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Community resilience and land degradation in forest and shrubland socio-ecological systems: evidence from Gorgoglione, Basilicata, Italy

Claire Kelly¹, Agostino Ferrara², Geoff A. Wilson¹, Francesco Ripullone², Angelo Nolè²,
Nichola Harmer¹, Luca Salvati³

¹ School of Geography, Earth and Environmental Sciences, University of Plymouth, United Kingdom

² School of Agricultural, Forest, Food and Environmental Sciences, University of Basilicata, Potenza, Italy

³ Consiglio per la Ricerca e la Sperimentazione in Agricoltura, Roma, Italy

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Abstract

Assessing the resilience of communities is assuming greater importance at a time of global economic upheaval, climatic and socio-demographic change. The past 10-15 years have seen a significant increase in the number of studies addressing resilience issues at community level from a variety of perspectives, and although the resilience of communities in dealing with disturbances feature strongly in these studies, less work appears to have been undertaken at the interface between community resilience and land degradation. In addition, little attention has been paid to land degradation, desertification risk and community resilience at the forest-community interface, despite the fact that forest ecosystems represent one of the most important terrestrial biomes in terms of the ecosystem services and socio-economic benefits that they provide. Building on existing community resilience literature, which highlights the importance of various socio-economic and political drivers for understanding community resilience, this study analyses how economic, institutional, social, cultural and natural factors at community level affect the ability of communities to adapt and adjust decision-making pathways towards resilience. The study focuses on the municipality of Gorgoglione (Basilicata, Italy), a typical Mediterranean forest and shrubland socio-ecological system characterised by a mixture of agricultural and forest landscapes, and prone to land degradation issues linked to both anthropogenic (deforestation, overgrazing, forest fires) and natural (soil erosion, droughts, climate aridity) causes. A case study approach is used, drawing on quantitative and qualitative data across spatial levels and temporal scales to examine the complex interrelationships between community resilience, forest ecosystems and land degradation.

Key words: Community resilience; forests and shrubland; socio-ecological system; land degradation and desertification; Mediterranean environment

Introduction

'Community resilience is the existence, development, and engagement of community resources by community members to thrive in an environment characterized by change, uncertainty, unpredictability, and surprise. Members of resilient communities intentionally

develop personal and collective capacity that they engage to respond to and influence change, to sustain and renew the community, and to develop new trajectories for the community's future' (Magis, 2010: 402).

The statement above, which emerged from a collective exercise to develop a theoretically and empirically-based definition of community resilience, encapsulates the idea that if a community has the right set of skills, knowledge and tools, and knows how to use them, it can make informed choices about the resources that it has access to, enabling it to thrive and persist (Adger, 2000; Wilson, 2012a). Critically, the definition above also highlights the difference between community resilience and sustainability. Sustainability, as Kuhlman and Farringdon (2010: 3443) note, 'is a matter of what resources—natural resources, quality of the environment, and capital—we bequeath to coming generations'. Sustainable development can then be seen as one of many potential pathways that a community may follow. In this respect, a sustainable development trajectory could be seen as the outcome of a resilient community.

Over the past decade or so, there has been a sharp increase in the number of studies examining various aspects of resilience at community level, including the relationship between community resilience and natural disasters (Cutter et al., 2008), climate change and social resilience (Hastrup, 2009), biodiversity/resource depletion and resilience (Forbes et al., 2009), rural/urban resilience (Wilson, 2010; Oudenhoven et al., 2011), the resilience of coastal communities (Bodin and Crona, 2008), collective action and community resilience (Cutter et al., 2008), community resilience and globalisation processes (Wilson, 2012b), and theoretical/philosophical issues differentiating community resilience from ecological resilience (Davidson, 2010). Studies focusing on social resilience have also highlighted the importance of learning pathways, social memory and communication in enabling socio-ecological systems exposed to disturbances, hazards or catastrophes to adapt, change and adjust decision-making pathways (Cutter et al., 2008; Davidson, 2010).

Although the response of communities to sudden-onset 'disasters' or 'hazards' features strongly in these studies (see for example Cutter et al., 2008), less work appears to have been done on the links between community resilience and land degradation. Exceptions can be found in journals such as 'Ecology and Society', which have highlighted the importance of understanding how land degradation affects community resilience. Authors such as Fraser et al. (2011), for example, have shown that in dryland contexts, livelihoods are often threatened by complex interlinked social, economic and environmental changes which include, but are not limited to, land degradation and desertification issues. Sendzimir et al. (2011) similarly investigated the processes needed to rebuild resilience in desertification-prone areas, noting in particular the complexity of actor interactions with resilience processes. Other authors such as Walker et al. (2009) have focused on understanding not only resilience but also adaptability and transformability in areas affected by land degradation. All of these studies have highlighted the fact that land degradation processes can hamper the ability of human communities to survive and thrive.

Although previous studies provide a robust foundation from which to assess the complex interlinkages between community resilience and land degradation, little attention has been paid to these issues at the forest-community interface, despite the fact that forest ecosystems represent one of the most important terrestrial biomes in terms of ecosystem goods, services and benefits they provide (FAO, 2010). Demands for forest resources generated by socio-economic development include energy and wood demand, as well as increased demand for agricultural and grazing land (see examples in Wilson and Juntti, 2005). As a result, forest resources can become overexploited or mismanaged and, eventually, suffer degradation. Yet

forests also provide a range of ecosystem services that contribute to the development of communities. Forests are complex, needing effective and adaptive management approaches which support ecosystem service provision (Maass et al., 2005; FAO, 2010; Basso et al., 2010). At community level, the most important forest ecosystem services are conservation of biodiversity, protection of watersheds/regulation of hydrological cycles, mitigation of land degradation processes, provision of forest products and regulation of biogeochemical cycles through carbon sequestration and storage (Maass et al., 2005; Thompson, 2012). Because these services are based on feedback mechanisms, forest management needs to be adaptive to ensure the continued contribution of forest services to community resilience (Magis, 2009).

Building on previous studies that have adopted wide-ranging conceptual frameworks on the key drivers affecting resilience at community level (Ostrom, 2008; Magis, 2009; Buikstra et al., 2010; Wilson, 2012a), this study will focus on how these factors enable communities experiencing land and forest degradation to adapt and adjust decision-making pathways towards resilience. The focus community is Gorgoglione Municipality (Basilicata, southern Italy), a community characterised by a mixture of agricultural and forest landscapes prone to several degradation issues.

