been an overall decrease in number of agricultural holdings in South-Central region of Bulgaria by 52% since 2003, the region contains the largest number of farms (109,450), accounting for 30% of the country's total agricultural holdings (Fig. 4.2). The second largest number of holdings (18% of Bulgarian farms) is found in the South-East region (65,510) and has seen a similar decrease of 42% compared with 2003. In terms of the Utilized Agricultural Area (UAA), the South-East region (731,360 ha), shows the highest increase since 2003 with 43%, with the South-Central and North-Central regions recording increases of 39% and 26%, respectively (Eurostat, 2012).

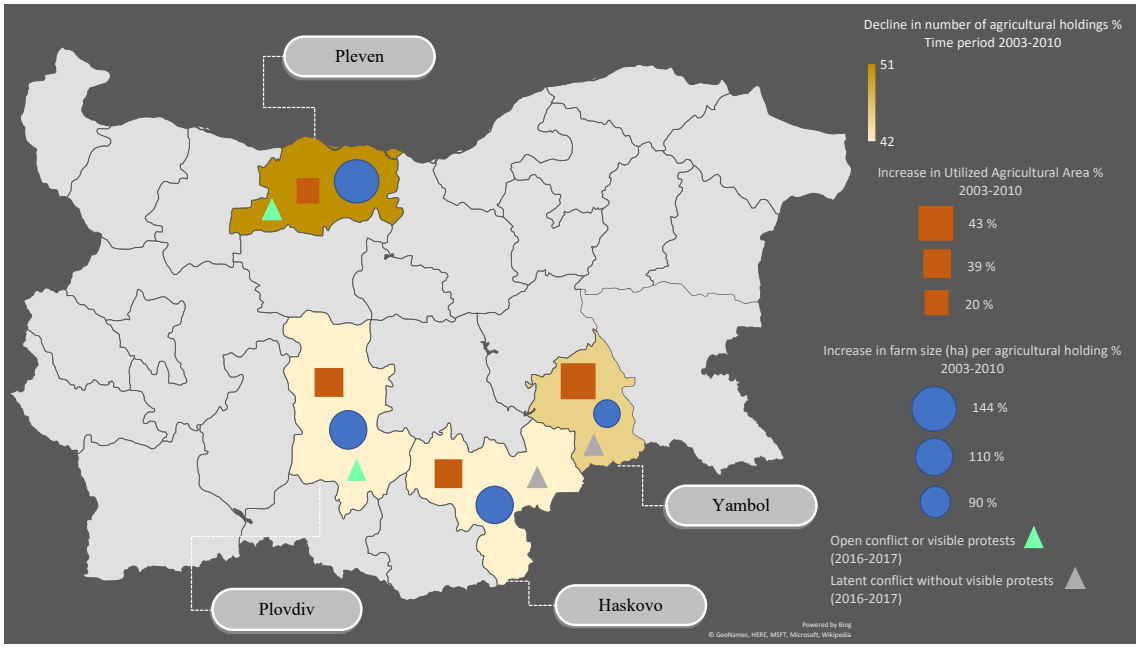


Fig. 4.2. Regions studied in Bulgaria. *The darker the color of the region, the sharper the decline of agricultural holdings. The larger the square or circle symbol, the larger the increase in Utilized Agricultural Area (UAA) or in average farm size, respectively. Triangles in light green represent an open agricultural conflict identified within the region, while those in grey represent a latent conflict without visible protests reported.* Source: Own elaboration of data from Eurostat, (2012) over the period of 2003-2010, BCA IS (2019), and consultations with researchers and agronomists in Bulgaria (2016-2017).

Regarding traditional small-scale farming in Bulgaria, the FAO (2016) identifies two major trends. Firstly, the diversity of local varieties and breeds is assumed to have suffered and declined as a result of structural changes in agriculture, socio-economic pressure and intensive agricultural development, and the accelerated introduction of new and foreign varieties suitable for large-scale agricultural production (FAO, 2016). Secondly, the economic, cultural, and ecological values of traditional forms of agricultural management supposedly neglect the potential of cultural involvement in more environmentally sustainable land-use systems alongside of improving the quality of human life in rural areas (FAO, 2016).

In relation to the stated changes in agricultural land-use and management, there has been an increase in complaints and concerns across southern Bulgaria and visible protests in the northern regions (Fig. 2) (Medarov, 2013). Small-scale farmers claim agricultural reforms favor big investors in obtaining land and agricultural subsidies, and cause an insecure future for agricultural workers, peasants, and farmers (Spoor, 2012).

In order to study these concerns, eleven communities practicing traditional small-scale farming and experiencing both latent and open conflicts in southern and northern Bulgaria were selected for the analysis (Fig. 4.2; Table 4.1). The choice of communities is based on an extensive review of gray and peer-reviewed literature, an examination of data from the Bulgarian Cadastral Information System (BCA IS, 2019) and Eurostat (2012), and consultations with researchers and agronomists in Bulgaria.

Table 4.1. Number of small-scale farms per community and reported type of conflicts within the literature and by local agronomists and NGOs in each region.

Region	Municipality	Community	Nº small-scale farms (1-2 ha)	Conflict type	Description of conflict
South-Central: Plovdiv	Maritsa	Kostievo	450	Open[1]	Development of irrigation systems, exclusion of small-scale farms, land privatization
	Kaloyanovo	Kaloyanovo	46	Open	
		Duvanlii	11	Open	
	Rhodopi	Tsalapitsa	82	Open	
South-Central: Haskovo	Haskovo	Haskovo	271	Latent[2]	Inequality, foreign investment, land privatization
South-East: Yambol	Elhovo	Chernozem	257	Latent	Existing public legislative sanctions (fines, punishments), land privatization
		Borisovo	352	Latent	
	Straldzha	Straldzha	1342	Latent	
		Malenovo	603	Latent	
		Kamenets	431	Latent	
North Central: Pleven	Cherven Bryag	Suhache	442	Open	Existing public legislative sanctions (fines, punishments), land concentration, and land grabbing

Data source: Own elaboration of the data from the Bulgarian Cadastral Information System (BCA IS, 2019), literature review, and from direct consultations with local agronomists and NGOs.
[1] Visible mobilizations or protests
[2] No visible mobilizations or protests

4.4. Material and methods

4.4.1. Data gathering

With the purpose of studying both latent and open environmental conflicts around CES in traditionally managed small-scale farms, a survey of local farmers and rural residents was conducted in eleven communities across the four case study regions between October 2017 and April 2018. Described in more detail in Hanaček et al. (2019), this survey targeted key stakeholders in each community who work, manage, or live near

traditional small-size farms (1-2 ha). The number of surveys per community ranged between 5 and 20. The total number of conducted surveys is 100. The survey determined the following data at the community level: i) the importance of CES and their interconnectedness; and ii) causes, outcomes, and responses of environmental conflicts for the identified importance of CES co-creation.

The first part of the survey measured the perceived importance of 21 CES categories in traditionally managed agricultural lands, based on Hanaček and Rodríguez-Labajos (2018) (Appendix 4.A). A 10-point Likert-scale was used to rank CES importance from low (one) to high (ten), an approach that allowed for a high degree of variance, and therefore a better measurement precision (Wittink and Bayer, 2003). Similarly, subsequent survey sections ranked the occurrence of categories on slightly simpler scale from one (low) to five (high). The second part of the survey evaluated nine categories of socio-economic changes reflecting potential *causes* of conflict (e.g. subsidizes or conservation initiatives, Appendix 4.B). The third part of the survey explored fifteen categories of potential conflict *outcomes* (e.g. poverty or resources degradation, Appendix 4.C). The last part of the survey measured nine categories of *responses* to environmental conflict, including open environmental conflict (e.g. visible protests) and eight latent forms of conflict (i.e. organizing cooperatives, Appendix 4.D).

4.4.2. Data analysis

Survey results were averaged in *Excel* and compared between the eleven communities to determine the perceived importance of CES to local stakeholders, and whether or not open protests take place in communities they inhabit.

To evaluate CES interconnectedness, linear regression analysis was used to i) measure the strength of association between CES variables at the scale of individual respondents, in the statistical econometric software *IBM SPSS (version 25)*. Additionally, linear regression analysis was used to determine ii) the strength of the effect that the independent variable has on a dependent variable. In this case, whether the central CES (independent variable) in the interconnected correlation network strengthens the importance effect for other CES categories (dependent variables). Linear regression

analysis was also performed across individuals to determine iii) whether different CES (the dependent variables) were related with the perceived conflict causes, outcomes, and responses (the independent variables) (Butts, 2008). In order to detect the direction of the relationship, the Kendall's-Tau-be test was conducted, which is especially appropriate for smaller samples used in this study (Conover, 1980).

Network diagrams were analysed and designed in the *Gephi* software (version 0.9.2) using the social network analysis. In addition, a cluster analysis was performed which optimized methods for detecting community structure in networks (e.g. CES with specific cause, consequence, and response of an environmental conflict). The Network analysis identifies connections based on mathematical modelling and indicates which variables serve as bridges between otherwise disconnected variables; or whether a given variable in the network shows signs of being more centralized, and therefore more connected with other variables (Butts, 2008). The complete methodological outline and steps undertaken are presented in Fig. 4.3.

