

## Open property regimes

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**Abstract:** In the literature on the commons, open access is considered the absence of a property regime and equated with a tragedy of the commons. However, a longitudinal study of mobile pastoralists in the Far North Region of Cameroon shows that open access is not the absence of rules and does not lead to a tragedy of the commons. Current theoretical models cannot explain this phenomenon of management of common-pool grazing resources in a situation of open access. Here I propose a new property regime – an open property regime – that solves this paradox. First, I will explain how open property regimes function as complex adaptive systems using our study of mobile pastoralists in Cameroon. Second, I will describe four other cases of pastoral systems with similar open property regimes. Finally, I discuss the key characteristics that these pastoral systems have in common and outline a new theoretical model of open property regimes.

**Keywords:** Common-pool resources, complex adaptive systems, open access, pastoralism

**Acknowledgement:** I want to thank Christine Beitzl, Elizabeth Gardiner, Paul Scholte, Paul Schure, and the three anonymous reviewers for their critical feedback on this paper. It has much improved as a result. The research was supported by the National Science Foundation (BCS-0748594, DBI-0827256), the National Geographic Society (8306-07), and the Ohio State University. I would like to thank pastoralists in Cameroon for participating in the study, the Centre d'Appui à la Recherche et au Pastoralisme (CARPA) for research support, and the Ministry of Scientific Research and Innovation, the Garoua Wildlife College, and the Higher Institute of the Sahel at the University of Maroua for granting research permission and research affiliation (2008–2013).

## I. Introduction

The goal of this paper is to propose a new property regime: an open property regime. The reason is that the current four categories – open access, common property, private property, and state property – cannot adequately describe a property regime that is frequently found in mobile pastoral systems. In these pastoral systems, described below in detail, there is open access to common-pool grazing resources but, and this is critical to note, open access does not mean the absence of rules; instead it refers to the right that every pastoralist has to common-pool grazing resources. It is important to add this new category because the unquestioned truth in the literature on the commons is that open access is not only the absence of rules but also that it will lead to a tragedy of the commons. Unfortunately, Hardin (1968) and his critics (Ostrom 1990) have forever linked pastoralists to the tragedy of the commons by using the same story of shepherds on the English commons. Both Hardin and Ostrom (and many others) argue that open access to common-pool resources leads to a tragedy. However, this is not the case for the pastoral systems that I describe below. The new category of open property regimes solves the problem of a misfit between current theoretical models of the commons and the social-ecological system of pastoralism in which resource distributions are highly variable in space and time and users have to be highly mobile, flexible and opportunistic in tracking the changing distribution of resources.

Pastoral systems have been often described as common property regimes (McCabe 1990; Niamir-Fuller 1999; Mwangi and Ostrom 2009) and not as open property regimes (and there are good reasons why researchers describe these systems as commons because labeling it open access would automatically invoke the specter of the tragedy.) Reviews of research on pastoral mobility have shown that most grazing lands do not have a formal tenure system and the social and spatial boundaries are porous (Niamir-Fuller and Turner 1999; Fernández-Giménez and Le Febre 2006; Galaty 2013). Instead, access to and use of these grazing lands is regulated through a number of informal institutions, social networks, and norms of reciprocity that are characterized by flexibility, porosity, and malleability (Casimir 1992b; Galaty 1994; Turner 1999; Fernández-Giménez 2002; Fernández-Giménez and Le Febre 2006; Bassett and Turner 2007). These informal institutions have consistently been interpreted in terms of restricting access to common-pool grazing resources rather than in terms of facilitating access. This interpretation is problematic because the empirical evidence of pastoralists' movements in West and Central Africa shows that there are practically no restrictions on access to common-pool grazing resources; and that instead the norms and networks of reciprocity *facilitate* access to new grazing areas (Boutrais 1996; Bassett and Turner 2007). Another problem is that describing pastoral tenure systems as “partial, intermittent, flexible, opportunistic, ad hoc, and often invisible” (Fernández-Giménez and Le Febre 2006, 352) does not explain how these “invisible institutions” lead to effective management of grazing systems. This is also noted by Fernández-Giménez and Le Febre, who argue that “despite the reams

of literature on pastoral societies and production systems, we still have relatively little understanding of how these institutions work” (2006, 357). We have argued that these open property regimes work as complex adaptive systems (Moritz et al. 2013a, 2014a, 2015a).