Understanding key factors affecting community resilience

Ostrom (2008), Buikstra et al. (2010) and Wilson (2012a) have highlighted that key for understanding resilience at community level is to understand the complex interplay between various ‘domains’ that characterise socio-ecological systems. While there is considerable debate about what is needed for ‘resilient’ communities (see in particular Adger, 2000; Cumming et al., 2006), most authors tend to agree that resilience and vulnerability can be understood as a spectrum, i.e. that a resilient system always has ‘positive’ attributes while a vulnerable system tends to be dominated by ‘negative’ attributes (Adger, 2000; Folke, 2006; Wilson, 2012a). This means that well developed economic, institutional, social, cultural and natural domains are crucial for resilient communities. In this study, we use a framework that focuses on understanding the factors that comprise these different ‘domains’ and how they interact and interlink to influence community resilience. Figure 1 highlights the assumption, based on a resilience-vulnerability spectrum, that community resilience will be strongest at the intersection of these different domains (provided they are strongly developed). Second, as Figure 1 highlights, all five domains are closely interlinked, and therefore weakening factors within one domain (increasing poverty, for example) can also weaken factors in other domains (by reducing social capital, for example). In addition, it is assumed that community pathways can never be *fully* resilient as some domains will always tend to be more weakly developed than others (Cutter et al., 2008; Ostrom, 2008). This emphasises that factors affecting community resilience are non-linear, interlinked in complex ways, and cumulative (Davidson, 2010; Wilson, 2012a).



Figure 1: Key domains affecting community resilience (Source: authors)

Many studies highlight how *economic factors* influence both community resilience and land degradation processes, suggesting that they are among the most important at community level (Pretty, 2002; Millennium Ecosystem Assessment, 2005; Gray and Moseley, 2005; Oudenhoven et al., 2011). Two aspects are important: drivers that exacerbate (or alleviate) land degradation processes; and factors linked to how communities can positively address land degradation processes. Economic drivers that exacerbate land degradation processes tend to be linked to specific policies through targeted subsidies or economic incentives, for example, which lead stakeholders to remove vegetation cover, exposing vulnerable soils (Oñate et al., 2005). Although pressures have eased since the 1980s, the on-going EU subsidy regime continues to exert substantial pressure on already intensive agricultural systems (Briassoulis 2005).

Broader economic forces linked to the embeddedness of communities into the global capitalist market also often encourage community stakeholders to intensify land use irrespective of the extant policy regime, although Gray and Moseley (2005) rightly warn that poverty-environment interactions are often complex and non-linear. Studies by Fraser et al. (2011), Sendzimir et al. (2011) and Walker et al. (2009) have highlighted how economic drivers often lead to the removal of protective vegetation, over-intensive use of vulnerable soils or short-term thinking that neglects longer-term soil conservation needs. Indeed, critics of global capitalism have highlighted how capitalism has led to a substantial intensification of land use, substitution of locally adapted crops with cash crops, clearing of forests for agricultural expansion, and a loss of flexibility for community-level autonomous decision-making, all of which have resulted in increased erosion and land degradation (Wilson, 2012b). Aggarwal (2006) discussed some of the key reasons why local institutions may fail to adapt, or new institutions to form, as a result of globalisation processes. In particular, she suggested that globalisation can lead to a breakdown of personal exchange, weakening of dense communication networks, and the breakdown of communities of common ideologies and sets of rules. This often means the loss of business-related social and economic networks, reducing the ability of communities to increase resilience through the development of local enterprise.

Economic factors are also an important explanation of the (in)ability of communities to address land degradation processes (Blaikie and Brookfield, 1987). A lack of financial resources and options for alternative livelihoods are crucial in this context, especially as a lack of alternatives can lead to a vicious circle of increasing demand for intensification and

over-use of soils, further exacerbating existing erosion problems (Sendzimir et al., 2011). Although such actions emanate from within communities, it is the embeddedness of community actors in global capitalist pathways that is often the key driver for intensification of production. Conversely, globalisation of a community may also enable more resilient pathways by offering more wide-ranging opportunities for development (see Wilson, 2012b, for an extended discussion on the link between community resilience and globalisation). In addition, economic factors play an important role based on how well community-region economic interactions are developed. Communities that are well linked within their regions tend to have more opportunities (and regional support) for land degradation alleviation (Povellato and Ferraretto, 2005).

Social factors are also crucial for resilience because they mediate the relationship between the socio-economic and environmental components of the system. At the heart of all land use decisions are human objectives driven by individual social and economic agendas. Social factors include levels of interaction between community members such as trust, relationships, conflict resolution processes, engagement of young and old people, learning and communication pathways, cooperation, strength of networks, bonding and bridging capitals, as well as community ‘cohesiveness’ (Cutter et al., 2008; Magis, 2010; Wilson, 2010; Wilson, 2012a). These factors influence community resilience, as well developed social factors usually signal the existence of adaptive capacity to deal with land degradation issues. In communities with weak social capital, there is likely to be little criticism of land use practices that exacerbate land degradation, powerful stakeholders will be more likely to override collective concerns, and community interests may become fragmented (Bodin and Crona, 2008). The causes of weak social factors include outmigration of young people, a process closely linked to the economic domain discussed above. This leads to ‘greying’ of communities which changes social dynamics, interrupts inter-generational communication, and disrupts social memory through the loss of knowledge and experience accumulated over several generations (Wilson, 2012a). Once social memory is lost, it can no longer be drawn upon to tackle land degradation.

The third domain, *institutions*, includes closely inter-connected factors linked to politics, governance and institutional bodies and structures. Political factors are broadly linked to predominant ideologies and worldviews held by local, regional and national decision-makers, in particular whether land degradation, soil erosion and desertification are *recognised* as problems in policy discourses, and whether they warrant spending effort and funds on affected communities (Juntti and Wilson, 2005). Key is the existence of political will and an ability to implement effective policies to help communities tackle land degradation (Sendzimir et al., 2011). Political pathways are particularly affected by the type of political system (e.g. democratic, autocratic) and whether and how policy is enacted on the ground (Wilson, 2012a, 2013). Entrenched local politics can lead to apathy, corruption and a general lack of integration of knowledge (Juntti and Potter, 2002). However, changes in policy can also have positive impacts, locking-in development to more sustainable pathways (Wilson, 2013). In addition, ‘learning pathways’ are often closely linked with the political domain, although the macro-scalar nature of most political processes means that change at the nation state level or beyond is usually slower than at community level (Cumming et al., 2006). This can mean that alternative pathways of change may not be considered at community level. As a result, the critical literature often portrays the political domain as frequently ‘conservative’ (and often ‘negative’) for innovation, as it tends to automatically channel decisions into known and already established pathways, rather than encouraging innovative thinking.