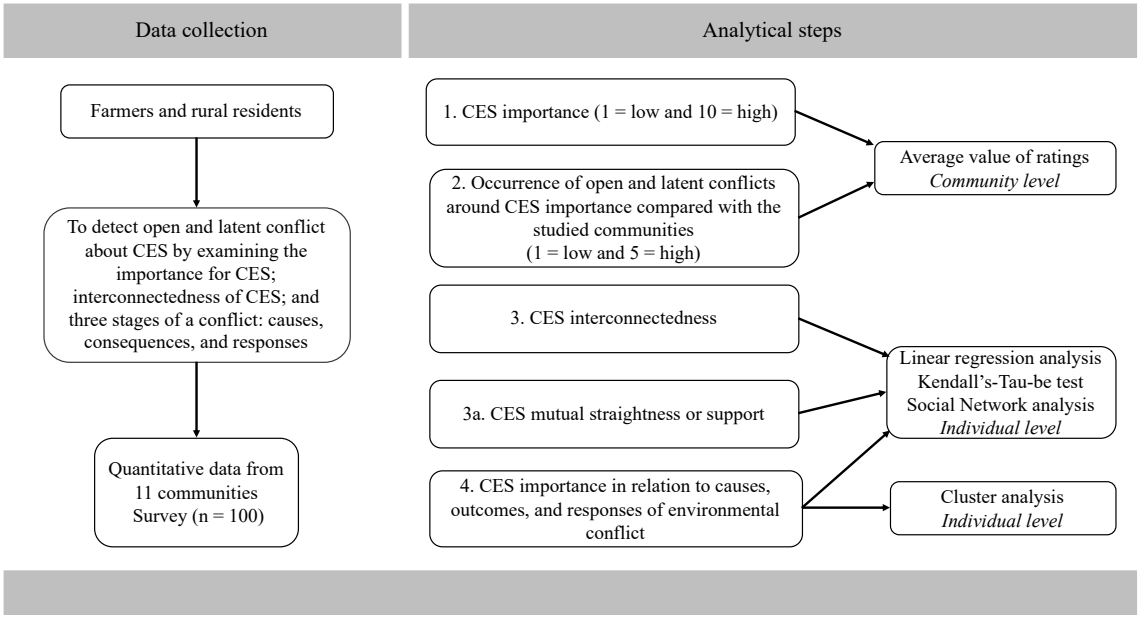


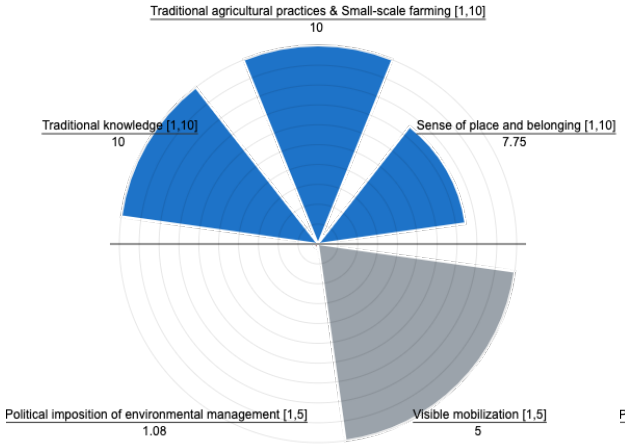
Fig. 4.3. Methodological outline. *An individual survey at community and individual levels by using quantitative data gathering methods through closed Likert scale questions. Analysis of the data is based on average value ratings, correlation, Kendall's-Tau-be test, Network analysis, and clustering.*

4.5. Results

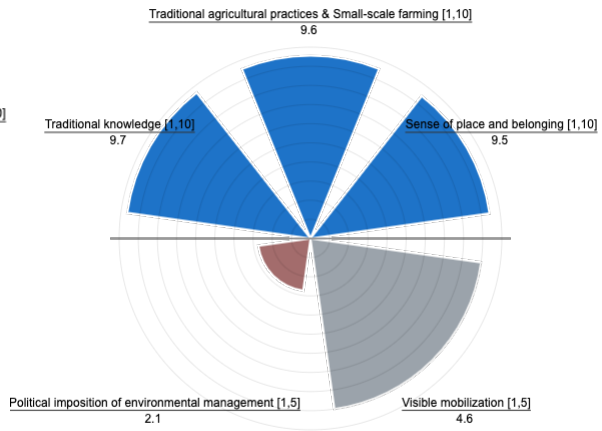
4.5.1. Cultural ecosystem services and environmental conflicts

Four out of eleven communities report significant open environmental conflicts (Figs. 4.4). Namely, Suhache community in the North (5.0 on average) and three communities in the South: Chernozem (4.5 on average), Straldzha (4.1 on average), and Tsalapitsa (3.6 on average). In comparison with communities that do not report a high rank of open environmental conflicts, these communities do show a higher importance of three CES: traditional knowledge, traditional agricultural practices, and sense of place and belonging (identity).

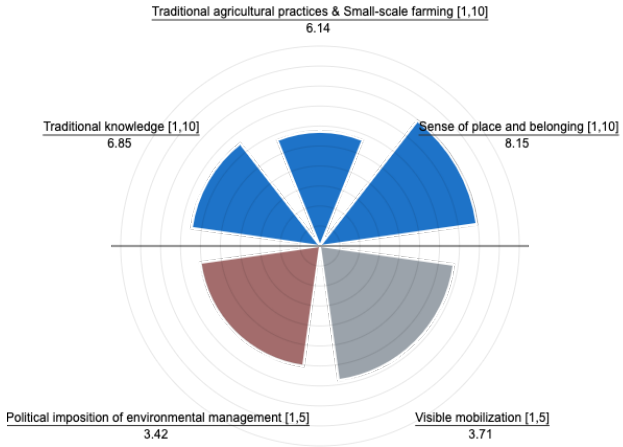
The higher the value of the three CES, the higher the mobilization and resistance as a response to conflict. The only exception is the community of Kamenets; here, despite high CES provision levels, only latent environmental conflicts have manifested to date. However, this community displays high levels of political imposition of environmental management and solution in comparison with the rest of the communities, suggesting the community has low degree of political power in environmental decision-making.



