

On the multifunctionality of hunting – an institutional analysis of eight cases from Europe and Africa

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Abstract

In many contemporary societies, multiple functions are connected to hunting. Here, we use the concept of multifunctionality to investigate the role of hunting beyond its traditional function of supplying meat. Hunting may contribute, for example, to biodiversity conservation, recreation and the preservation of economies and cultures of rural areas. Our comparative analysis of hunting in eight study sites in Europe and Africa examines the tensions and trade-offs between these ecological, economic and social functions of hunting, and investigates the interplay between the institutions regulating these functions to better understand conflicts over hunting. Based on this analysis, we present institutional arrangements that have developed to address these challenges of multifunctionality, and explore the institutional change brought about by such arrangements. Finally, we discuss implications of this study for policy and institutional design.

Key words: conservation, culture, governance, hunting, institutions, institutional interplay, multifunctionality.

1 Introduction

In many societies, multiple functions are linked to hunting. ‘Hunting’ does not only denote the act of pursuing and taking wild animals for meat, trophy or fur, but can, for example, also be understood as an important part of wildlife management that may contribute to biodiversity conservation or to the success of activities such as farming and forestry, as it keeps grazers, crop pests or predators under control. In many rural regions, hunting fundamentally shapes both the natural environment and people’s ways of life (Adams *et al.* 2009). We thus refer to hunting here as the totality of activities concerned with the management and the pursuit of game. The “multifunctionality of hunting”, then, denotes the

multiple benefits that hunting and related land management practices may provide for society such as food, recreation, employment in the tourism industry, cultural identity and desired ecological outputs. However, hunting is not only associated with benefits. Hunting and related management practices may also have undesired effects, for example, where species seen as valuable by some are persecuted by others as ‘vermin’ that threaten game populations. Hunting can thus contribute to several objectives at once (Abler 2004) but can equally create costs. The concept of multifunctionality has primarily been developed in relation to the multiple roles of agriculture (OECD 2001, Wiggering *et al.* 2003). As in agriculture, the various functions of hunting can be complementary, synergistic or in competition with each other (Rossing *et al.* 2007), and they can affect public as well as private goods. However, in contrast to the multifunctionality of agriculture which focuses on the joint provision of market- and non-market goods and services (Vandermeulen *et al.* 2006), classification of the functions of hunting into commodities (i.e. market goods) and non-commodities is far less clear-cut.

The present study addresses the interplay of the multiple functions of hunting in eight study sites in Europe and Africa. To understand the tensions that arise from this interplay, we analyse the multifunctionality of hunting from an institutional perspective, as many of the functions of hunting are enshrined in formal and/or informal institutions. Insight into the ways in which these different institutions interact with each other is crucial to understand the governance of multifunctionality, and thus ultimately the potential of institutional arrangements to enhance or ameliorate conflicts over wildlife management (Woodroffe *et al.* 2005). Rather than conducting an in-depth analysis of a specific institutional arrangement in relative isolation, we thus aim to provide an overview of the multifunctionality of hunting and related institutional issues across a range of different ecological, social and political

contexts, in order to identify and conceptualise the resulting challenges for the governance of hunting on a more general level than a single case study could.

To do so, we develop a conceptual framework to explore the multiple functions of hunting and the effects of related institutions, and their interplay, on the sustainability of hunting in our study cases. We then examine emerging institutional arrangements aimed at reconciling clashes between functions. Finally, we discuss implications of this study for policy and institutional design.

2 Conceptual framework

2.1 Multiple functions

Based on ideas on the multifunctionality of agriculture (Pretty *et al.* 2001, Hagedorn 2008), forestry (Slee 2007), and landscape planning (Selman 2009), in the first step of our analysis we describe functions of hunting in relation to three categories, namely the (a) ecological, (b) economic and (c) socio-cultural functions of hunting (Fig. 1). We define functions here as the provision of goods and services, regardless of whether these are commodities or non-commodities. Economic functions of hunting include, for example, both hunting for subsistence and hunting to obtain income from selling game and trophies, but also the sale of the hunting opportunity, i.e., hunting tourism (Bennett and Robinson 2000). The term ‘socio-cultural’ is here used in a broad sense including non-market values, social capital, social status and impacts on quality of life (Slee 2007), whereas ‘ecological’ refers to functions of hunting in relation to the ecology of a system, for example, population management. The importance of such ecological functions is, for example, stated in the European Charter of Hunting and Biodiversity which considers hunting as a legitimate and important tool in the management of biological diversity (Council of Europe 2007).

This three-dimensional structure, differentiating between social, economic and ecological aspects, is well-established in the sustainability discourse (Costanza 1999; Baker 2006), and frequently also used in relation to multifunctionality (Van Huylenbroeck *et al.* 2007; Van Cauwenbergh *et al.* 2007), occasionally even in relation to functions of hunting (Cahoone 2009). It has been used both in a normative function (e.g., Baker 2006) and as a structure for scientific inquiry and analysis (e.g., Costanza 1999; Glaser and Diele 2004; White *et al.* 2009). Whilst we employ this categorisation of three different function types here in an analytical (i.e., non-normative) manner to explore the emerging tensions, we do not imply any judgements on the effects and legitimacy of these functions and the assumed causalities, such as the impact of herbivores on ecosystems, or the impact of hunting activities on the well-being of the hunter.

2.2 Multiple institutions and their interplay

In a second step, we analyse the institutional arrangements related to each of these functions. We understand institutions here as rules (North 1990) that guide human behaviour. Formal institutions are usually written and codified sets of regulations and contracts (e.g., legislation), while informal institutions are typically unwritten and include, for example, implicit codes of conduct, taboos and other social norms (North 1990; Young 2002). Boundaries between formal and informal institutions can be blurred; for example, previously formal institutions can become informal due to regime changes. Institutions regulate social life. They reflect values and interests, and thus help to reproduce and maintain them in society (Vatn 2005). Institutions as crystallised values are thus a crucial element of social life at all levels, from local customs to international conventions; and institutional analysis aims to reveal such societal mechanisms. We use the term ‘governance’

here to refer to the entire body of societal mechanisms that steer people's behaviour. Governance is thus to a large degree constituted by institutions (Paavola and Adger 2005). Functions of hunting are usually enacted through a multitude of formal and informal institutions. Their interplay (Young 2002, Gehring and Oberthür 2007) may create tensions, but may also, when coordinated, lead to synergies (Hagedorn 2008). Institutional interplay may not only arise *between* the three different categories of functions and their associated institutions, but also *within* each one of these due to competing values or ideas about hunting and wildlife management (Loewen 2006).