Institutions (local or regional councils) play a key role in these political processes although non-political institutions (such as universities and advisory groups) can also play a

crucial role. As Wilson (2012a) emphasised, the institutional domain is often closely associated with exogenous processes that shape community-level decision-making pathways, i.e. ‘outside’ forces linked to institutional (and political) developments over which communities have little influence but that can severely constrain autonomous decision-making processes (Cumming et al., 2006). Institutional processes are often closely associated with ideological paradigms defined by societal worldviews, norms and accumulated organisational knowledge (Johnston, 1996). Although there are multiple institutional processes that influence community-level decision-making at a range of temporal and spatial scales, the nation state emerges as a key structural boundary within which decisions are taken. These decision-making processes are ultimately *mediated* by individuals and households, as actions with tangible effects on community resilience (Wilson, 2012a). Cumming et al. (2006) referred to these scalar interactions as ‘scalar mismatches’ between different and often conflicting institutional roles.

The ***cultural domain*** encompasses societal norms, conventions, traditions, rites and ideologies. These components are among the most challenging and interesting processes affecting community resilience. Ideologies are closely associated with how societal preferences and fashions change over time, and how such changes affect the decision-making processes in communities (Crane, 2010). These, in turn, affect the quality of economic, social and natural domains at community level. Cultural factors can be seen as the lattice of ideas that permeate society, constituting collective social consciousness over time. Ideologies shaped through religious, moral and other values directly affect local resilience pathways, as it is difficult for communities to leave behind the ideological and social mores exerted by wider society (Wilson, 2012a). Communities are, therefore, most often strongly embedded within the social memory and ideology of the society of which they are part. Yet, while almost every community will contain ‘non-conformist’, ‘radical’ or ‘rebellious’ citizens, most communities will also steer a pathway of compromise, usually well within the boundaries of accepted ideological norms.

The final domain is related to ***natural factors*** such as the type and quality of soils, water availability and quality, the steepness and accessibility of the terrain, climate (e.g. drought-prone or not) and the type of vegetation (Basso et al., 2010; Sendzimir et al., 2011). Inevitably, in a study of the interlinkages between community resilience and land degradation, natural factors are critical for understanding the vulnerability of soils, the risks associated with excessive water use (Mancino et al., 2009), and the repercussions of vegetation removal for land degradation processes (Blaikie and Brookfield, 1987; Fraser et al., 2011). As the next section will outline, the selection of Gorgoglione as a case study is predicated on the fact that this community continues to face severe land degradation problems, and that historically, for a variety of reasons, resources such as soils and protective forests have not always been managed effectively to reduce soil erosion and degradation risk.

Community description and methods

Community description

This study will focus on the community of Gorgoglione, a small town in Matera Prefecture in the region of Basilicata (south east Italy) (Figure 2). The region is comprised of small villages and regional towns with an average population density of c.60 inhabitants/km² (national average c.200 inhabitants/km²) (Salvati et al., 2013a). Basilicata is generally steep and the Apennine Mountains cross the western part from north to south. The eastern part of

the region is mainly hilly and, because of the lithological structure of the substratum, is particularly prone to soil erosion (Basso et al., 2010) caused by a combination of natural and complex socio-economic factors (Oliver, 1999).

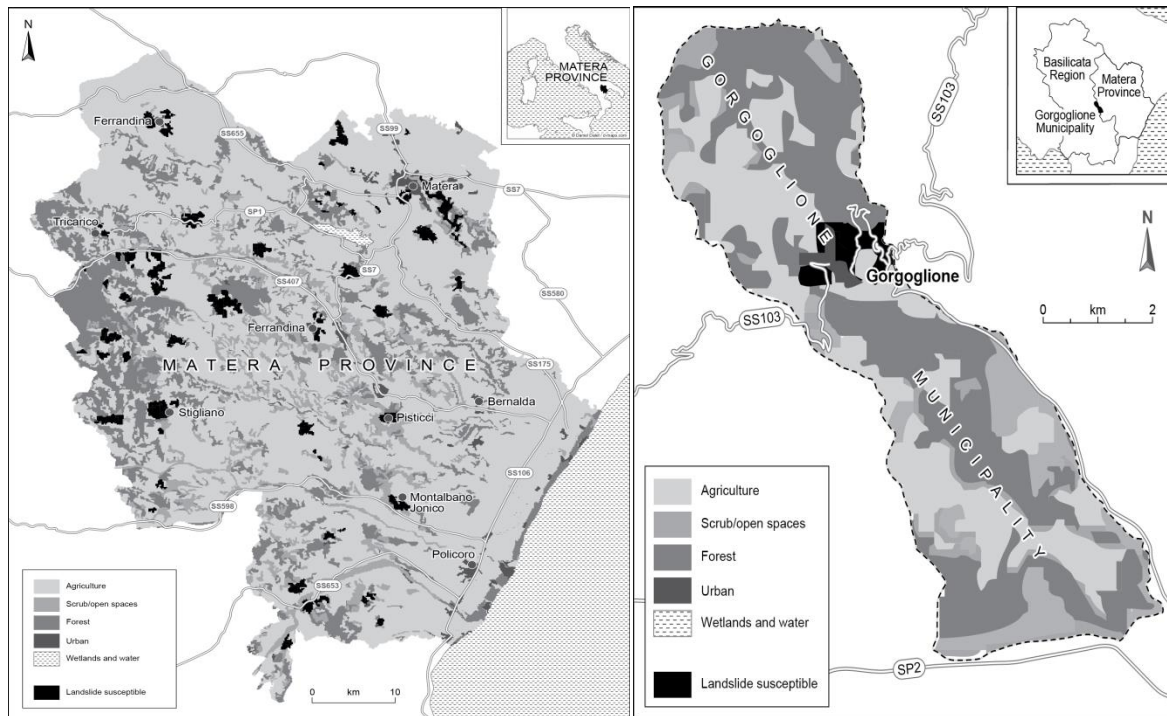


Figure 2: Case study location (left, Matera Province; right, Gorgoglione Municipality), main land use types and areas prone to landslides (Source: authors; after Corine land cover classification (EEA, 2006))