Complex adaptive systems have been described by Mitchell as systems “in which large networks of components with no central control and simple rules of operation give rise to complex collective behavior, sophisticated information processing, and adaptation via learning or evolution” (2009, 13). Lansing has shown how management of common-pool resources can function without central or collective decision-making in Bali where distribution of water among communities of rice farmers emerges from the bottom up (Lansing 1991, 2006). In the pastoral system in the Logone Floodplain in the Far North Region of Cameroon that I have studied for the last twenty years, a similar coordinated use of common-pool grazing resources emerges from the bottom up as individual pastoralists make independent decisions about when and where to move with their herds. The result of these independent decisions is an ideal free distribution of the pastoralists over the available grazing resources. In this system, the ideal free distribution is the emergent property of the complex adaptive system similar to bird flocks, the iconic example of a complex system, which emerge from individual birds following relatively simple rules (Reynolds 1987).

In the last eight years, my colleagues and I have conducted a longitudinal and interdisciplinary study of mobile pastoralists in the Far North Region of Cameroon. The goal of the study was to explain how mobile pastoralists manage common-pool grazing resources in a situation of open access in the Logone Floodplain. Our hypothesis was that management worked as a complex adaptive system and that as a result of independent decision-making pastoralists would distribute themselves over the available grazing resources in an ideal free distribution (Fretwell and Lucas 1969) in which the distribution of grazing pressure matches that of the distribution of grazing resources. We have described the findings of our study in a number of papers. First, we used ethnographic methods to describe how open access works in the Logone Floodplain (Moritz et al. 2013a). Second, we used spatial methods to document an ideal free distribution of pastoralists in the floodplain (Moritz et al. 2014a, 2014b). Third, we used agent-based modeling to show that it is relatively easy for pastoralists making independent movement decisions to achieve an ideal free distribution at the population level (Moritz et al. 2015a). Fourth, we showed that economic inequality did not undermine the system of open access (Moritz et al. 2015b). Fifth, we discussed the implications of our findings for the governance of rangelands (Moritz et al. 2013b).

In this article, I will review four additional case studies of pastoral societies with similar property regimes as we have documented in the Far North of Cameroon. I will then distill key characteristics of open property regimes. I will conclude with a discussion of the implications for the theory of the commons. But first I briefly describe the pastoral system in the Far North Region of Cameroon.

## 2. Mobile pastoralists in the Far North Region of Cameroon

The Logone Floodplain in the Far North Region of Cameroon is a key resource for mobile pastoralists in the Chad Basin. Each November thousands of pastoralists from Cameroon and neighboring Chad, Niger, and Nigeria with more than 200,000 cattle trek to the Logone floodplain when the water retreats to exploit the excellent quantity and quality of the grasslands (Seignobos 2000; Scholte et al. 2006). The vegetation in the floodplain is relatively homogenous in terms of forage quantity and quality because of the extreme flatness of the area. The quality and quantity of vegetation in the floodplain are mainly determined by annual variations in flooding depth; the deeper the depressions, the higher the forage quantity (Scholte 2007). While the distribution of forage resources is relatively predictable – low-lying areas have greater quality and quantity of forage than higher areas – there is also an element of unpredictability due to bush fires, generally set at the start of the dry season, which initially reduce forage through burning, but then later increase forage through regrowth. The changing distribution of grazing resources continuously shapes pastoral mobility patterns.

Pastoralists are organized in camps, which consist of multiple households each with their own herd, but households are autonomous decision-making units. During the migratory process the composition of camps changes continuously as individual households decide to follow other transhumance routes or set up camps in other places. Pastoralists in the floodplain use opportunistic grazing strategies that closely track resources. Pastoralists are continuously monitoring the well being and nutritional status of their animals, comparing them with the condition of animals in the same and other areas, and making decisions about moving to ensure that animals have access to relatively good pastures. Pastoralists have good knowledge of the distribution of resources and camps and the conditions of other cattle. When they visit other camps, they are checking how their animals are doing in comparison to others. When they travel to markets and meet other pastoralists, the first topic of conversation, after greetings, is the location of other camps and the grazing conditions in those areas. Pastoralists are constantly collecting information through their social networks, but they do not make decisions about movements based on this information alone. Before they make any decisions about moving, they send scouts to inspect pasture conditions.