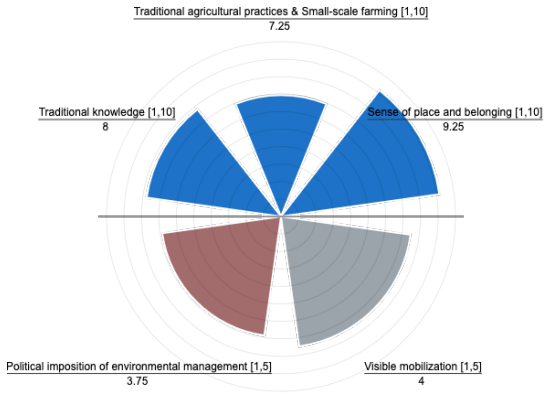
Suhache



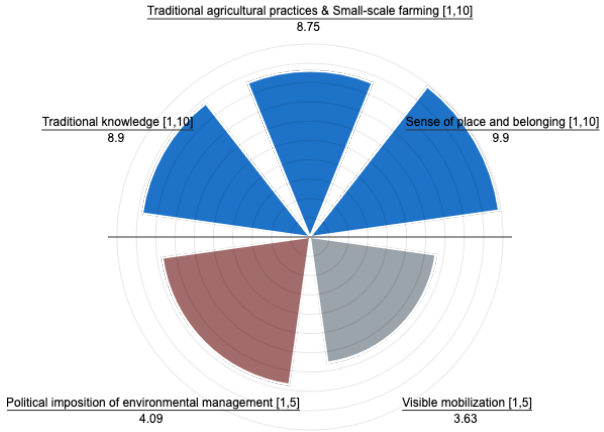
Chernozemen



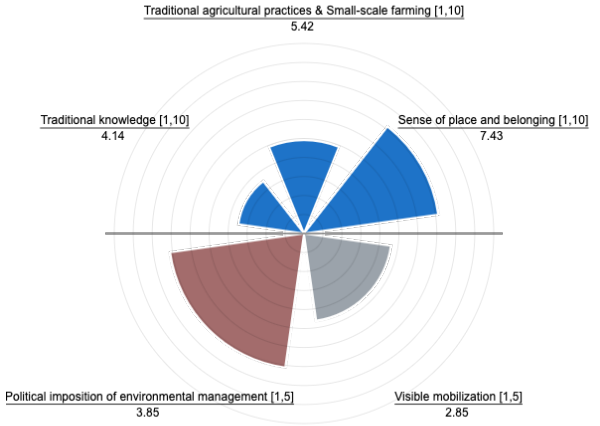
Malenovo



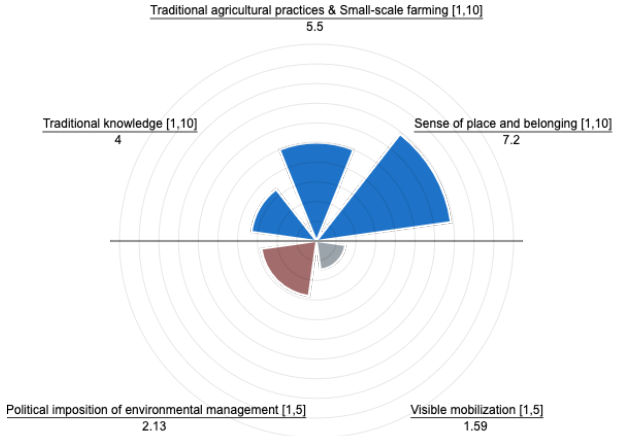
Straldzha



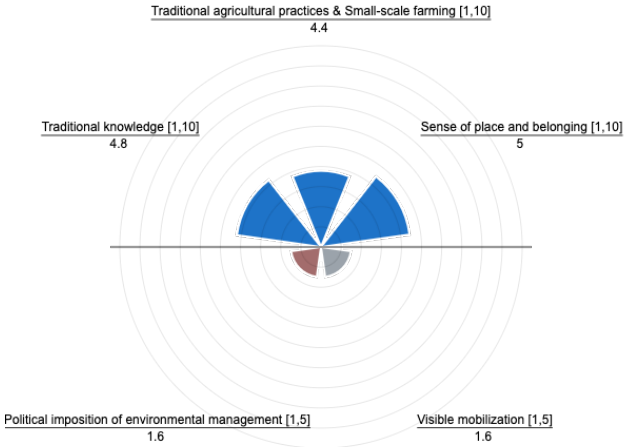
Tsalapitsa



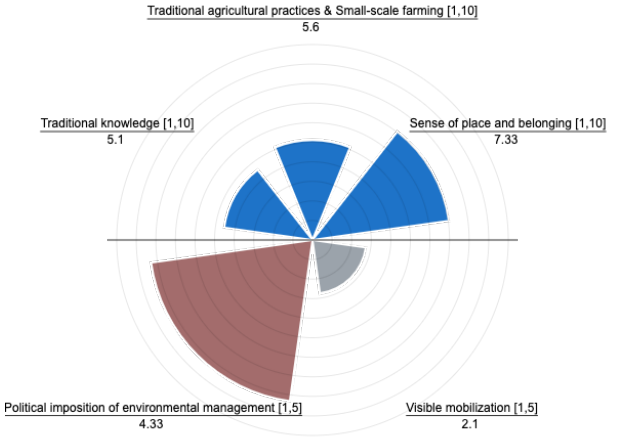
Haskovo



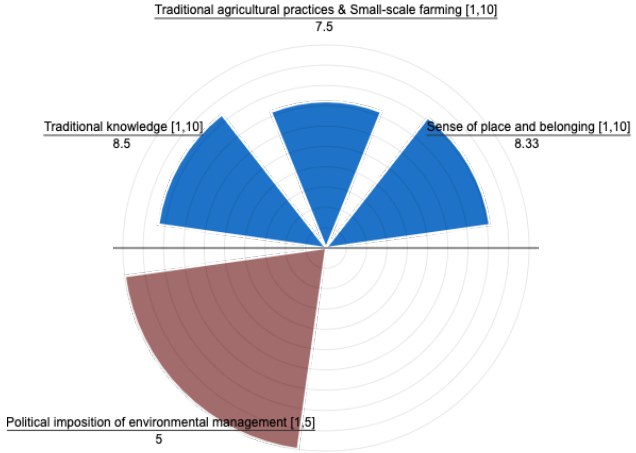
Kostievo



Kaloyanovo



Borisovo



Kamentes

Figs. 4.4. Appearance of open environmental conflicts in the studied communities and the co-creation of traditional knowledge, traditional agricultural practices, and sense of place and belonging (identity) from small-scale farming. There is a trend across communities toward: *the higher the co-creation importance of these three CES, and the lower the political imposition in environmental decision making, the higher mobilization and resistance as a conflict response and vice versa. Data based on average value of ratings on Linkert scale survey at the community level (2017/2018). The scale ranges from 1-10 for CES and 1-5 for visible mobilization and political imposition for knowledge and solutions about environmental decision-making.*

4.5.2. The interrelated character of cultural ecosystem services

There is a significant relationship between the perception of change in different CES across individuals. The analysis shows a positive and highly significant interrelation between CES, increasing or decreasing simultaneously with one another. The central and the most interrelated CES is traditional knowledge, examined in detail below (Fig. 4.6). Traditional agricultural practices, small-scale farming, and rural celebrations follow in the number of the positive relationship connections with other CES categories. Physical, emotional, and intellectual sustenance (cognitive development of people) is also closely related to traditional knowledge along with connectedness to nature. When people feel connected to the surrounding nature, it supports their sense of place and belonging (identity) (Fig. 4.5).

Aesthetics closely correlates with the recreational benefits of rural settlements and with place shaping and attachment. Further, traditional practices and small-scale farming activities are important for cultural transmission across generations, the education of people and/or scientific research, and the maintenance of social interactions in rural areas. Local rural celebrations or festivities are essential for history and memory of rural places and its people. Intangible agricultural heritage, such as oral rural stories and legends, and tangible agricultural heritage, such as traditional houses or dry-stone walls constructions, are also important for rural history and memories, with the latter also positively relating to inspirational contributions.

Some CES – spiritual enrichment, traditional varieties and breeds, tourism, and artistic creation– show a relatively low number of connections with the central nodes; yet, these CES show a strong interrelation among each other. Rural tourism positively correlates and contributes to spiritual enrichment, artistic creation, and to local varieties and the maintenance of local breeds.

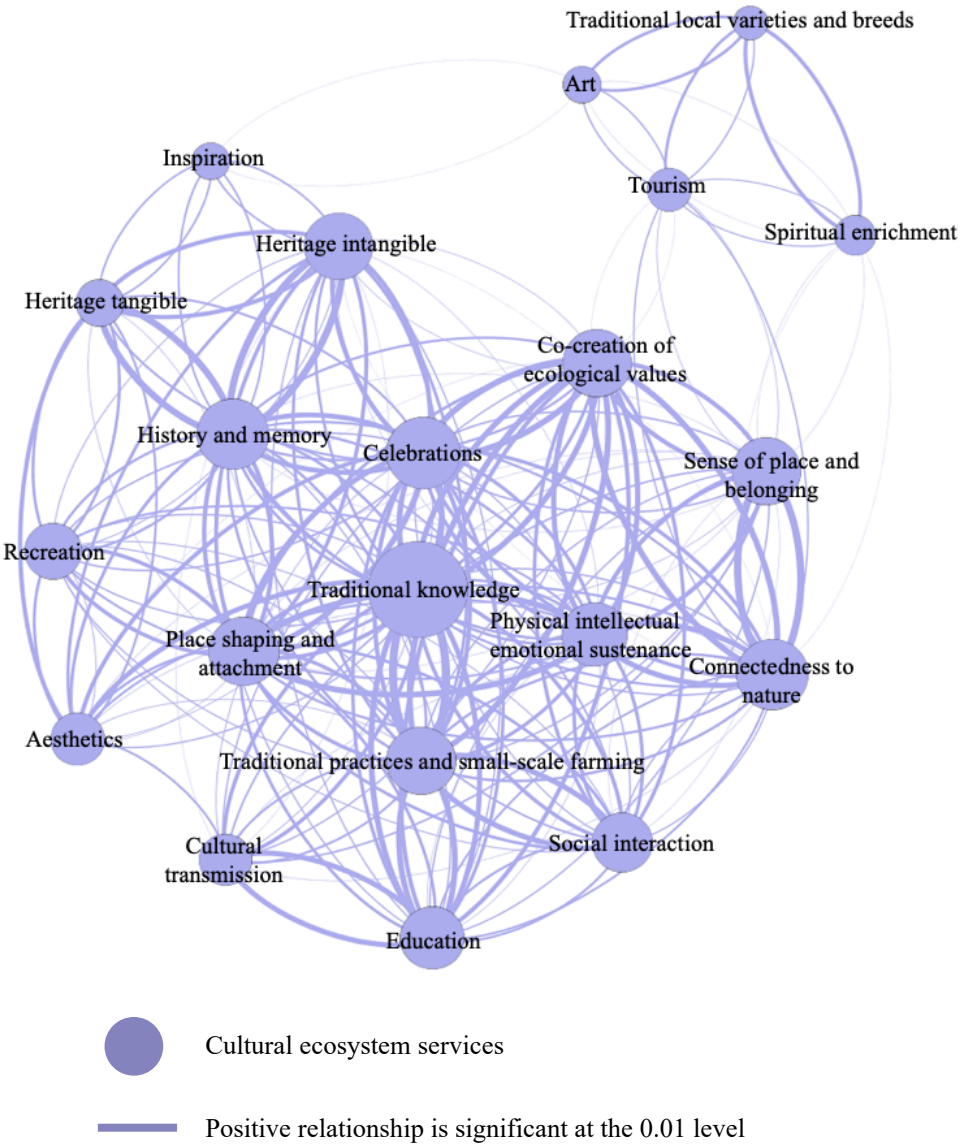


Fig. 4.5. The interrelated character of cultural ecosystem services (CES). *The centrality and the size of the circle indicate the relevance in the number of significant positive relationships: the more central a CES and the larger the circle, the higher number of connections. The closer the CES to one another and the thicker the arrow, the stronger the positive relationship. Data based on the strength of perceived importance for CES by individuals.*

As mentioned above, traditional knowledge has the most central role in strengthening the importance of almost all other CES from traditional small-scale farms, other than artistic creation (Fig. 4.6). The main sustaining role of traditional knowledge is for place shaping and attachment and for sense of place or belonging (identity). Furthermore, traditional knowledge is a key factor for cultural transmission and maintenance of traditional agricultural practices across generations, people's connectedness to nature,

and physical emotional and intellectual sustenance. Traditional knowledge sustains social interactions, and even formal education. Surprisingly, the results also show the importance of traditional knowledge in aesthetic and recreational contributions. Finally, traditional knowledge shows lower but still significant influence on history and historical memory of villages and inspiration.