Although institutional interplay has been recognised as a real life problem (Folke *et al.* 2007) that can severely hamper the success of institutional reform (Young *et al.* 2008), relatively little research has been conducted on actual cases (e.g., Moss 2004), particularly at the local level. In this study, we focus on *functional* interplay, i.e., situations where two or more institutions address the same issue (Young 2002, Loewen 2006).

2.3 Institutions for multifunctionality

In the third step of our analysis (Fig. 1), we will look at the ways in which conflicts and tensions between institutions have been addressed by the creation or emergence of institutional arrangements that reconcile or mediate between conflicting institutions and interests. Among the many possible ways of classifying institutional arrangements, or policy instruments more generally (for an overview see e.g., Vedung 2003; Jordan *et al.* 2003), we draw here on four categories to explore the governance approaches underpinning these newly emerging arrangements, namely (i) market-based governance mechanisms, (ii) hierarchical mechanisms, i.e., regulations or 'command-and-control' mechanisms, (iii) cooperation, i.e., collaborative arrangements, and (iv) information, such as certification that enables the consumer to make informed choices, widely used in forest and fishery management. These

categories thus include not only the three types of policy instruments first described by Etzioni (1975), and established by Bemelmans-Videc *et al.* (2003) as “carrots, sticks and sermons”, but also cooperation, often conceptualised as self-governance (e.g., Dietz *et al.* 2003). Although complex institutional arrangements often come about through institutional ‘bricolage’ (Clever 2002), i.e., an undirected rather than a targeted process, our analysis might contribute to an improved design of such arrangements in the future.

3 Methods and case studies

We conducted a comparative case analysis based on systematic collection of qualitative standard information across selected units (Table 1). Using structured focused comparison the investigator “defines and standardizes the data requirements of the case studies [...] by formulating theoretically relevant general questions to guide the examination of each case” (George and McKeown 1985). We draw here on eight cases to capture a rich picture of the social, cultural, economic and ecological variation within which hunting is conducted. These included three cases in northern Europe (Norway, Sweden and Scotland), one in southern Europe (Spain), two in eastern Europe (Croatia and Slovenia) and two in Africa (Ethiopia and Tanzania). The cases selected neither claim to be representative for their respective countries nor do they aim to present a complete assessment of all hunting types in a given place; rather, they were chosen for their diversity of cultural, ecological and economic aspects and the availability of data (such as access to policy documents, ecological and social scientific studies). While some cases include an entire country (e.g., moose hunting in Sweden), others, where there was a large degree of diversity within country, refer to a specific area (e.g., bushmeat hunting in Western Serengeti, Tanzania; see Table 1).

Our analysis was based on an iterative process (Fig. 2), starting with a scoping phase, where issues such as hunting rights, land use rights, hunting styles, game species, responsible

authorities, relevant stakeholders and main controversies were identified. This provided the foundations for developing our ideas about the multifunctionality of hunting, and a framework for analysis was set up to allow a comparative approach (Fig. 1). We then examined policies and documents, including bills and management plans to assess formal institutional arrangements, and supplemented the analysis by data from semi-structured interviews and focus group discussions with both hunters and non-hunters, including governmental and non-governmental actors, to obtain information about informal institutions as well as evaluations of the existing arrangements¹ (Fig. 2). Our conceptual framework thus emerged from the data (against the backdrop of theoretical considerations) rather than being a priori imposed on the data, was developed and refined throughout the entire process and used to investigate differences and similarities between study cases to assess the complex patterns of institutional interplay. We thus employed an inductive approach, starting from a description of the hunting system, identifying commonalities, differences and patterns in the functions and institutional arrangements, and drawing in concepts from the literature to capture these patterns as and when we considered these appropriate and helpful. Regardless of differences in hunted species, similar functions seemed to be linked to hunting in all sites that varied merely in their intensity and relative importance. Classification into the three categories (i.e., ecological, economic and social) was not meant as an absolute categorisation since most functions could be seen from more than one perspective. Instead, it was intended to provide structure to the analysis.

¹ Large parts of the data collected in these focus group discussions and interviews concerned the cultural meanings of hunting in the respective study site and are thus in detail analysed elsewhere (e.g., Lowassa *et al.* forth., Tadie and Fischer forth.). Site-specific sample sizes: Croatia n=29, Ethiopia n=144, Scotland n=37, Slovenia n=38, Spain n=40, Sweden n=41, Tanzania n=79. In Norway, no new data was collected; instead, we drew on existing information from previous studies (see e.g., Andersen *et al.* 2009; Sandström *et al.* 2009).

4 Multifunctionality of hunting (Step 1)

4.1 Ecological functions of hunting

In all our European study sites, hunting is regarded as an integral part of biodiversity management. For example, in Scotland and Sweden, red deer and moose management aims to maintain populations to enhance conditions for recreational and trophy hunting, while at the same time regulating populations in relation to other land use objectives, for example, the regeneration of forests for conservation purposes and commercial forestry. However, population levels optimal for trophy hunting are usually seen as detrimental for land uses that centre on woodlands, and conflicts between these two different management goals occur regularly (Wennberg DiGasper 2008).