While pastoralists are constantly collecting information about changing pasture conditions, there is nevertheless considerable regularity in the transhumance patterns at the population level, which is the result of the habitual movements of the herds in which animals develop *woowaande* (habitude) or preference for the pastures and campsites they visit annually. Pastoralists also have a preference for their habitual campsites, in part because their animals thrive there, but also because they consider them home. However, pastoralists' attachments to these sites does not result in territoriality (Moritz et al. 2013a). Access to water does not restrict the selection of campsites as water can be found throughout the floodplain in rivers, ponds, and depressions and can be used by everyone. Pastoralists can

set up camp wherever and whenever they want. Thus, access to grazing areas is open. No one is obliged to ask for permission from traditional or governmental authorities or other pastoralists to set up camp in the zones or near established campsites. This applies to all pastoralists, including newcomers from other groups or countries (Moritz et al. 2013a). It is an open system and this is reflected in the (recent) history of pastoral movements in the floodplain and beyond, which shows that the pastoral population is constantly changing in response to intra- and inter-annual changes in the distribution of grazing resources. We have found that open access to common-pool grazing resources and independent decision-making of highly mobile pastoralists results in an ideal free distribution of pastoralists in which the distribution of grazing pressure matches that of the distribution of grazing resources (Moritz et al. 2014a, 2014b). We have described this as a self-organizing complex adaptive system in which common-pool resources are managed without central or collective control (Moritz et al. 2015a).

The system of open access that I have described above is not limited to the Logone Floodplain; it extends beyond the Far North Region of Cameroon. To give an example, one of the groups in our study area spends the dry season in the floodplain and the rainy season in Nigeria and Niger (at least, before Boko Haram started slaughtering pastoralists and taking their herds). Others spend the rainy season in Cameroon and the dry season in Chad. They all describe an open property regime wherever they go in the Lake Chad Basin.

### 3. Open property regimes in other pastoral systems

A review of the ethnographic literature shows that there are a number of other pastoral systems with similar open property regimes. Here I will briefly describe four additional cases: Tuareg in Northern Mali (Berge 1997, 2000, 2001); Kababish Arabs in Sudan (Asad 1964, 1970); Turkana in Northwest Kenya (Gulliver 1951, 1955; McCabe 2004); and Pashtun in Western Afghanistan (Glatzer 1977, 1992; Glatzer and Casimir 1983). The goal is to show that open property regimes are not uncommon and that open access is not the absence of a property regime. On the contrary, pastoralists in these societies argue that everyone has a right to pastures and that no one can be excluded.

#### 3.1. Tuareg in Northern Mali

The descriptions of the pastoral system of the Tuareg in northern Mali draw extensively from the work of Gunnvor Berge (1997, 2000, 2001) who conducted fieldwork between 1987 and 1997 with the Kel Adagh, the people of the Adagh. The Adagh is a mountainous area in the Sahara Desert with very little and unpredictable rainfall. While most rain falls in July and August, it is never clear whether and where it will fall or how much. Water is a critical but ephemeral resource in the desert; there are no permanent rivers or permanent lakes. The area consists of multiple wadis or riverbeds. The Tuareg describe the landscape as a network

of wadis, with water flowing from smaller wadis to bigger ones, until it finally reaches, what they call the “head”. Depending on what side of the mountain or ridge the rain falls determines what wadi will temporarily have water. The wadis are a source of life and of great importance because where there is water there will be forage for livestock.

“Water is life” and “milk is food” are oft-repeated phrases. It is by keeping livestock that water is transformed into milk – the food that sustains and defines the Tuareg – and it is because of the milk that they move in search of water and pastures in the wadis. Knowledge of the wadis and the flow of the water through the wadis is critical and this knowledge is gained as people grow up in particular areas. The knowledge of the wadis and their possibilities in terms of forage offers, what Berge describes as, a feeling of liberty. One could argue that the feeling of liberty is a sense of control over one’s destiny through knowledge of the resources (but not control of the resources, which is impossible in this arid environment with unpredictable rainfall).