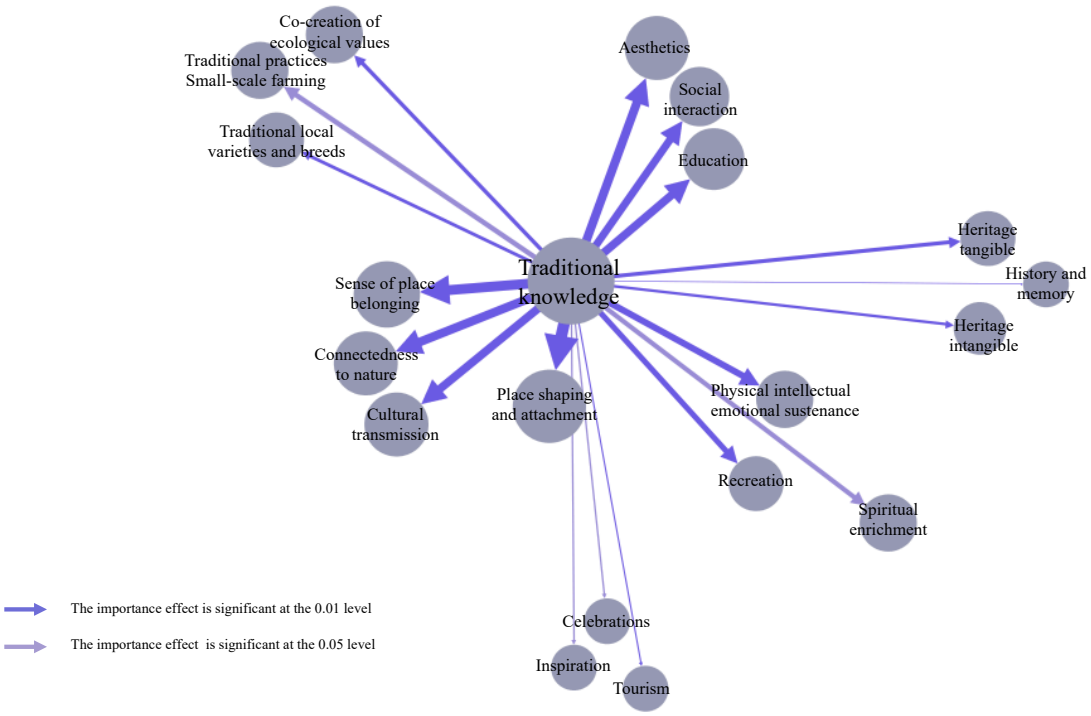


Fig. 4.6. The role of the traditional knowledge in the importance of cultural ecosystem services (CES) sustenance. *The centrality of the traditional knowledge indicates its important role in sustaining all other CES categories. The size of the circle indicates the relevance of the influence on CES. The thicker the arrow, the bigger and closer a circle representing CES is to traditional knowledge, the stronger it is strengthened by traditional knowledge. The color of the arrow indicates the direction of the relationships and its level of significance. Data based on the strength of perceived importance of CES by individuals.*

4.5.3. Open and latent environmental conflicts about the importance of cultural ecosystem services

Fig. 4.7 demonstrates the CES categories in the environmental conflict process. Looking at the clusters obtained, conservation initiatives and market influences as a cause, consequentially show a positive correlation with rural marginalization. Within this process a negative correlation of the value of traditional agricultural practices and small-scale farming and social interaction is observed. Furthermore, migrations negatively correlate with the value of traditional knowledge, local varieties and breeds. Interestingly, rural migrations in the studied communities positively corelate to the importance of cultural transmission. As a consequence of rural migrations, however, disconnectedness with the environment positively correlates across individuals.

Green economy measures positively correlate with the value for inspiration but negatively correlate with conflicting interest values and preferences. Tourism expansion and financial initiatives negatively correlate – and therefore – lack the recognition of traditional agriculture, as another consequence found in the studied communities. Enclosure and privatization of lands consequently show a negative correlation with breakdown of community structures, thereby positively correlating with the importance of cultural transmission and connectedness to nature.

Looking at the complete picture of both open and latent environmental conflicts surrounding CES within the studied communities, the principal and foremost causes of environmental conflicts are land enclosure, its privatization, and conservation initiatives. These three principal causes influence the majority of CES categories, particularly sense of place and belonging (identity); traditional knowledge; and physical, intellectual and emotional sustenance rural people co-create with the environment.

Traditional agricultural practices and small-scale farming are also influenced but to a smaller degree. While perception of change in connectedness to nature is influenced by enclosure and privatization, the perception of change in recreation and spiritual

enrichment is influenced by conservation initiatives. Moreover, the correlation of these principal causes is positive and highly significant not only to perceived CES importance but also to identified consequences such as general impacts to culture and tradition, disconnectedness of rural people with the surrounding environment, and marginalization of vulnerable groups: farmers and rural residents.

Conversely, conflict causes like market influences, financial initiatives, and tourism display a negative correlation with the perceived importance of CES like aesthetical and recreational benefits, or tangible agricultural heritage such as traditional rural architecture. These causes also negatively influence consequences like access issues of scenic sites but at the same time show a positive correlation with poverty or economic distribution issues.

Certain consequences of environmental conflict also negatively correlate with CES. For example, when people's social interaction and place history is influenced by the market commodities, financial initiatives, or on policy and market reforms (framed within so-called "green economy"), the consequences correlate to lack of recognition of traditional agricultural practices, as they negatively relate to the CES category of traditional knowledge. Other consequences are reflected in the positive correlation with the impact on culture and tradition in general, especially through the CES category of co-creation of ecological values.

Responses to environmental conflicts about sense of place and belonging (identity), traditional knowledge, physical, intellectual and emotional sustenance, and traditional agricultural practices mainly call for political and social reorganization, access to natural resources, and even formal agreements.

As an open conflict response with mobilization and resistance positively correlates to the importance of rural identity, history and memory. Open conflicts for these CES, however, occur when enhanced participation of different actors allows for openly expressed concerns and issues about the importance of rural identity related to agricultural land. Open environmental conflicts are also likely when resulting in a breakdown of community structures (fig. 4.7).

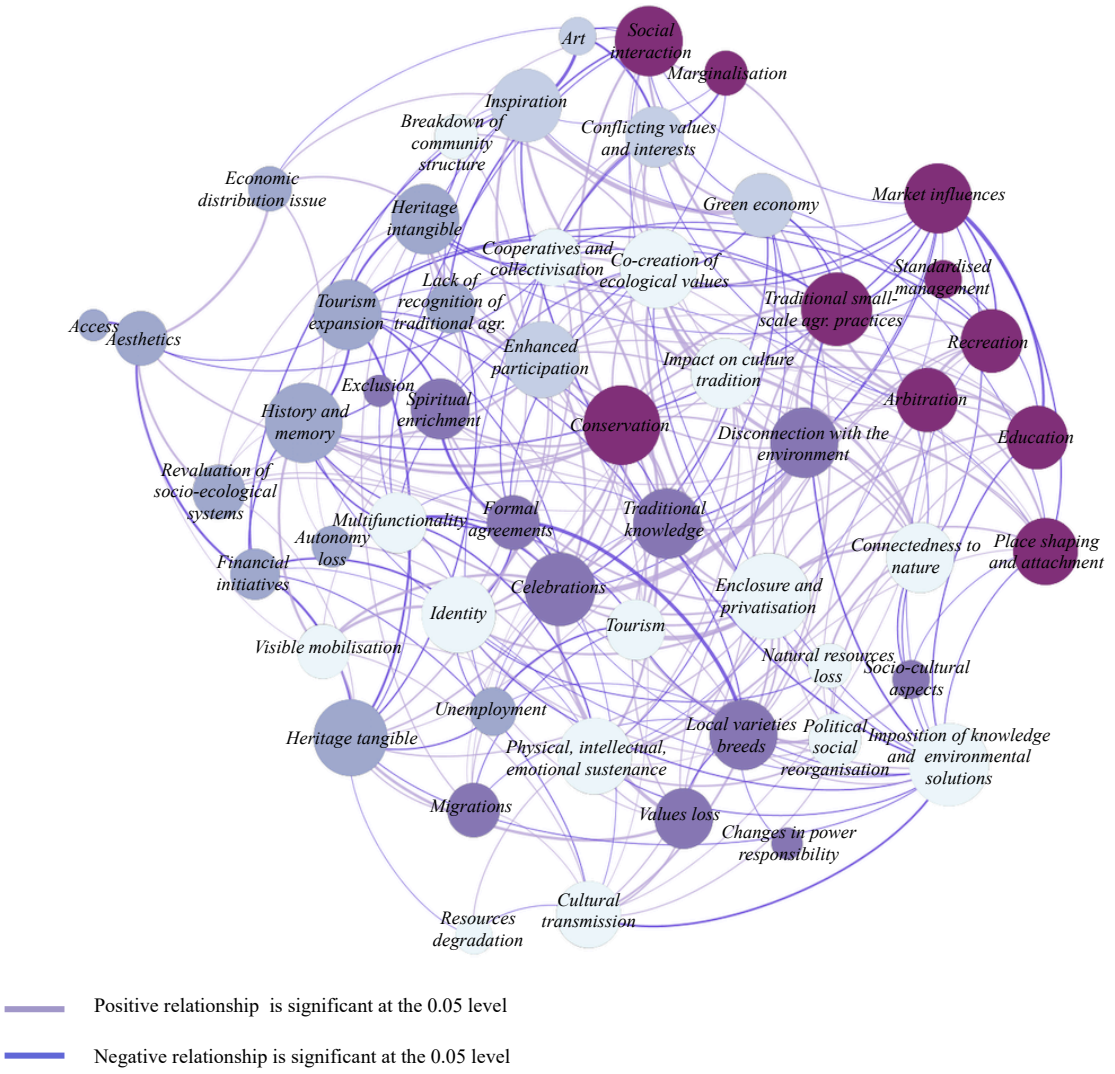


Fig. 4.7. Open and latent environmental conflicts about the importance of cultural ecosystem services (CES) co-creation at the community level. *Data obtained through Likert scale survey (2017/2018) from 1-10 for CES and 1-5 for conflict causes, consequences, and responses. The larger and more central the circle, the more frequent the conflict over the importance of CES co-creation. The width of the arrow indicates the strength and the color the direction of the conflict about the importance of CES in agriculture. The colors of the circles indicate different clusters of nodes (CES; causes, outcomes, and responses) that are more densely connected together than to the rest of the network.*