The red-legged partridge is a small farmland bird widely hunted in Spain. High densities of partridge are associated with areas of non-intensive agriculture, which are also good for farmland biodiversity in general (García *et al.* 2008). However, commercial forms of partridge hunting are often based on intensive management which includes rearing and releasing of large numbers of bird as well as predator control (both legally and illegally). This causes tensions between game management and predator conservation (Villafuerte *et al.* 1998, Virgós and Travaini 2005). Similar to the Swedish and Scottish cases, land management for hunting (and not the hunting itself) leads here to an increase in the abundance of the game and some associated species, resulting at the same time in a decrease in abundance and diversity of non-game species such as predators (Blanco-Aguilar *et al.* 2008, Casas and Viñuela 2010).

In Croatia and Slovenia, hunting serves as the main tool to control the numbers of brown bears. However, although both countries share the same mobile population, bear hunting in Croatia is regulated for commercial (trophy) hunting, while in Slovenia, since the country's accession to the EU, hunting is only allowed under derogation from the Habitats Directive. In

both countries, the bear population seems to have reached the socially acceptable maximum (Huber *et al.* 2008a). The overall goal is now to maintain bear numbers (Ministry of Agriculture 2002, Dečak *et al.* 2005). A similar situation occurs in Norway where lynx are associated with a range of conflicts, in particular with sheep and reindeer husbandry. In addition, the presence of lynx is regarded as in conflict with roe deer hunting. Government policy is to keep the lynx population at a level at which these conflicts are acceptable to society as a whole (Linnell *et al.* 2010). In all these sites, hunting thus has a clear function of population control, but at the same time, game management for (trophy) hunting often leads to a disproportionate increase in the game species population and other effects considered negative from an ecological perspective.

In Ethiopia and Tanzania, hunting is at present – except where wildlife such as elephants or carnivores are seen to infringe on human livelihoods – not specifically aimed at population control. However, trophy hunting can have indirect ecological effects through its economic function where income from hunting tourism is shared with protected areas and adjacent communities and incentivises wildlife conservation (Nelson 2007). Overall, aside from (not necessarily intended) ecological impacts more generally, hunting and associated land management practices thus have, at least in the European cases investigated, functions for population management of game and associated species. The actual implementation of these functions is often the subject of disputes between different groups of actors.

4.2 Economic functions of hunting

In several of our study cases, the main economic function of hunting is the provision of meat. In the southwest of Ethiopia, opportunistically hunted bushmeat (e.g., gazelles and other small game) is often consumed by the hunters themselves, for example, while herding livestock, whereas parts of big game, such as giraffe tails, can generate significant revenue. In

western Serengeti (Tanzania), many households consume bushmeat themselves and/or sell it on to obtain cash for other needs, such as clothes or school fees (Loibooki *et al.* 2002). In northern Sweden, moose meat is often consumed by the hunters or sold, with an estimated third of the total monetary value of moose hunting being meat value, while two thirds are related to recreation, for example, travel costs (Mattsson *et al.* 2008). In contrast, in Croatia and Slovenia, bear meat constitutes less than 10% of the monetary value of bear hunting. Due to underdeveloped markets, red deer venison in Scotland is also of limited financial value (MacMillan and Leitch 2008).

In addition to the provision of meat, hunting also has other economic functions. Recreational hunting and, in particular, trophy hunting, are very profitable forms of wildlife use in many of our study sites. In the African sites, especially in Tanzania, trophy hunting (as well as non-consumptive wildlife tourism) provides a substantial net contribution to the national economy (Thirgood *et al.* 2008). In Scotland, red deer hunting is run commercially, and provides rural employment for gamekeepers and stalkers and the hospitality sector, and a similar picture is found in Croatia and Slovenia. Also in Spain, partridge hunting, which was once a traditional practice, has over recent decades become an activity of increasing economic relevance that attracts non-local hunters, and now constitutes an important part of rural economies (Caro *et al.* 2009). In contrast, hunting in Sweden and Norway is primarily seen as a leisure activity rather than as a tourism-related business opportunity. Hunting tourism is thus currently a very small, although growing, sector of nature tourism (Willebrand 2009).

Overall, we thus found two types of economic functions of hunting in our case study areas: First, a contribution to local livelihoods directly through the consumption or sale of meat and other animal products, and second, the economic impacts of a commercialised recreational hunting industry. In some sites, such as Scotland, economic benefits from recreational hunting accrue to the landowners and their staff, e.g., professional stalkers, and thus allow

employment in remote rural areas, even though stalking as such might not always be an economically viable business (MacMillan and Leitch 2008). In other areas, benefits of the recreational hunting industry for local communities might be less visible, as license fees are collected by national-level authorities.

4.3 Social functions of hunting

In our study cases, we found the social functions of hunting to relate predominantly to the development and maintenance of social capital (Putnam 2000) and respect, prestige and status, i.e., symbolic capital (Bourdieu 1977). In the south of Ethiopia, big game hunting is an indication of manly bravery and maturity, especially among the Hamar people, and helps to create non-kin relationships that can be drawn on in times of hardship (for more detail see Tadie and Fischer, forth.). In Tanzania, bushmeat hunting is not generally seen as a high status activity – on the contrary, villagers in our focus group discussions referred to hunting as a poor man’s activity. However, the meat and cash income that bushmeat hunting provides can be very attractive to women, as several of our informants suggested (for more detail see Lowassa et al., forth.).

In Scotland, deer stalking is part of a 150 year old hunting culture, and continues to be one of the main activities of upland estates. Even where stalking is not commercially viable, it is a culturally important activity and has important bonding functions that help develop and reassure one’s social status (MacMillan and Leitch 2008). Similar functions can also be observed in Sweden where moose hunting teams are organised on a voluntary basis by local hunters’ groups and land owners (Gunnarsdotter 2005).

In the Spanish site, hunting has also been an important social activity for members of all social classes. Most villages have a social game estate where local hunters pay a small membership fee that entitles them to shooting and enjoy a day with a group of friends, which

is considered more important than the quantity and quality of the bag. Hunting is also considered an important social activity among, for example, some politicians or business men, who use hunting as a backdrop for business talk or bonding, as data from our focus group discussions suggests.