Tuareg in the Adagh have strong attachments to one or more wadis to which they are accustomed to and when asked about these places, they use the term *akal*, which can be translated as “earth”, “land”, or “country”, but also as “environment” or “landscape” (note that these are not just terms for territories). Their animals thrive on the water and pastures in the wadis to which they are accustomed. They grow fatter and produce more milk than on neighboring wadis to which they are not accustomed. Similarly, animals may even become sick drinking the well water from wadis to which they are not accustomed. And it is not just the health and well-being of animals; attachment to place also translates in health and well-being for the people who camp there. The attachment to place is truly a bodily experience for the Tuareg, who prefer to stay around the wells and in the wadis to which they and their animals are accustomed.

Tuareg not only prefer to stay in the same wadis, they also prefer to stay at the same campsite within the wadi. After four years of repeated returns a place, it becomes “their place” However, these attachments are not permanent; Berge describes them as strong but fleeting (2001, 188). Moreover, even families that tend to camp at the same site have no exclusive right to that site. Instead, they simply hope to find their habitual site unoccupied when they return to it. Berge described a case in which two brothers find their habitual campsite occupied by others, but note that they cannot drive them away. In fact, Berge writes, “Tuaregs do not only assert that the wadi is for everyone, they share outlooks that motivate (re)actions against exclusive claims to land. They find it sinful to restrict access to God’s blessings and may, when provoked, act with violence upon efforts to do so” (Berge 2000, 366).

Whereas attachments to wadis become stronger and stronger over time, this is not the case for campsites within the wadis. Tuareg frequently move their habitual campsites within the wadi for a number of practical reasons, including an increase in vermin, but also because people prefer not to return to a site where people have died and are buried. Tuareg attachment to place is developed through habitual

movements, which change over time. What always remains is the tent, which is taken from campsite to campsite. The tent is where the people are, near the hearth, and to play with a popular phrase, for mobile pastoralists “home is where the hearth is”. While Tuareg have strong attachments to their wadis, which they consider the source of life, they are not territorial. Access is open for all. Berge quotes a man expressing this sentiment, “Our love for the wadi is tied to liberty, to our love for the animals, and our love for milk. Nature exhales pure air. Nature exhales air that is pure. *The wadi belongs to everybody*, and money does not enter into life” (Berge 2001, 186)(emphasis added).

The attachment to place does not inhibit their readiness to move, which is captured by a quote from one of Berge’s informants, “We are attached to the wadi simply because life there pleases us. Life here is healthy. The stars are beautiful. They are important to us. It is always important to look far ahead, to see as far as possible” (Berge 2001, 186). The quote not only expresses the concept of attachment as a bodily experience but also the readiness to explore other areas and move beyond the wadi to which they have an attachment. They follow the animals to where there is grass, keeping their eyes on the horizon and what lies beyond (Berge 2000, 339). The term *Ihanzuzagh* refers both to the yearly itinerary and the habitual campsites along the itinerary. According to Berge, “Ihanzuzagh denotes habit in relation to space: turning space into place” (Berge 2001, 188). The *Ihanzuzagh* are the preferred places to be. But if there are no pastures, people will move to new places.

Of course, for the Tuareg attachment to place and open access are not a paradox. They are always ready to move because of their livestock. While livestock do better in the places to which they are accustomed, if they are unable to stay in these places because of unpredictability in rainfall, they will move to new places and habituate their livestock to new places. The result is an open system in which pastoralists can move to new places when necessary, and a yearly itinerary that is relatively predictable but not inflexible. The open property regime makes practical sense for Tuareg pastoralists in the Sahara desert in which resources are highly unpredictable in space and time.

### **3.2. Kababish Arabs in Sudan**

The descriptions of the Kababish Arabs in Northern Kordofan, Sudan draw extensively from the work of Talal Asad, who conducted research for his dissertation in the 1960s in Sudan. While Asad’s main research focus was on political power in a pastoral society (1970), he has also extensively discussed the ecology and seasonal movements of the Kababish (1964). The Kababish Arabs live in a semi-desert region with only one rainy season with minimal rainfall, which is highly erratic in incidence and intensity. Asad (1964) describes it as an area with poor soils and limited grazing resources (51), which nonetheless supports large herds of camels, sheep and goats. The Kababish keep multiple livestock species, but camels and sheep are the most important. The Kababish Arab form the majority of

a substantive pastoralists population of 113,000 in Kordofan province, of which 68,000 or about 60% were Kababish. The other groups are Kawahla and Hawawir.