4.6. Discussion

4.6.1. Rural identity and latent conflict detection

This study strongly reinforces ecosystem services framework as a valuable approach for in-depth understanding of the cultural relationships people build with ecosystems (Chan et al., 2018, 2016). Specifically, the investigation reveals how respondents are collectively concerned about different social, ecological, and economic changes that take place in the studied communities (Barnaud et al., 2018). This study demonstrates how cultural dimensions, indeed, are involved in environmental conflict processes (Hanaček and Rodríguez-Labajos, 2018; Muradian et al., 2003), and co-evolve rural identity as a principal CES category in expressing concerns about relational values and related power dynamics. Small-scale farming and traditional knowledge–as relational values–are central vehicle of how and why people relate to their surroundings (Chan et al., 2018, 2016), representing both the result and expression of rural identity.

Furthermore, the findings underline the importance of CES, the consequences of their loss, and how such CES deprivations can cause emerging environmental conflicts (Chapman et al., 2019). Moreover, the framework of the study allows for detection of latent environmental conflicts–those not openly manifested in social responses– due to the changing contemporary processes in agriculture (Hanaček and Rodríguez-Labajos, 2018).

According to the literature (e.g. Ariza-Montobbio and Lele, 2010; Brahm, 2003), open mobilization and resistance will not always appear as a conflict response. This has been shown in the comparative analysis of the studied communities, indicating other factors such as imposed political solutions in environmental decision-making by more powerful actors also determine whether conflicts appear as a latent or open response. If conflicts do not take the form of an open or direct clash, conflicts can still exist (Temper et al., 2018) and–as this study shows–continue even when environmental conflicts are silenced due to unequal power relationships across scales. This study confirms earlier arguments that environmental conflicts are value conflicts (Chapman et al., 2019; Gould et al., 2019; Martinez-Alier, 2002).

Where decision-making is considered to be a question of scientific expert knowledge and not of "politics of the people", democratic struggles over socio-ecological life are highly "de-politicized" and alternative views on environmental management are silenced (Chapman et al., 2019; Swyngedouw, 2010). This study shows and reflects on this theory in three categories of CES: small-scale agricultural practices, rural identity, and traditional knowledge. Indeed, although mobilization and resistance as a social response is suppressed, which impose "expert knowledge" over the local traditional agricultural practices, the importance of rural identity in particular remains present.

Beltrán (2015) argues that environmental conflicts can be silenced by different actors using strategies such as imposed scientific knowledge about "green economy" or market-orientated ecological production for sustainable environmental management. Accordingly, this study demonstrates how communities like Kamenets–where CES value remains high but mobilization and resistance is very low–are dominated by the process of knowledge power relations. For instance, Sutherland et al. (2017) found knowledge networks of small-scale farmers in Bulgaria are dominated by external agricultural advisors, especially in applying for agricultural subsidies. When power imbalance is extreme and open social responses are silenced, CES can themselves become a form of resistance. That is to say, communities *silently* resist unfair distribution of services (Brahm, 2003), as evidenced by the enduring importance for sense of place and belonging or rural identity.

Rules and restrictions in environmental management cannot simply be imposed by more powerful actors. Local people, their identity, and their knowledge matter in sustainable resources management (Ryfield et al., 2019), and this article emphasizes the critical importance of engaging with local stakeholders and their knowledge about traditional environmental maintenance. Moreover, the study sheds light on the essence of rural identity in the face of marginalization and disappearance of rural villages across Europe and elsewhere (Cruickshank, 2009).

Detection of latent environmental conflicts around CES is particularly relevant, since the importance of–and role played by–identity may be an important step toward opportunities for alleviating conflict and promoting shared values such as sense of place

and community cohesion. Through these relationships, collaborative governance can be promoted and solutions can be achieved (Colvin et al., 2015).

4.6.2. Degradation of interrelated cultural ecosystem services and environmental conflicts

The appropriation and prohibition of access to common land in the Bulgarian countryside due to large scale investments negatively affects rural livelihoods and well-being, and leads to environmental conflicts (Antonelli et al., 2015; Medarov, 2013). This study differentiates changes in the importance of CES within these processes, showing that the interaction of people with ecosystems is closely connected to traditional activities and cultural bonds to the land, sometimes leading to both open and latent conflicts.

In line with Rincón-Ruiz et al. (2019), results of this study show that environmental conflicts triggered by development programs, like mining or renewable energy production, are often related to trade-offs between CES. This article reveals social and cultural values in the process of environmental conflicts and contributes to a broader understanding of conflicts over CES, the interrelated character between disparate CES, and CES' role in latent social responses to environmental conflicts.

Agroecosystems affect well-being beyond simple economic productivity, also encompassing social and cultural dimensions such as traditional knowledge, connectedness to nature, and rural identity. Challenges, however, remain. This study shows how environmental stewardship must go beyond payment initiative schemes that often overlook the complex cultural relationships that motivate, co-create, and maintain a healthy use of environmental resources (Chan et al., 2012b; Soy-Massoni et al., 2016). Indeed, the investigation supports the findings of Vatn (2010) by demonstrating that schemes based on economic values alone drive land privatization and enclosures, creating a counter force against the idea of CES preservation.

While some suggest contemporary innovations like biomass energy production can help preserve rural landscapes (Gullino and Larcher, 2013), such programs represent a threat

to the long-term sustenance of CES in this Bulgarian case study. As demonstrated, rural development programs are related to land enclosures that erode sense of place and belonging and cultural transmission across generations. Therefore, this study argues environmental formations of dispossession (Harvey, 2004; Ribot and Peluso, 2003), are also intermeshed with the socio-cultural forms of dispossession. As a consequence, the connecting ties between people and the environment vanish.

Poorly planned development programs inevitably risk mismanagement of natural resources (Häyhä and Franzese, 2014). This study shows land privatization, standardized agricultural management, and rural migrations are related to continuous degradation of CES and increasing pressures on culture and tradition of rural areas in general. This comes at a time when many households still find it difficult to maintain a comfortable standard of living (unemployment). However, the overall analysis shows that conflicts related to traditional knowledge are latent, and remains so if the presence of knowledge in environmental decision-making is dominant and impeded by powerful actors (Pascual et al., 2017; Veuthey and Gerber, 2012).

4.6.3. The critical importance of cultural ecosystem services for rural sustainability

This study furthermore reveals that social responses can take different forms, where culture related to farming and its nourishment is a way of persisting social, economic and environmental unfairness (Fischer and Eastwood, 2016). Social response processes go beyond the assumed trade-offs between economy and CES (e.g. Rincón-Ruiz et al., 2019). It is the economy of rural development itself that produces inequalities in the name of economic growth, as it passes on the inequalities for further accumulations by dispossession (Harvey, 2004) of rural identity, traditional knowledge, place shaping, and attachment.

Inequalities enter the intangible and non-material sphere of communities' way of living within the surrounding environment, "*changing social relations with all manner of deleterious social and environmental consequence of landscapes"* (Harvey, 2004:66). This disrupts intangible human-nature relationships and raises social-environmental

conflicts, usually at the expense of the most marginalized groups like rural communities and peasants (Lele, 2013; Martinez-Alier, 2014; Peluso and Lund, 2011). Nevertheless, this study shows how traditional knowledge, traditional agricultural practices, and rural identity still remain highly important despite the imposed rural development programs and deprivation of land and culture.

It can be argued, that environmental conflicts concern all ecosystem services, including the deprivation of CES, as these cultural services include an important dimension of traditional knowledge (Pascua et al., 2017; Reyes-García, 2015) and the co-creation of rural identity with surrounding agroecosystems. Thus, environmental conflicts cannot only be seen through economic, social, and environmental elements in a fragmented way. Rather, conflict processes are intertwined with the loss of cultural bonds and benefits.

For instance, Barthel et al. (2010) argue how local ecological knowledge and associated practice are essential to sustain and enhance ecosystem services, where participation and reification interact and social-ecological memory is a shared source for critical ecosystem services preservation and maintenance. Similarly, small-scale farming practices in Bulgaria act as a bridge between traditional knowledge and the biophysical functions of ecosystems and rural communities, while social interactions connect traditional knowledge to cultural transmission. Therefore, facilitating participatory environmental decision-making, based on local environmentalism (Lele, 2013), could be very useful in improving the local economy, preserving environmental traditions and practices, and preventing environmental conflicts. This is an important point for the detection of environmental conflicts, but also for avoiding their generalization. In this case study, open mobilization and resistance over CES were only observed when central services such as traditional knowledge or identity were disrupted, and the power knowledge dynamics were poor.