Bear hunting in Croatia and Slovenia and lynx hunting in Norway are relatively new phenomena. Until recently considered as pest species, bears and lynx are nowadays highly appreciated trophy game. Although it appears that particularly lynx hunting is often motivated by the desire to limit its population, there is also an emerging body of hunters who value lynx hunting as a recreational activity, regarding it as a particularly challenging form of hunting. For these specialised teams, lynx hunting is clearly an important identity-building interest and conveys status. In Croatia and Slovenia, bear hunting began with the 1947 Hunting Act (Huber *et al.* 2008b), and had become popular among foreign hunters by the 1960s (Frković 2002). Similar to the Spanish case, it was often used as a platform for political negotiations. Today bear hunting continues to be a commercial type of hunting in Croatia, and quotas and high trophy fees make the bear hunt an exclusive, but culturally embedded form of hunting.

Overall, hunting thus appears to have significant social functions as it helps to develop symbolic and social capital, especially in terms of creating and maintaining bonds within one's social group. Interestingly, these types of capital can in some cases indeed, as described by Bourdieu (1977), be transferred into economic capital, as for example, in our Ethiopian and Spanish sites.

4.4 Tensions between social, ecological and economic functions

Hunting is thus expected to fulfil many different functions in our case studies. As mentioned above, these are not always complementary, and often result in conflicts. With regard to the

ecological functions of hunting, there are often disagreements over optimal population levels of a game species (Section 4.1). The many different economic functions of hunting cause tensions about the distribution of socioeconomic benefits of hunting, while the social functions of hunting, bound by cultural norms and customs, result in tensions between traditional and more recently developed uses of natural resources. There are, however, not only tensions within the various functions but also between the different categories of functions.

Two patterns emerge from our case studies, both based on conflicts between ecological functions of hunting and social and/or economic functions. These conflicts either lead to ‘overhunting’, i.e., adverse impacts on survival of a species in an area, or the opposite, i.e., ‘underhunting’, when a population of a game species has impacts perceived as negative, or negatively affects habitats that are of value to others.

In Ethiopia and Tanzania the major conflict is the interaction between ecological and socio-economic functions of hunting. Many conservation actors believe that the approach to hunting practiced by many local communities has the potential to cause serious declines in wildlife populations (Loibooki *et al.* 2002). In Spain, the main conflict results from the interaction between the ecological and economic functions of partridge hunting. Over the past decades, partridge hunting has become a profitable business in Spain (Garrido 2009). Indeed, over-hunting is, together with changes in agriculture, the main cause explaining the critical decline of Spanish partridges (Blanco-Aguilar 2007). As a consequence of an increasing demand for large daily bags (obtained through drive shoots), managers aim to produce as many birds as possible, which ultimately helps to increase their income. Some of these management practices, such as indiscriminate predator control or releases of farm-reared partridges, have negatively affected biodiversity conservation (Villafuerte *et al.* 1998, Rodríguez and Delibes 2004) and could thus be described as ‘overmanagement’.

In contrast, ‘underhunting’ characterises the conflict in our other study cases. In Scotland and Sweden, the two main functions of deer and moose stalking, respectively, are cultural (stalking as a culturally important ‘sporting’ or recreational activity) and ecological (culling to allow forest regeneration) in nature; and those advocating the ecological function maintain that not enough stalking takes place. In Croatia, hunting ground managers focus their bear hunting efforts on the lucrative large individuals. However, they cannot always attract enough hunters due to the highly competitive bear hunting market. As a result, some hunting grounds do not meet their prescribed bear cull quota, resulting in cull numbers that are substantially lower than the quota originally determined.

In Norway, the main goal for lynx hunting is to maintain the population close to the level that was set by parliament in 2003. In principle, this should balance competing interests between conservationists, livestock herders and roe deer hunters. However, in practice there is a great deal of discussion about the actual size of the population, the level at which the goal has been set, and the way the population is distributed in space, with environmental NGOs claiming that too many lynx are hunted (over-hunting) and farmers claiming the opposite (underhunting) (Linnell *et al.* 2010). Struggles over perceived ‘underhunting’, ‘overhunting’ and ‘overmanagement’, i.e., disputes over the degree to which perceived functions of hunting should be translated into action, are thus widespread in our study areas.

5 Multiple institutions and institutional interplay (Step 2)

How can such tensions arising between different functions of hunting be reduced? We argue that an institutional perspective that focuses on how the functions of hunting are embedded in (and framed by) formal and informal institutions can help us to understand tensions and provide suggestions for possible solutions. In this section, we examine the links between hunting functions and the institutional rules regulating these functions. Again, we can discern

institutions that deal with (i) ecological functions of hunting, i.e., rules addressing population management, (ii) economic functions, in particular, institutions regulating access to and monetary benefits from hunting, and (iii) social functions, such as rules and norms concerning social status and social capital. An analysis of their interplay gives important pointers towards the need for institutional change, if disputes over hunting are to be addressed.

Interestingly, many formal institutions in our case studies, especially the most recent hunting and wildlife policies, explicitly recognise the multifunctionality of hunting and wildlife management. For example, in Castilla-La Mancha (Spain), the Hunting Act (1993) and the associated Hunting Regulation (1996) address both ecological and economic functions of hunting, and aim to promote nature conservation as well as the practice of recreational hunting as a hobby and an activity that generates local employment. Also in Croatia, Norway, Sweden and Tanzania, the current hunting or wildlife policy is built on the idea that hunting needs to strike a balance between economic and ecological objectives. It thus seems that contemporary formal institutions that regulate hunting tend to acknowledge the multiple aims underpinning hunting activities. However, they might not take the existence of different functions *within* each of these categories into account. For example, while hunting in Tanzania and Ethiopia fulfils economic functions at the national level as it generates income to the state, it also has important economic functions for the local population whose livelihoods are partly reliant on consumption and trade of bushmeat. However, these forms of hunting are classified as illegal by current legislation. Economic and ecological functions as defined by those in power are thus not necessarily reconciled with the functions that hunting has for the local population, who use their own informal institutions to address the social, ecological and economic functions as defined from their perspectives. For example, there are many rules and customs associated with bushmeat hunting in our Tanzanian and Ethiopian