The forestry sector in Gorgoglione has undergone a number of political and institutional changes which began in the early 19th century with changes in land ownership brought about during French Napoleonic rule. While French-sponsored reforms brought social benefits, they also caused the deforestation of large areas. As a consequence, most large estates were broken up and entrusted to municipalities or purchased by private agents. Successive forest policies in the first half of the 19th century promoted rather than limited deforestation by allowing residents to clear forests in order to cultivate more land, with restrictions only on cultivating land on steeper slopes. Forests in the Matera prefecture were cleared to grow cereal monocultures. It was only during the last two decades of the Bourbon administration (1840-1860) that issues such as deforestation, soil erosion and land degradation began to be considered.

In 1877 a new ‘Forest Law’ was an attempt to curb deforestation on land that was particularly sensitive to soil erosion but its implementation was weak and remedial work was never monitored or checked. During this period, the development of new social classes, together with population growth, resulted in demand for more land for agriculture, leading to deforestation of over 100,000 ha of forest in Basilicata (Basso et al., 2010; Salvati et al., 2013b). The twentieth century marked a significant change in culture as awareness of environmental issues grew due to worsening land degradation. The Italian Prime Minister issued a Special Law for the Region in 1904, subsequently extended to the national level in 1908, which promoted construction of infrastructure for soil protection, engineering works for waterways and the first reforestation programmes. Unfortunately, implementation of these

policies was poor, with structural work undertaken in only 47 municipalities out of the 96 threatened by landslides, while reforestation was undertaken on only 6,000 ha out of a possible 20,000 ha (Basso et al., 2010).

In the 1970s, substantial constitutional and administrative reforms in Italy included the complete transfer of competences for territorial administration from national to regional level, and regional-level administrations became directly involved in the development of forest policies. The transfer process involved granting legislative powers to the regions as well as ownership and responsibility for state-owned public forests. This process had a positive impact on the quality of the environment and, in particular, benefitted forests through regionally formulated forest, environmental and soil protection policies which were better targeted at local needs than previous national policies had been. In particular, the devolution of power led to a new and more participatory approach to the management of environmental resources. In the Basilicata region, this has led to new policy instruments which take account of macro-scalar socio-ecological processes by supporting the development of local Forest Management Plans (FMPs).

Gorgoglione (Figure 2) epitomises many of the ecological, social and economic conditions of small municipalities located in this region. It is characterized by severe climate and environmental conditions (800m altitude, average rainfall c. 850mm/year but with substantial seasonal variations), marginality and scarcity of land resources (Oliver, 1999) and high sensitivity to desertification (Basso et al., 2010). Gorgoglione, along with other inland municipalities, has also experienced a sharp decline in population since the 1900s. This rural exodus began in the 1950s with internal migration (mainly northern and central Italy) and emigration, driven by mass unemployment. In the 1970s, population movements started to slow but again gathered pace during the 1990s with young adults moving away to find work, leaving an ageing rural population (Salvati et al., 2013b). In 2010, local census data shows the population of Gorgoglione was around 1,000 inhabitants.

Despite attempts at industrialization and the gradual development of a service sector, economic activity in the area remains dominated by agriculture. In 2010 there were approximately 300 farms covering an area of 2,600 ha. Two thirds of these were small farms of less than 5 ha. The economic viability of these small farms was seen to be too low to support innovation or expansion, making family farm succession extremely difficult with many relying heavily on EU and state subsidies (Povellato and Ferraretto, 2005).

The main land degradation issues around the community are forest productivity decline, driven by abiotic factors such as increased frequency of extreme climatic events and biotic factors such as historic forest mismanagement and uncontrolled grazing pressure. Soil erosion and surface landslides are an ever present risk (Figure 2), caused partly by the nature of the geological substrate, although poor agricultural practices and overgrazing have also contributed towards soil erosion. Water stress and deterioration of forest cover are a further cause of degradation with seasonal climatic conditions, poor soil quality, and in some cases overgrazing, combining to exacerbate vulnerability to water stress. Within the community perceptions of local land degradation issues are mixed, with some community members blaming the unsustainable agricultural practices of the past, driven by CAP policy, which had resulted in soil erosion, compaction and organic matter depletion. Conversely, some felt that there were no longer major land use issues, partly because land abandonment (through rural outmigration) had resulted in less soil erosion and the stabilisation of some slopes due to vegetation re-growth (CL1; CLT¹). This diversity of perceptions has been a critical barrier to

¹ Individual quotes from interviews are anonymised and respondents are labelled according to which stakeholder group/spatial level they come from (Community Level [CL], Prefecture Level [PL], Regional Level

raising awareness of land degradation issues in the community because it is not necessarily seen as an issue that affects all community members, and is therefore not treated as a priority by local politicians and decision-makers.

Given the conditions discussed above, Gorgoglione, therefore, provides an apt case study to highlight many of the complex interlinkages between community resilience and land degradation in Mediterranean forest and shrubland socio-ecological systems.

Methods

A broad range of data was collected (Table 1). Primary qualitative data was collected at regional and community levels through interviews with 12 stakeholders, clustered according to their spatial level of representation, or area of expertise (see footnote 2 above), and through two stakeholder forums (one at regional level (Basilicata) and one at community level (Gorgoglione)) attended by stakeholders representing a range of sectoral and institutional interests. This primary data was further supplemented with quantitative and qualitative data from secondary sources, including existing statistical data, to contextualize local-level findings.

Data Type	Source	Stakeholder groups represented	Spatial levels represented
<i>Primary data</i>	Individual stakeholder interviews, Gorgoglione (community) stakeholder forum, Basilicata (regional) stakeholder forum	Farmers, local teachers, land owners, community decision-makers, regional decision-makers, forestry officers and professionals, academics, researchers and representatives of NGOs	Individual household, community (Municipality of Gorgoglione), prefecture (Matera), regional (Basilicata)
<i>Secondary data</i>	Census data, published statistical data, historical records, research data, published papers, newspapers	All	Community (municipality), prefecture, regional, national

Table 1: Data collection types and sources (Source: authors)

Triangulation with other sources of data was conducted to ensure adequate representation from multiple viewpoints, and a combination of quantitative and qualitative approaches was used to interpret the data.