Mobilization and resistance do take place in the studied communities, particularly related to history and memory, celebrations, tangible agricultural heritage. Furthermore, consequences of these open concerns relate closely to rural migrations and even call for socio-cultural aspects in economic development activities. When consequences are economically manifested through unemployment or poverty, and disconnectedness to

environment is likely, then agroecosystems are promoted as multifunctional, in this Bulgarian study. The inherent focus on cultural, economic, and environmental functions of the multifunctionality concept (Lovell et al., 2010), allows for the open expression of concerns about identity, history and memory, and tangible heritage. Furthermore, even enhanced participation is identified as an additional response to open mobilizations.

As Tilliger et al. (2015) argue, traditional agricultural landscapes degrade without local people and their traditional knowledge, suggesting the potential failure of rural management schemes that are driven by market forces and motivated by profits. Instead, traditional practices that enable communities to manage resources for collective benefit in sustainable ways must be widely encouraged by policies. Otherwise, rural areas risk continued water availability reduction and biodiversity loss associated with depopulation and land abandonment (Otero et al., 2011). Indeed, the long-term coevolution between peasants and their environment sustain habitats and species which are now declining along with rural exodus (Otero et al., 2013). This paper establishes further insights into how these trends correlate with the importance rural people hold for CES, which –when disrupted– lead to open or latent forms of environmental conflicts.

4.6.4. Limitations

As a general limitation of this study, it should be noted that the CES categories applied in the survey are based on a global literature review, and therefore, it might not necessarily capture the whole range of relational values farmers and rural residents in the studied communities hold. The survey contained descriptions of the specific CES category. However, the description might have a different meaning to different individuals. Moreover, this study does not show exactly how sense of place is experienced or practised. Regarding the analysis of CES by means of average value ratings, only rural identity, traditional knowledge, and traditional agricultural practices and small-scale farming were addressed and correlated to levels of open (visible mobilisation or protests) and latent (no visible mobilisation or protests) environmental conflicts at the community scale.

Furthermore, the perceived importance of traditional knowledge related to the increase of the perceived importance of other CES, is based on the assumption that the relationship between variables is linear. That is to say, the methodology of linear regression applied in this study ascertains only *relationships* between different CES. The involvement of a certain situation not covered in the CES list is not considered. This applies for the linear regression of CES related to causes, outcomes, and responses to environmental conflicts. Only the three stages of environmental conflicts and its categories included in the survey are considered as the *relationship* of *changes* in perceived importance of CES. The number of observations this study covers is relatively low (total n=100).

4.7. Conclusion

This study analyses open and latent (or silenced) environmental conflict values surrounding cultural ecosystem services (CES) in small-scale farming systems and traditionally managed agricultural land in Bulgaria. The study relates processes of environmental conflicts, including causes, consequences, and responses as a result of ongoing social-environmental and economic changes, with different CES.

The comparison of each studied community shows that mobilization and resistance are a silenced social response involving the three main CES: sense of place and belonging (identity), and traditional small-scale agricultural practices, and traditional knowledge. The open social response is silenced when a strong unequal power relationship is given, especially in the form of dominant external knowledge providers. At the same time, as culture itself–and rural identity in particular–becomes a force of resistance, it remains highly important for rural farmers and residents to latently resist in the face of the strategies of more powerful actors. When power relations in agricultural decision-making are not highly unequal and open mobilizations and resistances take place; it can be concluded that rural identity is the CES through which people express their concerns and issues.

The study reveals traditional knowledge in a central position of CES. Thus, people are crucial for the maintenance of traditional knowledge, itself crucial for the sustenance of social relations, since all CES are positively interrelated with traditional knowledge. Traditional small-scale agricultural practices, and identity or sense of place and belonging have the strongest significant interrelations with traditional knowledge. These relationships suppose traditional knowledge in agriculture to be critically relevant to sustain most other CES. This also explains the central role of traditional knowledge and rural identity in environmental conflicts.

The study illustrates how conflict processes and their different causes, consequences, and responses can manifest differently depending on CES category and the specific social, environmental, and economic changes of a given place. The study also shows latent environmental conflicts surround CES. Findings indicate the main environmental conflicts over CES are enclosure and privatization of agricultural land and conservation initiatives. In particular, these causes have an influence on the important rise of traditional knowledge, sense of place and belonging (identity), history and memory. Open environmental conflicts arise when resulting in a breakdown of community structures. Otherwise, open concerns around CES are silenced and enhanced participation becomes another conflict response.

CES play a fundamental role in redefending ecosystem services distribution issues and promoting social, ecological, and economic sustainability. Therefore, recognition and preservation of CES through science and policies represents a pathway for better economic, environmental, and social stability in marginalized rural areas.

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Appendix 4.A. List of the 21 different cultural ecosystem services identified in agricultural systems worldwide
based on Hanaček and Rodríguez-Labajos (2018)

Cultural ecosystem services (CES)	C	On a scale from 1-10, with **1 being not important** and **10 being very important**, please select if your farm and the surrounding area:	1	2	3	4	5	6	7	8	9	10
Aesthetics	01	Has beautiful scenery										
Artistic creation	02	Has appeared in paintings, movies, novels or other forms of popular or traditional arts										
Traditional local varieties and breeds	03	Contributes to biological and cultural diversity of the place, such as genetically divers crops and local languages										
Celebrations	04	Is a place for celebrations such as harvesting and food festivals, traditional ceremonies or religious events										
Co-creation of ecological values	05	Helps to care the health of the soil, the environment and the people										
Connectedness to nature	06	Helps you to build a relationship and connection to nature										
Sense of place - belonging (Identity)	07	Makes you feel belonging to the place										
Cultural transmission	08	Serves to sustain knowledge, values and believes between and within generations										
Education	09	Is a learning and teaching resource about land management and food production										
Heritage – tangible	10	Contains elements of historic rural architecture such as stone walls, traditional houses or churches										
Heritage – intangible	11	Is related to family traditions and/or maintaining oral traditions such as languages										
History and historical memory	12	Represents the history and historical memory of your place										
Inspiration	13	Inspires artistic creativity										
Outdoor Recreation & Cultural hunting	14	Is a place for recreation and/or hunting										
Physical, intellectual, emotional sustenance	15	Is a place for physical, emotional and intellectual nourishment for your body and mind										
Place shaping and attachment	16	Creates for you an emotional bond with your place										

Social interaction	17	Is a place for social interactions, which helps you to connect in a meaningful way with other people										
Spiritual enrichment	18	Is related to local stories, myths or any other believes, including spiritual ones										
Tourism	19	Is an agritourism attraction or visited by many tourists										
Traditional agricultural practices & Small-scale farming	20	Contributes to retain traditional rural lifestyle and agricultural practices										
Traditional knowledge	21	It is a place where traditional knowledge is maintained and shared										

Appendix 4.B. List of causes of environmental conflicts around cultural ecosystem services worldwide based on Hanaček and Rodríguez-Labajos (2018).

C	On a scale from 1-5, with **1 being not likely** and **5 being extremely likely**, please select the changes occurring in the area where your farm is situated or in the area where you live:	1	2	3	4	5
01	There are increasing market influences in agricultural production decisions					
02	Subsidies have become more relevant for determining whether to cultivate a specific crop or not					
03	Land has been privatized					
04	Migrations is increasing					
05	Scientists or local government promote agricultural and environmental measures that are not adapted to our specific situation					
06	The trend to promote farming practices that pursue environmental and climate goals is increasing					
07	There are increasingly diverging perspectives within the community how landscape should be managed					
08	The influence of the tourist sector on land managements has increased					
09	There are more nature conservation initiatives taking place					

Appendix 4.C. List of consequences of environmental conflicts around cultural ecosystem services worldwide
based on Hanaček and Rodríguez-Labajos (2018)

Cq	On a scale from 1-5, with **1 being not likely** and **5 being extremely likely**, please select the changes occurring in the area where your farm is situated or in the area where you live:	1	2	3	4	5
01	Local customs and traditions related farming have changed					
02	Our land, water, and biodiversity are contaminated ruined					
03	There is a lot of poverty in the area					
04	Our farms do not have cultural, economic, and environmental values anymore					
05	We are excluded from the decision making in farming management					
06	There is an unjust treatment to us for who we are (farmers) and because we live in a rural area					
07	Our traditional farming practices are not recognized					
08	I feel connection with farming and environment that surrounds me (relationship with nature)					
09	We cannot cultivate anymore what we would like to					
10	We had to move out of our traditional lands, or we no longer have access to water and land resources					
11	I do not feel any responsibility anymore for my farming practices					
12	Community sense does not longer exist					
13	There is no enough food in the area					
14	Others control our land areas and our work					
15	Our work is not paid enough					

Appendix 4.D. List of responses to environmental conflicts around cultural ecosystem services worldwide
based on Hanaček and Rodríguez-Labajos (2018).