study sites, including rules on which species are hunted, hunting methods and the selection of the person to lead the hunting trip, and, in south Ethiopia where firearms are used, to do the shooting. Due to the formal illegality of these activities, conflicts arise between illegal hunters and those enforcing the law, for example, rangers of national parks and game reserves. Because of the current property rights that give the state the ownership of hunting rights, local residents thus forego the potential benefits of hunting – but what is more, they often also have to bear the costs of increased wildlife populations and conservation activities (for example, due to land use restrictions or crop damage by elephants) without obtaining a share of the economic benefits of state-sanctioned hunting. In addition, informal institutions that regulate illegal or bushmeat hunting are not static, but develop and partly erode over time due to wider societal changes. Our focus group discussions in western Serengeti suggest that hunting taboos associated with species such as zebra or elephant by some ethnic groups have disappeared over recent years. As these informal rules are not effectively replaced by the formal institutions defined by government, a vacuum develops that ultimately affects the degree to which economic, ecological and social functions can be fulfilled. Overall, in some of our study cases, formal institutions that regulated hunting thus ignored local, informal arrangements with regard to hunting. This had two types of consequences: (a) the potential power of informal institutions, such as taboos, for sustainable (i.e. viable on the long term and in line with ecological, economic and social requirements; Baker 2006) hunting was not effectively used and (b) parts of the population, typically those not wealthy enough to obtain formal rights to hunting, were denied the benefits of hunting. In addition, and this might not only hold for our African, but also for some of the European cases, such formal institutions also neglected the unequal distribution of costs incurred by land management for hunting. A second pattern emerged from the analysis of our case studies, in particular, in Scotland, Spain, and also in Slovenia. Here a number of relatively recent formal institutions address

ecological functions of wildlife management, often connected to international conventions and EU directives. These are then translated into national and regional law as well as, for example, Habitat Action Plans and Natura 2000 designations. At the same time, and unconnected to these, formal institutions exist that govern economic and often also social functions of wildlife management and hunting. For example, the economic and social functions of deer stalking in Scotland are to a large degree founded in the distribution of property rights: Land holdings are generally large, ranging in size from 1,000 to over 10,000 hectares (MacMillan and Leitch 2008), and the right to hunt generally lies with the landowner. While this right is in many cases used to obtain income from paying clients or shooting syndicates, it is often exerted to fulfil social functions, for example, to take family, friends and business colleagues out stalking. Resting on these formal rights to hunting, an informal institutional context has been developing since Victorian times that includes customs on social relations and dress codes, and regulates the social and economic functions of deer stalking in the uplands (Phillip et al. 2009). In contrast, the national and European rules governing ecological aspects are rather recent, and in many ways seem to have developed in parallel to, and are not embedded in, the existing property rights regimes. While these institutions set the scene for land management in the Scottish uplands and are a means to formalise conservation goals, they seem to have a rather limited and localised impact on deer management. Instead, for example in the Spanish case, partridge management follows informal rules on predator control and stock maintenance, even if these are in conflict with formal regulations. In Slovenia, since the country's accession to the EU, the emphasis on formal institutions that focus on ecological functions, such as the Habitats Directive, has severely constrained the enactment of the social and economic functions that bear hunting had granted until then.

Two patterns of institutional interplay thus emerge from our case studies: (i) conflicts arise between functions of hunting as defined by the government and functions for the local population and (ii) ecological functions often seem to be embedded in formal institutions that have developed separately to the formal and informal institutions guiding the social and economic functions of hunting. While the first pattern could be characterised as a clash between formal and informal institutions, the second pattern emerges as formal institutions that aim to address ecological aspects come in conflict with a second set of formal institutions, supported by informal ones, which embed socio-cultural functions. Here, the formal ecological rules are not necessarily defined by a more powerful class, but are generated by international and non-local actors who claim the general right to influence wildlife management. However, in the eyes of local actors, they seem to ignore the existing property rights, cultural norms and traditions that are specifically related to hunting. In both cases, locally supported, well embedded and ‘old’ institutions are in conflict with those that have recently come in from higher political levels or ‘outside’.

6 Managing multifunctionality and institutional interplay (Step 3)

In many of our study sites, the multifunctionality of hunting and related negative implications of institutional clashes have been implicitly or explicitly recognised. Political and policy efforts to reconcile these functions and manage institutional interplay have been undertaken or are currently discussed. In this section, we examine a selection of such institutional arrangements in relation to the governance structures they draw on (Section 2.3) and the degree to which they address the multiple functions and tensions between institutions diagnosed above.

6.1 Institutional arrangements to address multifunctionality

A first glance at selected examples of institutional arrangements that address the multifunctionality of hunting in our study sites (Table 2) suggests that the governance of hunting through committees and fora is a very widely used approach. Such committees exist in Norway, Sweden, Slovenia, Croatia and Scotland, and tend to focus on single game species (such as moose or brown bear) or small groups of related species (such as deer or large carnivores). Their general aim is to reconcile conflicting functions of hunting by bringing land users, other interest groups and the government together to provide a platform for the negotiation of potentially diverging interests. However, a closer look reveals that these arrangements cover a wide range of governance approaches, as follows:

In Scotland, for example, Deer Management Groups (DMGs) are a voluntary association of neighbouring land managers, whereas the Deer Commission for Scotland (DCS) was (until August 2010, when it merged with a non-departmental government body, Scottish Natural Heritage) a statutory body specifically aiming to reconcile deer management with other conservation interests. In Croatia and Slovenia, committees consisting of responsible national authorities and experts have been established with the responsibility to produce and update Brown Bear Management Plans and Action Plans. In both countries, the committees have only an advisory function to the responsible ministry. In Norway, Regional Large Carnivore Committees consist of elected politicians, and thus represent a move from collaborative fora of stakeholders towards representative democracy. These committees are, however, supposed to manage lynx in close collaboration with interest groups.