The seasonality in rainfall and forage availability shapes the movements of herds and households, with separate movements for each. There are three main seasons – *khareef* (rainy season), *shita* (cold dry season), and *saif* (hot dry season) – and pastoralists make a seasonal round or transhumance between the grazing areas associated with the different seasons. Asad notes that there is considerable variation in seasonal movements within and between groups, with some travelling as far as Darfur Province and the neighboring country of Chad. Transhumance cycles change frequently in bad years when households shift from one dry season area, *damar*, to another, which is similar to the process of migratory drift and migration (Stenning 1957). Asad argues that the movements are never haphazard and that Kababish generally move to areas with which they are familiar or where they have relatives (1964).

Similar to the Tuareg described above, the Kababish Arabs develop attachments to their habitual dry season grazing grounds or *damar*. However, in drought years, pastoralists often change their transhumance cycles and while this may lead to permanent or temporary changes in seasonal rounds, it most certainly leads to attachments to multiple *damar*.

The Kababish form small migratory groups that consist of multiple households, but in which the household is the smallest and fundamental migratory unit. The migratory groups undergo a continuous process of fission and fusion in response to changes in the spatiotemporal distribution of grazing resources in which groups split if there is not enough forage in one location and/or join others when there is enough. The result of this migratory process is a social organization is best described as a fragmentary lineage system (Dupire 1970) in which clans and sub-clans are scattered over a large area. This fragmentary lineage system is not grounded in a territorial base, but a reflection of the instability of migratory groups in which there are no stable camps and no corporate interests hold the households together (Asad 1970, 28). Asad argues that households are autonomous and although they are interdependent in terms of herding, they are free to cooperate with whomever they prefer, friends and/or family.

Asad describes Kababish pastoralism as an open system (1964, 1970). “Neither watering-points nor grazing grounds are individually or sectionally owned. Even prior occupation gives no exclusive rights of usufruct. Herds of different owners may and do frequently mingle at the rain-pools and on the grazing grounds. There is, however, the courtesy custom of not allowing one’s herd to stray too near someone else’s tent” (Asad 1964, 54). This courtesy custom should certainly not be understood as regulating access to grazing grounds or water sources.

*Damar* are the customary dry season grazing grounds that includes a well field where pastoralists dig their own wells to water their livestock. The size of the *damar* is determined by the distance that animals can cover from the well field before they have to return to be watered after two or four days. There are no boundaries for the *damar*; the space is point-centered with the well field as its



center. It is not a discrete territory and it is not for exclusive use of the households that traditionally have used it customarily. The population of *damars* varies from one season to the next and has households from multiple clans, which is the result of the migratory process described above.

The well field and the grazing grounds in the *damar* are not owned by any individual or group. In addition to open access to grazing resources, there is also open access to the well field, which lies in the center of the dry season grazing grounds of the *damar*. Anyone can dig a well there, as long as there is some reasonable distance so that animals can be watered without herds mixing too much or too often. Pastoralists from multiple sections may own wells in a field, together or individually. While the people who dig the well, own the well; some are individually owned, while others are communally owned. Moreover, wells are often shared among pastoralists. Thus, access to water is not restricted and neither does access to wells restrict access to grazing grounds.

The clusters of tents in the *damar* are a reflection of the distribution of the grazing resources. In the dry season, too many herds may aggregate at the pools, but then individual pastoralists decide to move their herds away and find clean water and pastures elsewhere. In other words, individual decision-making leads to a redistribution of animals over the available resources. Asad writes that the human/animal and animal/land ratios are favorable, i.e. there are enough animals to support humans and not too many animals for the land (1970). Human population densities are low – less than one person per square kilometer – and cattle populations are below carrying capacity, writes Asad, although he offers no evidence to support these claims. But neither is there evidence of a tragedy.

### 3.3. Turkana in Northwest Kenya

The descriptions of the Turkana in Northwest Kenya come from Philip Gulliver (1951, 1955) and Terrence McCabe (1990, 2004). The Turkana live in arid and semi-arid Turkana district in the northwest corner of Kenya. They raise camels, cattle, sheep, goats and donkeys and are highly mobile, moving seasonally between different grazing areas. They practice no agriculture because it is too hot and dry. The vegetation is dominated by annual grasses, shrubs and thorny trees, which provide forage for the different livestock species, although there are a variety of microclimates due to differences in elevation throughout Turkanaland.