R	On a scale from 1-5, with **1 being not likely** and **5 being extremely likely**, please select the changes occurring in the area where your farm is situated	1	2	3	4	5
01	In face of possible changes in agriculture I would like to participate more in research and/or decision making					
02	Local culture and tradition have the potential to promote local economic activities					
03	The fact that agro-ecosystems serve many purposes: environmental protection, rural employment, food security, this should be better integrated in agricultural decision making					
04	Typically, farming-related decisions are imposed by actors outside the community					
05	When unexpected or unwanted changes in farming occur in the area, people openly protest and resist these changes					
06	Formal agreements with public authorities and private sector contribute to solve problematic changes in the region, such as biodiversity loss or loss of traditional or/ small scale farming					
07	The important role of local landscapes or useful parts of them need to be better recognized					
08	We should organize cooperatives					
09	A political and social reorganization is urgent is our region					

Chapter 5

5. General discussion and conclusions

By looking into contemporary social, economic, and environmental circumstances of rural areas, this dissertation addresses environmental conflicts related to impacts of land-use changes on cultural ecosystem services (CES) in the light of relational values. The dissertation emphasizes biophysical and social system changes and makes the following contributions to the body of literature: (i) environmental conflicts are associated with CES due to land-use changes at the global level; (ii) the importance the local stakeholders perceive for CES is disrupted due to land-use changes; and (iii) latent forms of environmental conflict are expressed by rural residents through an increased valuation of CES importance when the degree of power in environmental decision-making of a community is low.

This chapter summarizes the main findings of the dissertation with regard to the main research objectives, highlights the main conceptual and methodological contributions, and closes with prospects for further research.

5.1. Main findings

5.1.1. The global impact of land-use changes on cultural ecosystem services and associated conflicts in rural areas

By examining CES, the dissertation builds on previous studies of ecosystem services and environmental conflict in the context of land-use changes in rural areas, providing an in-depth cultural ecosystem services analysis of the dimensions and changes within agricultural areas, and the cultural bonds local people develop with agroecosystems. Indeed, the continuous degradation and progressive disappearance of traditional agriculture, CES, and landscapes due to land-use changes should receive greater recognition and be better integrated into land-use policy designs.

This is especially important as environmental conflicts emerge related to land-use changes, leading to further CES loss (Fig. 2.14). These environmental conflicts are not always expressed in a visible protest, but as latent grievances about CES. Moreover, the phenomenon of environmental conflict related to CES is not isolated to a particular region but is occurring and spreading into rural areas worldwide (Figs. 2.3 and 2.5).

This dissertation discusses land-use changes as visible biophysical transformation of rural areas; whose causes are mainly related to economic development programs targeting marginalized communities. These rural land-use changes affect not only biophysical agricultural processes, but also the CES associated with such farming practices, including traditional knowledge, recreation, sense of place and belonging, and local agricultural varieties and breeds. Due to the general impact of land-use changes on culture and tradition, this dissertation suggests that global agricultural heritage is at risk of being lost (Fig. 2.6).

Worldwide agricultural heritage is therefore key to explaining how CES are affected by land-use changes. The chapter further demonstrates that this global agricultural heritage cannot be studied separately from the vast number of mutually interrelated CES that form and sustain it. Such changes have not only been shown to be ineffective in solving the economic problems of many rural areas, but also contribute to the loss of CES and values associated with rural communities.

5.1.2. Relations between land-use changes and the importance of cultural ecosystem services in small-scale farming systems for sustainable policy design

The Bulgarian case study reveals how land-use decision making at the European scale influences land-use design at the national level. The analysis has shown that generalized land-use decision making is further reflected at the regional level and defines how the community farmland is managed. These generalized policy designs risk the decomposition of regional landscape as traditional farms and rural communities are marginalized and neglected. Generalized policy programs are therefore inappropriate and harm transmission of important cultural knowledge. Since CES are place and

context specific, land-use policies should not be designed and implemented in the same manner and extent for each country, region, and community in Europe.

This dissertation contributes to better land-use management and policy programs, as it strongly emphasizes the importance of the socio-cultural dimensions in the push to halt land abandonment and the disappearance of villages across Europe.

Specifically, the dissertation reflects upon changes to both land-use and the associated value of CES (Fig. 3.8) and discusses links between these perceived changes and three main agricultural policies in the country: Energy and Energy Efficiency Act; Special Accession Program to the European Union for Agriculture and Rural Development; and the Common Agricultural Policy of direct payments, including its second pillar for Rural Development (Table 3.1). In the studied communities, people perceive a rich quantity of CES from agriculture, namely place shaping and attachment, aesthetics, cultural transmission, and connectedness to nature (Fig. 3.5). At the same time, people report many different land-use changes taking place in the communities and across the region, with agricultural intensification and development of rural areas occurring the most frequently (Fig. 3.7).

Moreover, stakeholders' evaluation of CES at both regional (Fig. 3.6) and farm levels (Fig. 3.8) indicate a disrupted trend of CES evaluation, in which the value of some CES increase while others decrease. Specifically, at the regional scale there has been an increasing trend in the last 50 years for the CES place shaping and attachment, history and memory, and intangible agricultural heritage. On the other hand, stakeholders express the decreased relevance of traditional agricultural practices and traditional knowledge.

The network analysis of the survey results (Fig. 3.8) explains this disrupted trend in detail. In line with classical economic theory, traditional small-scale farmers and rural residents' value CES more as land-use changes such as mining, transport infrastructure, and intensified practices start to threaten CES throughout rural areas in Bulgaria. Conversely, the value of CES decreases as land-use changes such as abandonment, defense projects, and commercialized grazing of common rural land create extreme disconnectedness to the land. Thus, this dissertation comments on land-use policies to

consider the critical importance of CES for rural livelihoods at different governance scales.

5.1.3. Identity as a response to latent environmental conflicts

Environmental cultural dispossession, distribution issues, and deprivation of local culture relate to loss of agricultural land in Bulgaria. Specifically, the dissertation uses the ecosystem services framework in order to detect latent or the not yet openly manifested environmental conflicts for CES. The study assesses attitudes towards CES values when different socio-economic and environmental changes take place within the studied communities in Bulgaria.

The dissertation found that environmental conflicts over CES in Bulgaria are latent when the political power of imposed environmental solutions and knowledge increase. Both open and latent conflicts center around three main CES: traditional knowledge, sense of place or belonging, and traditional agricultural practices and small-scale farming (Fig.4.4). Open environmental conflicts also take place when social interactions are threatened, resulting in a breakdown of community structures (Fig.4.7).

Network analysis reveals how latent conflicts also include concerns about cultural transmission for future generations of farmers and rural residents. Another important finding of the analysis is that enclosure and privatization of agricultural land and conservation initiatives increase the value of CES (Fig. 4.7). Specifically, place shaping and attachment, traditional knowledge, physical, emotional and intellectual sustenance occupy a central role in the network.

Furthermore, rural people experience a disconnectedness to nature as a consequence of land enclosure and privatization. If this is followed by social and political imposition of environmental management, environmental conflict is again latent. However, if rural residents in Bulgaria have political power, then they are likely to organize in collective cooperatives, call for agricultural multifunctionality, and engage in open environmental conflict in the form of protest.

Rural people are crucial for maintenance of traditional knowledge, and traditional knowledge is integral for sustaining social relations. It can be concluded that rural communities and their knowledge build CES at the community level and are a backbone of the rich agricultural heritage on the global level.

However, land-use changes including the green economy, such as biomass and other market oriented ecological production fail to ensure traditional socio-cultural rural structures. Thus, attention to the specificities of local traditional culture is needed in both policy and research with a salient recognition of the imposed knowledge and power, in terms of community identity and the politics of a given place.

Yet, rural farmers and communities resist highly political changes in rural areas, such as consolidation of traditional farms and privatization of land, through CES like identity and place attachment. Such analysis of latent conflict is a novel approach for detecting and halting the escalation of conflicts involving cultural value concerns attached to agricultural areas. Moreover, the quantitative methodologies used provide a foundation for a better understanding of how cultural values for local residents and farmers in Bulgaria reveal open and latent environmental conflicts surrounding CES.

CES were framed within political ecology framework in terms of who benefits from ecosystems, the environmental goods and services they provide, and whose culture, tradition, and knowledge are recognized and taken into account in environmental management decisions. Local communities have different degree of political power in environmental decision making (Fig. 4.6). When the degree of power is high, then concerns about CES are expressed openly thorough demonstrations or protests. When the degree of power is low, then conflicts about CES are latent. The use of power in both environmental decision-making and knowledge about environmental management in general is a particularly relevant issue for rural people, because traditional knowledge strengthens the value of all other CES categories co-created with agroecosystems (Figs. 4.4 and 4.5).

5.2. Conceptual and methodological contributions

While holistically approaching CES, the dissertation primarily draws upon two main fields of scholarship: ecosystem services and political ecology of environmental conflict. By drawing upon the two different bodies of literature, the dissertation supports a better understanding of the forces that drive the biophysical transformation of rural areas, how such land-use changes influence co-creation of CES in light of relational values and provides insight into the resultant open and latent environmental conflicts.

5.2.1. Advancing the understanding of cultural ecosystem services

The interdisciplinary study underlying this dissertation responds to previous calls for the incorporation of environmental conflicts over ecosystem services (ES) into the ES framework (Breslow, 2014; Corbera et al., 2007), both conceptually as well as methodologically. This is an important angle in ES research, because both access to natural resources and distribution of environmental goods and services vary among different social groups (Martinez-Alier, 2014; O'Connor and Martinez-Alier, 1998), and are embedded in vast processes of agricultural land-use change (Rasmussen et al., 2018; Stephenson, 2008).