In summary, such committees and fora combine regulatory and collaborative elements to varying degrees. Their governance functions range from a merely advisory role (Croatia, Slovenia) to, albeit limited, decision-making power (Norway, Sweden), with some holding legal authority to intervene in perceived mismanagement of game (Norway, Sweden, DCS in Scotland). Some committees draw solely on voluntary participation (DMGs in Scotland).

And while some include a relatively small subsection of interest groups (Scotland, Croatia, Slovenia), others are more inclusive (Sweden), with Norway as a special case, where the committee consists of elected politicians, and stakeholders are only consulted. Such fora and committees also work on varying spatial scales, often to mirror the range of a game population, for example in Sweden and Scotland, where institutions are spatially nested to manage game at the population level (Scotland: DMGs, Sweden: MMAs, Table 2) and, at the same time, reflect local interests (Sweden: MMUs), as well as providing overview and coordination (Scotland: DCS, Sweden: WMDs).

Our examples from Ethiopia, Tanzania and Spain show further variety in institutional arrangements to govern multifunctionality. In both Ethiopia and Tanzania, designations exist that aim to reconcile conflicting functions of hunting, and that involve government authorities, local communities and private companies. In both cases, the main idea is to designate areas for hunting to protect them from other land uses that might lead to a decrease in game populations, and in exchange, provide benefits for neighbouring communities to incentivise wildlife conservation and compensate for land use opportunity costs. The Ethiopian approach, the designation of Controlled Hunting Areas (CHAs), is currently more strongly focused on regulation than the Tanzanian Wildlife Management Areas (WMAs) which require a large degree of collaboration. Symptomatic of this is the establishment of Authorised Associations in Tanzania, i.e., community-based organisations managing the WMA, whereas the Ethiopian approach draws on command-and-control approaches to establish rules and distribute revenue – although demarcation of CHAs and revenue sharing are increasingly carried out in a participatory way.

In Spain, an information- and market-based approach has been suggested by researchers and policy makers: A Game Quality Certificate, as a means of setting standards similar to international certifications forestry or fishery products, aims to certify those estates that

manage game in a sustainable, semi-natural manner (e.g., without releases of farm-reared game), and help to maintain valuable habitats or species. Hunting estates using management methods adjudged unsustainable or detrimental to conservation would not receive the certificate. Hunters could thus choose their destinations based on the information provided by the certification, and thus ideally create economic incentives for estates to move to more sustainable approaches of game management.

This overview suggests that in our study sites, the multifunctionality of hunting is addressed through a range of structures: (a) committee-based approaches that combine collaborative with regulatory governance to varying degrees, (b) designations of hunting areas of which some, again, rely more strongly on regulations, while others are based on collaboration and (c) certification systems that combine information with market-based approaches. In the next section, we examine the extent to which these structures address the multiple functions described above.

6.2 Functions addressed – functions neglected

Four main findings emerge from our analysis: First, across all study sites, it appears that the institutional arrangements considered here address primarily ecological and economic functions. For example, in Norway, the elected committee's collaboration with stakeholder groups aims to integrate carnivore conservation and viable livestock husbandry (Sandström *et al.* 2009; Linnell *et al.* 2010). In some cases, socio-cultural functions of hunting are implicitly incorporated, for example, in the Deer Commission for Scotland, where conservation interests as well as those of the stalking industry – which comprise not only economic but also cultural aspects – are included. However, in other cases, social functions tend to be neglected, for example in Sweden, where the transfer of power from local management units to large areas, to be implemented in 2011 to better take account of the scale of moose

population ranges, raises concerns about the degree to which social functions of hunting can be included in large-scale management decisions. In the southwest of Ethiopia, Controlled Hunting Areas (CHAs) do not formally take account of the cultural functions of hunting, for example, among the Hamar people. In Spain, the suggested Game Quality Certification would not address social reasons for hunting in specific areas that are unrelated to the bags acquired or the ecological value of the game or the hunting environment.

Second, and related to this, functions of hunting for local populations are in some cases only insufficiently represented by these institutional arrangements. CHAs in Ethiopia do not allow hunting by the local population, whether for economic (food) or social (proof of manhood) purposes. At the same time, revenue sharing with local communities is either still rudimentary, where revenue disbursement is not clearly regulated and depends on the goodwill of the regional government, or not satisfactorily implemented and communicated. This is the case in the southwest of Ethiopia, where the regional government is currently revising their revenue sharing scheme, suggesting that this might improve in the future.

Similarly, in Scotland, views on hunting held by the wider public – beyond stakeholders from conservation and stalking backgrounds – are under-represented in the current collaborative fora: The interests of hillwalkers and animal welfare advocates, voiced by their respective organisations, are included in round-table discussions, but have not yet found a stronger, more formal reflection in the Deer Commission's or Deer Management Groups' work.

Third, and connected to this, not all of the institutional arrangements presented here address the tensions between local and international formal institutions. For example, Slovenia is, as a member of the EU, committed to stricter international agreements for bear protection than Croatia. Although both countries have chosen collaborative approaches, human-bear conflicts are a major concern in Slovenia, but not in Croatia (Milner-Gulland *et al.* 2010). This might be due to the dominant role of the EU Habitats Directive in Slovenia, forcing a focus on

ecological functions of bear management, and thus ignoring its social and economic functions. In contrast, Croatian bear management has been, to date, not answerable to the EU, and could thus afford to maintain the synergies between social, economic and ecological functions of bear hunting.