Resilience and land degradation in Gorgoglione: key issues and processes

Although small-scale or extensive agriculture remains the dominant industry in Gorgoglione, the area has experienced significant change with mixed impacts on the economy, the environment and society over the past 50 years. Several interrelated issues are important in this context: critical environmental conditions; weak community-region economic interactions; entrenched semi-extensive agriculture; and linked changes in social

[RL], Farmer [FM/FL] and Teacher [LT]). Quotes from stakeholder workshops are attributed to either the Gorgoglione community level (GW) or Basilicata regional level (BW).

factors, such as rural depopulation, which threaten the economic stability of the community but can have mixed impacts on its ability to respond effectively to land degradation.

Weak community-region economic interactions

Issues related to poor road and communication infrastructures were frequently raised by stakeholders and access challenges were seen as contributing to a lack of economic development in the community (FL1; PL1; CL1; CL2; CLT). This is due to the location and scale of agricultural holdings in the community, two thirds of which are smaller than 5 hectares and more than 80 km from main centres of population, making access to markets expensive, and preventing significant innovation and/or expansion because of a lack of short-term return on investment. As a result, many of these farms are close to the margins of financial sustainability.

Many stakeholders cited the length of time to travel to major urban centres as a significant barrier to economic development. One interviewee complained that *‘on our roads it takes at least one and a half hours to [reach the] main towns in the district ... This isolates the local community from policy and business centres’* (PL1). Lack of adequate funding from higher level institutions (EU, Italian government, regional administration) for infrastructure improvements was seen as the most significant barrier to addressing these problems. The associated closure or absence of local services was also mentioned by community-level decision-makers as an issue creating challenges within the community (CL1; CL2; CLT). One community decision-maker in particular highlighted the economic impact of this isolation: *‘the causes are often linked together [...] for example, because of the particular topography of the territory that does not allow fast connections to main centres, the companies and investors in general have no interest to invest in our area [...] unemployment rises’* (CL2). Targeted funding plans to develop and improve road infrastructure were seen by stakeholders across all spatial levels as a primary need to enable economic development (RL1; PL1; CL3; FL2; LT1).

A key example of the impact of geographic isolation was the loss of local abattoir services, which has had a profound effect on the economic viability of livestock farming in Gorgoglione (GW). Until 1991 livestock was slaughtered at a small local abattoir, which enabled farmers to keep livestock transport costs to a minimum. However, regulations regarding the operation of slaughterhouses changed due to a new national law following EU Regulations², forcing the abattoir to either adapt to new regulations or face closure, which was the eventual outcome. Farmers must now make a 100 km round trip to the slaughterhouse which has become prohibitively expensive. The impact of these changes has been an increase in meat production costs and a direct reduction in farm incomes, leading to reduction in herd sizes and – most crucially for land degradation issues – abandonment of land and farms leading, in some cases, to further deterioration of protective terraces or hedges and increased erosion and landslide risk (GW).

As various commentators have highlighted, land abandonment often leads to reduced resilience through its interlinkages with erosion, reduced income and potential loss of social and cultural factors such as skills, local knowledge and learning pathways (social memory) (Wilson, 2012b). Many critical commentators see land abandonment, therefore, as a key indicator of declining community resilience (Oudenhoven et al., 2011). Conversely, however, in forest socio-ecological systems land abandonment can also have ‘positive’ effects through

² Council Directive 91/497/EEC amending and consolidating Directive 64/433/EEC on health problems affecting intra-community trade in fresh meat extended to the production and marketing of fresh meat (CELEX-EUR Official Journal L 268, 24 September 1991, pp. 69-104).

natural forest expansion into abandoned land (stabilising steep ground), thereby indirectly leading to improved resilience (Mancino et al., 2013). In the case of Gorgoglione, forest recolonisation processes in the last 50 years (an increase of >5% of total forest surface area) have led to local improvements in biodiversity (an increase in the naturality index), primary production (an increase of >5% in terms of dry matter) and in the regulation of hydrological processes (with a decrease of >10% of run-off), despite a slight increase in grazing pressure. These positive impacts are expected to continue over the medium to long term, due to ongoing improvements in forest management and conservation practices. The key is to find a dynamic balance between human needs and pressure on forest and resource use. Only by maintaining this equilibrium, through dedicated measures and incentives supporting local communities, is it possible to reduce land degradation and strengthen community resilience.

Entrenched agricultural practices

The marginalisation of local agriculture and agricultural products was highlighted as a problem, linked to low levels of innovation and development on farms and the poor state of infrastructure such as roads. The lack of an ‘entrepreneurial spirit’ was also identified by a number of stakeholders as a barrier to building resilience (linked to a lack of a culture of self-help, discussed below) (RL2; PL1; FL1; FL2). Several farmers linked this lack of local enterprise to low levels of innovation in agriculture in the region as a whole. One farmer explained that *‘farmers prefer to deal with traditional products...they are afraid to open themselves to new initiatives’* (Farmer, medium sized property). Another argued that *‘farmers insist on continuing to cultivate the obsolete cereal crops instead of trying new alternative crops’* (FL1). One possible reason for these entrenched attitudes is CAP subsidies which were seen as encouraging continuity rather than experimentation: *‘rather the farmers prefer subsidies that are more attractive than put efforts to create alternative opportunities’* (FM1).

One regional-level agricultural expert, however, highlighted the general crisis in farming in Italy, coupled with the lack of young farmers and poor educational levels in the community, arguing that it was this which had affected the viability of farms in the area: *‘unfortunately, most of these farms are obsolete and lacking modernization and technology, and in general driven by farmers aged over 50 and with low levels of school education’* (RL1). This same interviewee suggested that regional institutions should fund technical assistance and training to enhance local skills and expertise, particularly in terms of technology. Another regional level interviewee also suggested skills in the environmental sector needed enhancing: *‘the agency for environmental protection in Basilicata Region is planning several targeted actions with the aim to train people in environmental monitoring, [to] assess the impacts that oil extraction activity has in this area. This monitoring will analyse likely changes to flora, fauna, water, air and soil. Such training would lead young people to have greater awareness of the good environment and natural features of its territory, which would bring awareness to trigger virtuous processes of development which start from below’* (RL2).