This is especially true for rural inhabitants and the cultural importance they attach to agricultural land, as inhabitants co-create and can be seen as the stewards of CES (Chan et al., 2012b; Hartel et al., 2014). Indeed, CES are deeply embedded with changes in material and biophysical elements of the environment and the undergoing changes (Fig. 2.8)–because CES are both the result and expression of the co-creation (Table 2.2 and Fig. 2.7). Hence, the continuation of traditional practices, relational values, and CES co-creation is a part of the pathway to progress in sustainability science (Chan et al., 2018, 2016).

As suggested by the literature (Chan et al., 2012a), this dissertation extracts social, biophysical, and socioecological contexts and interactions by employing methods which

explicitly identify relevant CES co-creation and their relationships (Chan et al., 2018, 2016). By following these recommendations this dissertation has considerably advanced the understanding of CES in applying:

1) The coding of the existing literature on the global level and thereby identifying a diverse range of CES categories and their subcategories (Table 2.2). This dissertation, furthermore, holistically examines the cultural relationships (Chan et al., 2018) that people develop with the natural and built environment in contemporary changing agricultural contexts (Hanspach et al., 2014; Hartel et al., 2014). In that way, the identification of CES in this dissertation goes beyond the standard CES classifications, such as in CICES. Furthermore, the social network analysis provides evidence about the hypothesis of an interrelated character of CES. For example, agricultural heritage (Fig. 2.6) and traditional knowledge have been shown to be fundamental element in sustaining other CES (Fig. 4.5).

2) The approach adopted in this dissertation for studying CES in the context of rural land-use changes has demonstrated changes to the environmental and cultural settings of landscapes. Through the assessment of CES, this dissertation explores how the cultural bonds (Chan et al., 2018; Ryfield et al., 2019), including rural identity and traditional knowledge, are disrupted by land-use and management changes such as agricultural intensification, expansion, and the urbanization of rural areas (Fig. 3.8). The codification, furthermore, reveals that both open and latent environmental conflicts about CES rise due to the land-use changes in agriculture, providing a foundation to explain complex value relations (Chapman et al., 2019) in socio-ecological systems at the global level (Fig. 2.14). The dissertation confirms the disrupted nature of CES due to land-use changes (Soy-Massoni et al., 2016b, 2016a).

3) Land-use science typically fosters policy and decision-making (Plieninger et al., 2016) but rarely incorporates CES (Plieninger et al., 2013). The results of this dissertation are relevant to inform policymakers that such advanced disconnection from agricultural land and traditions can have additional negative consequences for already marginalized communities and degraded agricultural areas. The changes in land-use also lead to environmental conflicts over CES in agriculture, because these traditional agricultural systems are extremely important for sustaining and maintaining livelihoods

of rural communities. Land management programs, thus, should prioritize preserving traditional forms of knowledge, identity, and the aesthetic beauty of surrounding landscapes.

5.2.2. Creating a broader foundation for understanding environmental conflicts

As important as it is to study open environmental conflicts, equally important is knowing how to effectively approach their latent forms and potential escalations (Brahm, 2003). As shown in this dissertation (Figs. 4.4), although latent environmental conflicts consider CES, the importance of these concerns are silenced by more powerful or "knowledgeable" actors in environmental management decision making (Chapman et al., 2019). For this reason, detection and analysis of latent conflicts are of critical importance for marginalized rural inhabitants and their cultural relationship to the land (Kenter et al., 2019). This is particularly true as rising social inequality, economic insecurity, and environmental crises dominate the current socio-economic system (Queiroz et al., 2017). By detecting CES-related latent conflicts or *silenced* environmentalism (*cif* Martinez-Alier, 2014), has the potential to contribute to a more equitable and, hence, sustainable socio-ecological farming system.

Environmental conflict is a process with three main stages: causes, consequences, and responses (open or latent). The responses, as the last stage of a conflict, do not necessary appear as openly manifested clashes over CES, but as latent disagreements or concerns that often involve a call for enhanced participation of disadvantaged groups– i.e. farmers and rural residents (Fig. 2.13)–in environmental decision-making or promotion of agricultural multifunctionality (Fig. 2.14). Therefore, a main finding of this dissertation is the notion of environmental conflict as a latent or open process that interlaces biophysical, socio-economic, and cultural elements of the changing rural areas both globally (in Chapter 2) and regionally in Bulgaria and Eastern Europe (Chapters 3 and 4).

A flow graph based on the in-depth line by line coding (Fig. 2.14) explains the environmental conflict process with causes, consequences, and responses of land-use change dynamics related to CES. For example, land-use changes like urbanization and

industrialization of rural areas negatively affect CES categories like traditional agricultural practices and rural lifestyle. The main cause of the changes in land and CES relates to the influence of global market structures (e.g. demand for natural resources, or a specific agricultural commodity) and privatization of agricultural land. As an outcome, the flow graph clearly shows an impact on culture and tradition and a loss of different values. This can result in either a latent conflict response for considering sociocultural significance in agricultural economic activities, or an open conflict response expressed in demonstrations and protests.

Furthermore, the Social Network Analysis clearly reveals CES categories as a part of changing socio-economic situations and environmental conflicts. Environmental conflict, in point of fact, coevolves as a complex culturally-bounded issue (Escobar, 2008; Muradian et al., 2003). At the same time, cluster analysis applied within the Network discloses, for example, place shaping and attachment as a CES category related to latent forms of conflicts caused by conservation initiatives and standardized agricultural management. Despite that, the analysis also shows rural identity relates to open or visible mobilization only when imposition of knowledge across studied communities is low.

These findings further contribute to environmental conflict literature by showing how the rural community resists the imposed knowledge–"solutions"–that result in cultural deprivation and dispossession through environmental management–by relying on their identity, sense of place and belonging, and traditional forms of knowledge. This is true even when the cultural concerns are not expressed openly but are maintained in a latent form.

5.3. Limitations and prospects for further research

Although based on a global categorization, this dissertation does not cover all existing land-use changes, CES categories, and associated environmental conflicts in agriculture. Additionally, the sample size and the description of CES in the surveys was somewhat limited, only just achieving the minimum needed for network and cluster analysis

(n=100). The description of CES categories did not cover the whole range of meanings related to “aesthetics”, “belonging” or “attachment” to a village (see section 3.3.2 and Table 3.4). Linear regression analysis ascertained only *relationships* between different CES. The involvement of a certain situation not covered in the CES list was not considered in the analysis. This applies as well for the linear regression of CES related to causes, outcomes, and responses to environmental conflicts (see section 4.5.4). Furthermore, the classification system (see Tables 3.3 and 4.1) necessarily grouped a variety of farm sizes into broader categories (i.e. 1-2 ha units) and did not account for overlap in farm ownership (i.e. one farmer being associated with multiple farm units). Moreover, the interrelation between different land-use changes. For example, how land abandonment and mining activities might affect each other constitute future research questions. Additional research questions also emerge with regard to CES and different geographical regions; CES and historical perspectives of agricultural governance; CES and discriminated or disadvantaged groups (gender, caste, race); as well as CES and conflict detection and its resolution.

5.3.1. Interdisciplinarity, different social groups, and geographical regions/places

The literature review of this dissertation revealed that many regions in Eastern Europe, South Asia, and Africa remain understudied from the perspective of CES, land-use changes and environmental conflicts. This dissertation, hence, suggests wider and continued research on place and context specific CES categories is merited. Future research requires both a more anthropological and historical analysis of the changing components and drivers of the human-culture-nature relationship.

Potential future research could therefore explore the role of oral stories, beliefs, and legends; or examine how differences in rural identities affects the maintenance of traditional agricultural practices across generations. By studying different land-use changes and how they interact and develop through time and extent would contribute to a better understanding of rural-cultural issues of a specific place, region, or even social group (i.e. indigenous, traditional peasants, or women).

As this dissertation shows, there is a complex web of interrelated drivers and decisions behind the transformation of traditional rural settlements worldwide. Another prospect for further research could reveal how land-use changes relate to large-scale agricultural commodity production and influence traditional agricultural practices, CES co-creation, and environmental conflicts worldwide. For instance, it would be very important to study how people defend their land, spirituality, and identity against extractive and destructive industries worldwide. Similarly, a future study could determine what role colonialism and coloniality play in governing the cultural and environmental effects of resource extraction and changing nature-culture relationships; and how decolonial movements resist these nature-culture transformations and inequalities.

5.3.2. Conflict detection and resolution

To gain deeper insights about human-culture-environment interactions, further research should address not only emerging environmental conflicts and ecosystem service distribution issues, but also the resolutions to these conflicts once they are detected or escalated in an open visible form. It is important that we involve specific traditional agricultural practices and management activities into prospective future ecosystem services research, so that they can be incorporated into land decision-making and put into practice, thereby helping to preserve nature and supporting different agricultural traditions and cultures. This could be achieved by studying and comparing case studies at different geographical levels and agricultural perspectives.

Finally, better decisions are urgently needed to address environmental conflicts within rural agricultural communities. At the community level, environmental conflicts related to land-use changes, local culture, and co-created contributions require analysis of how specific communities resist changes through their traditions, cultural norms, and beliefs. Such an investigation can be used to inform policy makers of what is needed from local actors' point of view to achieve environmental, social, and local economic well-being of today marginalized and neglected – but still diverse rural areas.

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