Turkana pastoralism is a relatively successful adaptation to the arid and semi-arid ecosystem of northwest Kenya. One of the reasons why their pastoral system is so persistent, despite the frequent droughts, is livestock mobility, which allows them exploit the spatiotemporal variability in forage, and keeping multiple livestock species which allows them to exploit the diversity in forage resource. This high mobility is combined with a flexibility in social organization, which allows them to split their extended households into smaller units that take different livestock species to different pastures, e.g. cattle to the highlands, camels to the plains. The mobility and herd splitting strategies allow for highly efficient use

of available foraging resources, but also reduce the grazing pressure in each location, making overgrazing unlikely.

It is important to note that there is considerable variation among the Turkana, including in their property regimes. The Turkana in southern Turkana land have a common property regime, whereas the Turkana sections further north have a tenure system that is best described as an open property regime. The Ngisonyoka Turkana in the south, for example, have a common property regime, according to McCabe (1990). Members of the Ngisonyoka section can move freely within their territory and herds from other sections may cross the territorial boundaries, but only after asking for permission to do so from the elders (McCabe 1990, 88). Boundaries of the section's territory are defended and fights over access to forage and water occur frequently according to McCabe. McCabe writes "For the Ngisonyoka, there are a number of conditions that must be met before a herd owner from another section is allowed access to the forage resources contained within the Ngisonyoka section" (54), whereas "for the northern sections of the Turkana, the sectional boundaries have little meaning, with individual herd owners crossing through a number of sections in search of forage and water during the dry season" (54–55). McCabe explains this striking difference in tenure systems in terms of environmental variables. In southern Turkana land, where the Ngisonyoka territorial section is, there are multiple microhabitats of plains and mountains within one territorial section and this diversity allows pastoralists to remain within the territory throughout the year, and there is no need for long-range migrations outside the territory. In northern Turkana land, on the other hand, there are plains and mountains but there are vast distances between them, and not every section has mountains, with lower temperatures and higher rainfall, within their territory. Thus, depending on the spatiotemporal distribution of rainfall and security, pastoralists in northern Turkana land may have to move to different sections.

Gulliver's (1955) description of Turkana use of pasturelands is similar to an open property regime. Although, it is not always entirely clear about what territorial sections Gulliver writes (1951). McCabe also indicates that there are Turkana territorial sections in the north where the boundaries mean very little (2004, 54). Turkana have no exclusive rights in pastureland at all, according to Gulliver (1951): "Turkana can go anywhere", "People just live together. When the grass is finished they move on somewhere else where there is grass" (61). Turkana pastoralists regularly change their transhumance orbits and move to new seasonal grazing areas. When they do, "no rights are given nor permission sought in the old area, nor rights taken up or permission obtained in the new" (61). Households just move, Gulliver writes, and "we can therefore, I think, entirely disregard any territorial basis of the organization of rights in pasture land" (62). There is a clear ethos of open access: "There is no notion that 'we got here first and so we own this area for the time being', or 'the pasture here cannot support any more stock', or 'you were not here last year, why do you not go elsewhere then?'" (62). The Turkana argue, "we can move anywhere, everywhere. Are we not all Turkana? You own stock and things; you do not own the country" (Gulliver 1955, 34).

The case of the Turkana is confusing because there are territorial sections and every Turkana herd owner is member of one of the eighteen territorial sections. The existence of *territorial sections* suggests that there is a territorial systems and that are no open property regimes. McCabe writes that, "membership confers equal access to the forage contained within sectional boundaries to all herd owners" (2004, 54). However, this is an apt description for the southern sections, but not for the northern sections. In north Turkanaland the social organization of the sections has no territorial basis. In other words, there are no territories, no boundaries, and no exclusive access to grazing resources (Gulliver 1951).

### 3.4. Pashtun in Western Afghanistan

The fourth example of an open property regime comes from Pashtun pastoralists in Western Afghanistan, which have been described extensively by Bernt Glatzer and Michael Casimir (Glatzer 1977, 1992, 1982; Glatzer and Casimir 1983; Casimir 1992a). The Pashtun are nomadic pastoralists and live on the Iranian plateau, a steppe, which is bordered by Turkmenistan and Iran. Pastoralists from multiple ethnic groups use the same grazing lands, but the most numerous group of pastoralists are the Pashtuns, even though the lingua franca is Persian. The Pashtun keep different livestock species, camels are kept for transport, while sheep and goats are mainly raised for meat, but also for wool and some milk. Pastoralists are highly mobile and make seasonal movements between the highlands and lowlands.