Funding and technical support were therefore identified as key needs to promote more innovation in agriculture locally. Practical ideas in the form of training, business support and more specifically support for the development of sustainable agriculture were identified (FM1). Help and encouragement with the development and promotion of locally distinctive products were also seen as important to enable local farmers to access new markets and develop new opportunities. The entrenchment of production methods and slow modernisation in the agricultural sector in general, together with a lack of available financial capital have tended to lock Gorgoglione into a pathway of low income production, with little appetite for innovation (Basso et al., 2010). This lack of diversity leaves the community particularly

vulnerable and unable to respond rapidly when prices for local agricultural products are depressed.

Threats to economic stability of the community

The economic future of the community was closely coupled with social factors with clear links to processes occurring across spatial scales. In particular, economic stability was threatened by the inability of young people to start new businesses, primarily due to financial difficulties and a lack of new ideas. Further, the lack of social structures capable of attracting and consolidating the existing community contributed to further depopulation and exacerbated the lack of investment in the area.

The migration of people from the region was a recurrent theme in stakeholder interviews and focus groups. Numerous interviewees identified the decline in population, particularly among younger age groups, as being linked to the lack of economic opportunities and local facilities (RL1; CL3; FM1; FL2; LT1). Demographic change was also linked to other economic constraints in Gorgoglione: *'the consequences are inevitable ... the members of the community prefer to leave the community because it does not guarantee a sufficient income'* (LT2).

As a consequence of rural depopulation, young people were also no longer entering farming, and local environmental knowledge and skills were declining. Several interviewees commented on this loss of knowledge as a barrier to addressing land degradation problems: *'the abandonment by farmers of their activities is also a loss in local knowledge. So when something is going to re-start in ten years, twenty years, we will [have lost] this local knowledge. So everything will be different and the landscape will be different. It is not only a problem related to the landscape, [...], or only to the economic aspect, but everything is connected: social, economic and environmental aspects'* (BW participant). The loss of knowledge and skills, together with reduced farm succession as young people leave the community, is likely to impact on future development pathways in the community, reducing economic opportunities still further (see also Potter and Lobley, 1996; Calus and Van Huylenbroeck, 2008). Sendzimir et al. (2011) highlighted the importance of maintaining local knowledge systems and the transfer and sharing of knowledge between stakeholder and intergenerational groups as critical components for adaptive and effective responses to land degradation and the strengthening of resilience. Similarly, Cutter et al. (2008) suggested a link between availability and integration of local environmental knowledge (LEK) and economically viable livelihoods. As young people leave the community and opportunities for intergenerational learning and knowledge exchange are reduced, so too are opportunities for innovation and diversification based on deep knowledge of local soil, vegetation, hydrographic and climatic conditions. This loss of available knowledge and skills in Gorgoglione will continue to have a deep and direct impact on the ability of the community to either address land degradation issues or find opportunities for economic transformation (Berkes et al., 2000).

The role of institutions

Political changes over the past century in Italy have led to some improvements in institutional responses to forest-related land degradation issues in Gorgoglione. Devolution of power to the regions led to more localised responsibility for the implementation of agricultural and environmental policies, including forest policy. Regional legislation introduced in the late 1990s included a range of management actions (sustainable agro-pastoral management;

management plans for protection of natural environments; protection of areas subjected to landslide risk; forest fire protection plans and forest management plans (FMPs)). The new regulations provided guidelines for the preparation of FMPs and funding to cover up to 50% of the costs of plan preparation, as well as penalties for failure to produce plans. More recently, further regulations have been introduced and financial support has been increased to cover 70% of the costs of plan production (for municipality-owned forests), providing renewed stimuli for municipalities lagging behind. As a result, community-owned forest in Gorgoglione is now managed through a rolling ten-year Forest Management Plan.

A parallel regional development which underpinned the new legislation was the development of agricultural and forest science courses at the University of Basilicata. These courses have led to a renewed interest in the local forest environment and have played a key role in promoting and supporting implementation of forest management practices. Forestry professionals from the University were also instrumental in setting up a decision-making panel to support, monitor and develop FMPs, further strengthening the links between forest policy, research and the implementation of sustainable silviculture. Several interviewees described this as a positive step providing an effective framework for forest management in Basilicata (CL1; CL2; FL2). There are also economic incentives encouraging municipalities to establish management plans: *'So when the municipality ... starts to sell the forest [timber] they are forced to leave 15% of the budget to the region, if they have the management plan. If they don't, they need 20%. The region uses that money to make improvements to the forest area in general.'* (BW participant).

The modern forestry planning process also offers opportunities for a wide range of stakeholders to engage in participatory decision-making, and public scrutiny of forest policies and plans is facilitated by the region: *'when the region decides the guidelines of the measures that will be drawn up, they meet with all the associations. So the region talks with all the stakeholders at community level but also with NGOs and so on'* (BW participant). As a result, the committee which assesses forest management plans includes stakeholders from statutory and non-statutory bodies. A number of stakeholders argued that this process is effective because of the close-knit community of forestry professionals, regional and community-level decision makers where *'everybody knows who is in charge of everything'* (BW participant), and that over twenty years, significant levels of trust have been built between stakeholders through pragmatism and understanding of opposing viewpoints.

This suggests that regional devolution of responsibility for policy development and implementation, together with the establishment of a pool of well-trained forestry professionals has combined to provide a positive outcome for forest management across the region. However, regional forest policy is not implemented in isolation and not all community-level stakeholders have a voice in decision-making committees. The positive benefits achieved are sometimes undermined by a lack of cross-compliance with agri-environmental policy actions. Stocking rates in local forests, for example, sometimes threaten the success of forest management plans: *'the number [of livestock], officially, may be compatible with the area, but [...] for the fact that [livestock] stays all year the [environmental] damage can be high ... and also because the real number of animals in some cases is higher than the official number'* (BW participant). This lack of engagement and cross-compliance is also linked to the marginalisation of agriculture discussed above. In addition, although forest policy is implemented at regional level, the national level remains the conduit through which EU Directives are translated into policy guidance. Regional policy in Basilicata is, therefore, still constrained by policy objectives set at supra-national (European) and national levels. This highlights the impact of the closely coupled links between domains and across spatial scales: forest policies are not implemented in a vacuum,

nor are they implemented in isolation. Furthermore, regional policies are not wholly independent of the national level as they must comply with top-down policy objectives.