Fourth, problems of over- and under-hunting are not, or only partially, solved by the institutional arrangements presented here. Over-hunting, especially in the CHAs in Ethiopia's southwest, still continues due to a number of reasons, including weak law enforcement and unclear demarcations. In the Ethiopian highlands, there is also insufficient communication between actors where, for example, demarcations are carried out collaboratively between communities and regional government, but without the concessionaires, i.e., the hunting companies. Under-hunting as in Scotland, Sweden and Croatia is, to date, still ongoing as the collaborative arrangements have not yet succeeded in increasing the weight of the population control functions of hunting relative to its social and economic purposes. However, this might change in the future. In Croatia, improved communication between the committee and hunting ground managers has recently led to an increased fulfilment of the quota. In Sweden, the introduction of ecosystem-scale management is supposed to improve the match with ecological goals. In Scotland, the incorporation of the Deer Commission into Scotland's conservation agency might also help to reduce under-hunting. However, it remains to be seen if this shift, heavily contested before its implementation, fosters or hampers sustainable deer management in the long run.

7 Conclusions

Our analysis has shown that in our study cases, hunting has multiple ecological, economic and social functions. Two patterns of conflicts between functions emerged: The phenomenon of 'overhunting' (or 'over-managing' in Spain) where, seen from an ecological perspective,

too many individuals of a species were hunted in order to fulfil economic and social functions of hunting, and ‘underhunting’, where, again for economic and/or social reasons, too few individuals were hunted to fulfil ecological functions of hunting.

We found, however, that such multifunctionality is increasingly recognised in formal institutions. Notwithstanding this recognition, formal institutions still often neglect important functions of hunting and related formal and informal institutions, such as (a) ecological, economic and social functions for local populations in Ethiopia and Tanzania, where hunting permits are virtually inaccessible for local people, and (b) more recent ecological functions of game management, originating in international agreements on biodiversity management, that clash with both formal and informal institutions encapsulating social and economic functions of hunting at the local level, for example, in Spain and Scotland.

Increasingly, complex institutional arrangements are developed that aim to reconcile tensions between function-specific institutions. These include, for example, committees, area designations and certifications. While superficially similar, these institutions can vary in their governance approaches on a spectrum from regulations to collaboration (committees and designations) and market-based governance to information (certification). And again, these might not necessarily succeed in addressing the multitude of functions that hunting and game management might have in a given area. Overall, our analysis suggests that the following aspects should be better recognised in institutional arrangements that address hunting:

First, social functions of hunting and functions for local people need to be given more attention. While often very well developed and associated with a range of formal and informal institutions, social and cultural functions of hunting are frequently neglected in recently emerging institutional arrangements. Similarly, whilst strictly regulated hunting access might be desirable from an ecological point of view, the exclusion of local people with strong economic and cultural interests in hunting results in conflict. Breaches of regulations

are virtually inevitable. In places such as Scotland, where the wider public increasingly claims a voice in decisions that concern wildlife management, institutional arrangements should be as inclusive as possible. Generally, committees and fora that aim to bring stakeholders together might thus need to adopt more open approaches to allow representation also of those land uses and interests that are regarded as illegal, or that have only been recently emerging.

Second, where institutional systems have developed in parallel – and seem to be neither vertically nor horizontally integrated – they should be actively reconciled. This is required, for example, in Scotland, where formal property rights and a wealth of informal hunting institutions are in conflict with international formal institutions concerning biodiversity management (Irvine *et al.* 2008). A similar issue has developed in Slovenia: Decision-making on bear populations is strongly informed by international agreements, and decoupled from local hunting decisions, which seems to lead to tensions among the local population.

This draws attention to the fact that it is no longer the nation state that is exclusively in charge of setting standards for the ecological functions of hunting. For example, the European Habitats Directive has a strong impact on national-level biodiversity governance through the harmonisation of legislation. Although harmonisation might be a powerful tool to reach common goals across the EU, it fails to take the variety of ecological, economic, social and cultural aspects of biodiversity management – here specifically of hunting – into consideration. An alternative and possibly more fruitful approach would be to draw on open coordination using information-based mechanisms such as guidelines and indicators, benchmarking and sharing of best practice. This approach would acknowledge the different hunting traditions in the member countries and be compatible with the collaborative approaches widely used in our study cases.

Third, a move from a single-species to an ecosystem approach would contribute to an institutionalisation of the multifunctionality of hunting, game management and other activities, and help to create institutional synergies at the horizontal level. It would thus address the issues of under-hunting, and possibly also over-management as described for the Spanish study site. The problem of over-hunting in Ethiopia and Tanzania, in contrast, might more appropriately be addressed by (a) a better recognition of the functions of hunting for local people as suggested above, and (b) an improved implementation and enforcement of existing arrangements, such as Wildlife Management Areas.

In this study, we explored a range of cases and institutions related to hunting. Our selection of examples is by no means exhaustive, for example, there are also fora-based approaches in wildlife governance in Tanzania (such as the Serengeti Ecosystem Community Conservation Forum). More in-depth approaches are needed to provide detailed insights into each of the cases presented here (e.g., Lowassa *et al.*, *forth.*; Tadie and Fischer, *forth.*). At the same time, future research could scale up and investigate the patterns that emerged from our data with quantitative methods and in larger datasets, including a larger number of countries (also from southern Africa, where hunting plays an important role in land use) and a wider variety of hunting types in each country. Such research could also systematically identify factors that foster or hamper success of institutional arrangements that reconcile the multiple functions of hunting. However, in this study, our aim was to provide a first overview of the multiple functions of hunting, and to identify patterns in the governance of the multifunctionality of hunting across a range of cultural, economic and ecological situations in Europe and Africa, and our analysis shows that such an approach can be very fruitful to point out shortcomings in and recommend modifications for current institutional arrangements that deal with the multifunctionality of hunting and wildlife management.

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Remembering Simon Thirgood, who brought us together.

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Table 1: Overview of study sites with species, key stakeholders and formal hunting rights.

“Landowner” includes private, charitable and governmental landowners.

<i>Country: site</i>	<i>Target species</i>	<i>Key stakeholders</i>	<i>Formal hunting rights</i>
Croatia: Gorski kotar	Brown bear (<i>Ursus arctos</i>)	National and regional government, local hunters and game managers, hunting organisations and companies, researchers	With the government, can be leased out.
Slovenia	Brown bear (<i>Ursus arctos</i>)	National government, local hunters and game managers, hunting organisations and companies, local communities, conservation NGOs	With the government, can be leased out.
Norway	Eurasian lynx (<i>Lynx lynx</i>)	National government, conservation NGOs, reindeer and livestock herders, landowners, hunters and wildlife managers	With the landowner, can be leased out.