Governance structures

Closely linked to institutional factors, governance structures, autonomy and power also affect the resilience of communities such as Gorgoglione in dealing with land degradation. Governance processes also have an important cross-scalar dimension associated with how decision-making structures tackling land degradation are integrated (Cumming et al., 2006). Key is what powers have been ceded for decision-making at regional and local levels (Johnston 1996). As discussed above, changes in governance structures and the empowerment of regional decision-making in Italy have had positive effects on forest-related land degradation alleviation in Gorgoglione. However, as Juntti and Wilson (2005) have emphasised, governance is also about the efficiency (or lack) of community-region political interactions, especially linked to communication and transfer of knowledge about when and how to tackle land degradation (both from region to community and from community to regional stakeholders). Weak governance, therefore, usually means non-transparent, top-down decision-making pathways that may lead to increased corruption and encourage weak policy implementation. Analysis of multiple data strands in this case study suggests limited local autonomy in the community, with the exception of forest planning and management highlighted above. While some community-level stakeholders felt the solution to local problems to be the shared responsibility of citizens and all levels of government, some also felt that the local administration was not well integrated enough with regional or national levels, and that, as a consequence of a lack of power, the community's ability to influence decision making was minimal (RL1; PL1; CL2).

Administrative shortcomings at regional level have meant delays and uncertainties for farmers trying to innovate and diversify, engendering a lack of trust between farmers and regional officers. Lack of trust in the political/administrative process at regional level was also a disincentive to local action for change. For example, one regional stakeholder felt that local input into planning the use of natural resources was limited and others alluded to a historical lack of trust: *'There is a general tendency to not trust the local administration because of mistakes and wrong policies committed in the past'* (PL1), while another argued *'[is there any conflict?] I think so, often due to jealousy and contrast between [local administration] and members of the community'* (FM1). This concurs with findings from the stakeholder workshop in Gorgoglione where frustrations emerged with the lack of progress in bringing attention to local problems, due to a perceived lack of interest at regional level and a lack of direct access to politicians and administrative officials (GW). While many stakeholders suggested a lack of empowerment at local level, one regional level interviewee felt that de-centralisation would increase the agency of Gorgoglione residents and local institutions (RL2). Yet some also felt there were limits to the implementation of macro-level policies due to the failure of actors at local level to adhere to rules and regulations (BW). It would appear, therefore that while devolution may offer stakeholders more opportunities to engage with decision-making processes, lack of local capacity and macro-level economic challenges may still hamper efforts to address land degradation issues in the community.

As the discussion above shows, changes in governance structures and the empowerment of regional decision-making can have positive effects on land degradation alleviation. However, as the Gorgoglione case also shows, governance is about the efficiency of community-region political interactions (Wilson, 2009). Political and geographical isolation have contributed to a lack of attention by the region on land degradation issues because they

were not raised as a priority at regional level. Communities such as Gorgoglione may, therefore, often have little opportunity to improve their lot without significant political support from higher spatial levels.

Cultural factors

Two key cultural factors were apparent in Gorgoglione: traditions and practices associated with forest use and management (positive and negative impacts on land degradation); and a lack of a culture of self-help (negative impacts).

Forests play an important role in the cultural life of the region and the community. Although now known as Basilicata, the ancient name for the region is 'Lucania', a possible historical reference to its thickly-forested landscape ('lucus' means 'wood' in Latin). Many modern inhabitants of Basilicata maintain their links with the past, preferring to be known as 'Lucanian' and its ancient traditions and festivals associated with harvest and fertility are closely held to. These festivals (also celebrated in other municipalities in Basilicata) highlight the deeply embedded relationship between forest and identity of local people, and the historic and on-going importance of the forest in providing resources, including timber, food and fuel to the region and the community.

Aside from these traditional festivals, productive forests are an important community-owned resource. Gorgoglione owns around 500 hectares of forest which were used extensively for grazing and for harvesting nuts, fungi, fruits and herbs, although, as a result of rural depopulation, such practices are declining and will continue to do so as local traditional knowledge is lost. The use of the forest for livestock grazing in the past was seasonal, linked to traditional patterns of transhumance. However, since the reduction in transhumance and pressure on farm livelihoods from increased production costs, grazing in the forest has become common all year, with negative impacts on seedling survival and species succession. During discussions with stakeholders, ideas about the traditional use of forest areas for grazing were linked to wider cultural and historical influences (GW; BW). Stakeholders felt that pressure on forest soils from grazing was likely to decrease as a result of the general reduction in livestock numbers but one respondent, for example, noted that '*overgrazing is a real problem but in general in the Mediterranean forest grazing is an income. So grazing is connected with the forest. We can say that in the past we always had grazing in the forest. So the forest is grazing. It is just where to find the correct balance*' (BW participant). Linked to grazing practices are local attitudes to the protection of wolves³. Whilst wolves receive national protection through conservation and biodiversity protection legislation, they are still perceived by some as a threat to livestock. The depth of this tension was revealed by one stakeholder who explained that even when livestock are killed by dogs, wolves sometimes receive the blame, underscoring the tension between rural cultural practices and macro-scalar species conservation objectives (BW).

As local knowledge is lost and traditions are abandoned, forests lose their cultural and economic importance and careful local management tends to decline as a result. Regional policy actions promoting the development of forest management plans have begun to reverse this trend in municipalities such as Gorgoglione, focussing attention back onto the benefits that can be achieved through sustainable management of forest resources and helping to maintain or rekindle cultural traditions which 're-value' community forests. These specific forest traditions, norms and rites are particularly important in communities such as

³ In 2005-2006 there was an estimated population of 500-800 wolves (*Canis lupus*) resident in the Italian peninsula, an area covering 11 autonomous regions: Lombardia, Emilia-Romagna, Tuscany, Marche, Latium, Abruzzi, Molise, Campania, Basilicata, Apulia and Calabria.

Gorgoglione because they also influence decision-making processes with regard to land degradation. In other words, if cultural and forest management traditions remain strong and accessible the community can still draw on them through positive social memory to help alleviate land degradation issues both now and in the future.

A second key cultural trait with direct impact on the economic domain is the pronounced lack of a culture of self-help in Gorgoglione. Regional stakeholders articulated the broader socio-economic trends affecting Basilicata which had produced specific local impacts in the municipality. As noted above, these included out-migration of young people of working age, with a concomitant increase of in-migration of older age classes (>65 years). One interviewee highlighted the resulting lack of enterprise culture within the community: *'The main threat [...] in our small community is the lack of persons with entrepreneurial mindsets, persons willing to launch a new venture or enterprise and accept full responsibility for the outcome'* (PL1). Questions surrounding stakeholder agency also revealed pessimism amongst interviewees centred on the willingness of the community to tackle its problems (CL2; CLT). This attitude emerged from discussions around community self-reliance, where several interviewees felt that although the community was well aware of the problems and issues that it faced, it did not necessarily feel able to address them (RL1; FL1; FL2).

An attitude of dependency emerged as part of a wider historical set of values and practices. Although stakeholders were aware of the need for more entrepreneurial innovation and self-help, they felt unable to break out of this pathway. Compounding these cultural issues are economic and social factors, operating at various spatial scales, which combine to prevent the community from 'seeing' alternative development pathways. Interviewees felt overwhelmed by the scale of some of the issues, particularly the current economic problems that Italy faces, and powerless to find local solutions (FM1; FL1; GW). In terms of resolving the issues, most interviewees were in agreement that institutions at all levels, including the local level, should play a part in identifying and implementing solutions.

Discussion and conclusions

Economic, political and cultural factors have had substantial impacts on the ability of Gorgoglione stakeholders to address land degradation issues and, consequently, on the resilience of the community to withstand and alleviate its problems. Weak community-regional interactions, partly attributable to Gorgoglione's geographical isolation and limited access to infrastructure, but also linked to a lack of local political will and civic action to effect change at the regional level, have resulted in a sense of powerlessness and frustration among many community-level stakeholders. These factors are compounded by the community's embeddedness in global markets, impacting through the depression of market prices for local agri-forestry products, as well as in increasing production costs which, in combination with cheap imports, negatively affect rural livelihoods. The resultant impacts include a decline in farm incomes which deters young people from entering the agricultural sector and, together with a lack of an entrepreneurial culture, leads to rural out-migration, farm fragmentation and, eventually, land abandonment, further exacerbating land degradation issues (Povellato and Ferraretto, 2005).

Institutional factors have also, however, had a positive impact on the ability of the community to deal with land degradation, leading to some improvement in resilience. Positive effects are seen particularly in the devolution of responsibility for forest policy which has resulted in context-specific participatory forest planning and management with important environmental benefits. One of the keys to the success of this initiative has been

the development of strong networks and partnerships between a range of stakeholders from the state forestry sector, academia, local and regional authorities and local communities. In particular, the presence of locally trained forestry professionals has facilitated the development of trust and knowledge transfer between local and regional stakeholders and ensured that planned actions are context-specific and appropriate. Increases in vegetation cover and quality as a result of the implementation of forest management plans are also leading to an increase in quality of natural capital factors at both community and regional levels, through a reduction in loss of biodiversity, reduced forest fragmentation and reduced vulnerability to soil erosion and landslides. From this perspective, Forest Management Plans represent a set of measures which underpin a range of positive environmental, economic and social responses to land degradation issues in the community.

The findings from this study show that land degradation issues in Gorgoglione are closely coupled with economic, institutional, cultural and social factors. Several studies have found that a reduction in the quality of natural resources often goes hand-in-hand with the loss of resilience at both local and regional levels, and that land abandonment tends to lead to further loss of natural capital, followed by reduced economic opportunities, outmigration and overall loss of services and livelihood quality at community level. Yet this case study also shows that improvement in the natural domain, through the implementation of sustainable forest management practices, can help improve community resilience by supporting linked improvements in the social and economic domains through forest-related employment opportunities and better incentives for young people to stay in their home communities (Bodin and Crona, 2008). However, these positive impacts are also countered by economic and institutional issues operating at higher spatial scales, which have had a negative effect on local livelihoods and, concurrently, on trust in political leaders and processes. These negative aspects continue to hamper progress, weakening Gorgoglione's resilience overall by undermining its ability to build on improvements in natural capital brought about through improved forest management (Magis, 2009; Wilson, 2012a).

The discussion has particularly highlighted the importance of the 'quality' of forest management services and practices for resilience. Thus, forest expansion (often policy-driven) together with other conservation and protection measures are often prerequisites for improved forest health which, in turn, have the potential to improve community resilience (Salvati et al., 2013a). As the evidence from Gorgoglione has highlighted, part-and-parcel of these approaches are knowledge- and awareness raising schemes (important components of social and cultural domains), training courses and school education about forest conservation (i.e. building 'positive' social memory) that tend to contribute towards improved adaptive capacity (Davidson, 2010).

The Gorgoglione case study also demonstrates the complex interplay between economic, institutional, social, cultural and natural domains and shows how it is easily disrupted, often undermining the resilience of socio-ecological systems at multiple scales. This study has particularly emphasised how both positive and negative impacts caused by changes to factors in one domain can affect other domains (see Figure 1). As with other systems, social memory forms a crucial component for resilience, especially as specific skills, knowledge and learning pathways are gained or lost with changing forest management and agricultural systems. As seen in Gorgoglione, this social memory is threatened by various processes, in particular outmigration of young people, land abandonment, land degradation in forests, and the loss of locality-specific environmental knowledge (Magis, 2009). It is here that complex geographical interlinkages between communities, localities and regions are at play, as skills, knowledge and expertise in forest management often rest with regional-level stakeholders who may be largely unaffected by local processes (Salvati et al., 2013b). Further, a decline of

bridging capital in social processes (e.g. reduced communication between community and regional administrations) does not inevitably lead to reduced local forest management quality, as local innovation and, indeed, enthusiasm for improved forest management may be both awakened and encouraged through 'relocalisation' processes (Wilson, 2012a). Similar to Povellato and Ferraretto's (2005) study, these findings reinforce the extent to which macro-scalar processes impact at lower spatial levels and limit the influence and autonomy of local communities to address socio-economic and land degradation issues and build resilience.

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