Sweden	Moose <i>(Alces alces)</i>	National government, landowners, local hunters and game managers, conservation NGOs	With the landowner, can be leased out.
Scotland	Red deer <i>(Cervus elaphus)</i>	National government, landowners, local hunters and wildlife managers, tourist hunters	With the landowner, can be leased out.
Ethiopia: (i) South-western lowlands (South Omo) (ii) South- eastern highlands (Bale)	(i) All lowland wildlife, including giraffe <i>(Giraffa camelopardalis)</i> , buffalo <i>(Syncerus caffer)</i> , various gazelle species (ii) Legally hunted 'trophy' species	National and regional government, local communities, hunting companies, tourist hunters	With the government, can be leased out (within Controlled Hunting Areas). Hunting without license thus illegal.
Tanzania: western Serengeti	'Bushmeat': Migratory blue wildebeest <i>(Connochaetes)</i>	National government, local communities, conservation NGOs, hunting companies	With the government. Bushmeat hunting without license

	<p><i>taurinus</i>), plains zebra (<i>Equus burchelli</i>), resident species such as buffalo (<i>Syncerus caffer</i>)</p>		thus illegal.
Spain: Castilla La Mancha	<p>Red-legged partridge (<i>Alectoris rufa</i>)</p>	<p>Regional government, landowners, local hunters, tourist hunters and game managers</p>	<p>With the landowner, can be leased out.</p>

Table 2: Examples of institutional arrangements addressing multifunctionality in our study cases

Country	Institutional arrangement	Type
Croatia	Committee for the development and implementation of the Brown Bear Management Plan for the Republic of Croatia Committee for monitoring large carnivore populations in the Republic of Croatia	Collaborative arrangements involving key stakeholders in consultation and joint planning with government to manage long-term sustainability of brown bear as a game species.
Slovenia	Committee for large carnivore management – expert group and stakeholder group	Collaborative arrangements involving key stakeholders in consultation and joint planning with government to set quota and develop Brown Bear Management Strategy and 5-year action plan.
Norway	Regional Large Carnivore Committees	Regulatory mechanism targeted at the reconciliation between carnivore conservation and livestock and hunting interests. Implementation decentralised to indirectly elected politicians at regional level.
Sweden	Moose Management Units (MMU) and Moose Management Areas (MMA) and Wildlife Management	Collaborative arrangement involving key stakeholders at local (MMU), ecosystem (MMA) and regional level (WMD) with the task to reconcile different objectives through moose

	Delegations (WMD)	population control.
Scotland	Deer Commission for Scotland (DCS – until 2010 ²) and Deer Management Groups (DMG)	Collaborative arrangement at local (DMG) and Scottish (DCS) level bringing selected key stakeholders together to reconcile different deer management objectives.
Ethiopia	Controlled Hunting Areas	Regulatory mechanism involving government, communities and private companies to protect wildlife and its habitat and, to some degree, share revenue from hunting.
Tanzania	Wildlife Management Areas	Collaborative arrangement between government, communities and private companies (implemented through ‘Authorised Associations’, i.e. specially formed community organisations that can use or sell hunting quotas) to protect wildlife and its habitat and share revenues from hunting and other tourism.
Spain	Game quality certification (suggested)	Information- and market-based arrangement certifying hunting estates based on standards of ecologically and socially responsible as well as economically viable hunting.

² Our analysis began in 2009, which gave us the opportunity to include the merger of the DCS with Scotland’s conservation agency in our study.

Fig. 1: Conceptual framework, showing the three steps of our analysis

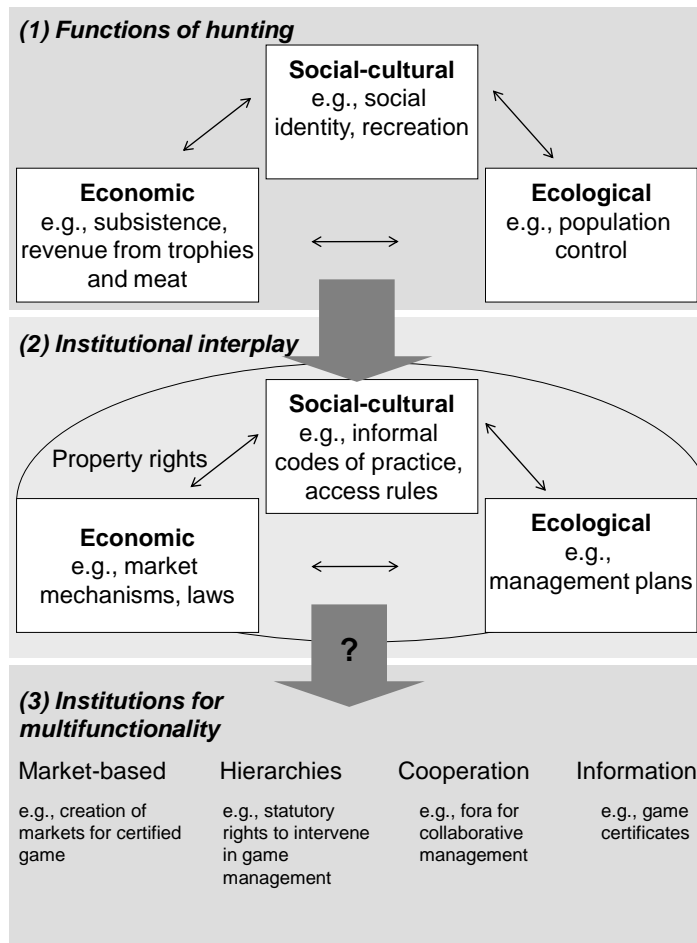


Fig. 2: Research process