The composition of migratory groups changes regularly due to migratory process, which is a response to the variability in the spatiotemporal distribution of forage resources. The smallest and fundamental migratory unit is the household and multiple households make up one herding unit. Because of the autonomy of individual pastoralists, "herding units and the camps are extremely unstable in composition. At least once every year, but normally more than twice, they regroup" (Glatzer and Casimir 1983, 310). The composition of the camps is continuously changing and one finds pastoralists from different ethnic groups in the same camp. "Most camps are formed by several herding units and last only one season, even if the composing herding units remain unchanged internally, because the number of animals which can be herded in one place has to be adjusted to the varying pasture conditions" (Glatzer and Casimir 1983, 310).

Pashtun pastoralism is best described as an open system. Glatzer writes that Western Afghan pastoral nomads maintain neither corporate not individual ownership of grazing lands. Their pastoral idea is free and unlimited grazing for all; their practice is a complex set of rules and of recurring strategies which regulate access to pasture and form a pattern of territoriality, without binding individual households or groups permanently to a defined territory. Attachment to a territory is as fluid as are the nomads' local groupings" (Glatzer 1992, 293). There is no correspondence between social and territorial organization. Instead the principle of first-come-first-served applies and the right to use grazing resources is

only valid while one occupies the area. As soon as one leaves, those rights are foregone. Similarly, Casimir (1992a) mentions frequent conflicts with sedentary farmers over grazing too close to fields and villages, but no conflicts among pastoralists over grazing rights. He describes it as a system without a “definite ideology of land held in common” and an “egalitarian political ideology” (Casimir 1992a, 160).

The Pashtun system of rights to pasture is complex. I argue that this is an open property regime; however, others might argue that it is a common or private property regime. Let me explain. Individual households hold immediate rights over a pasture area, through rights to campsites. Newcomers have to ask for permission to use these same pasture areas and are considered clients who mediate rights through others. Glatzer refers to immediate rights (of hosts) as “rights to pasture” and mediate rights (of clients) as “permission to use pasture” (Glatzer 1992, 297). It is similar as “the right to be asked” described by Myers (1982). However, it is more complicated. Pastoralists with pasture rights only have those rights when they actually use the pasture area; otherwise they lose them to others using the area. Similarly, newcomers can establish their immediate rights by spending several consecutive seasons in the pasture area. These changes in rights over pasture change regularly as pastoralists are rarely content with their pastures. They are always looking for better pastures elsewhere and question visitors about pasture conditions in other places and regularly send scouts to verify these reports.

The flexibility of the system is its strength because it allows pastoralists to adapt to ecological and climatic changes as well as political changes. As soon as better pastures have been identified and pastoralists have decided to move to the new pasture area, they have to ask permission from those owning the rights to pasture. This involves the use of their extensive network to approach one of those owning rights. Glatzer writes “The whole range of the nomad’s social universe may now be activated” (Glatzer 1992, 299). Permission is generally granted, especially when their kinship relations between clients and hosts. However, permission may also be denied, but only if there are strong reasons, for example if there are bad relations (enmity) between strangers and one of the residents or there are already too many animals or too little forage.

The system is guided by the general principle of reciprocity. Pastoralists know that the tables may be turned next year. Because of the frequent changes in the transhumance cycles, pastoralists do not stay clients for long; after a few years they gain rights to pasture. Similarly, the hosts do not expect to remain in the same pasture area forever either; “most [pastoralists] explicitly abhorred the idea of being bound to any area” (Glatzer 1992, 300). The hosts are also always on the lookout for better pastures elsewhere, and when they decide to move elsewhere, they too become clients.

The spatial organization of pastoralists shares similarities with the other societies described above, for example, “pastures areas have visible and named centers but no defined boundaries and may overlap with each other” (Glatzer 1992). Often the center is a campsite and the extent of the area is determined by the

grazing radius from the campsite and the density of resources. Glatzer argues that the number of herding units in a pasture area depends on the quality of its pastures, i.e. there is a match between grazing pressure and resources. If there is an imbalance in grazing resources and grazing pressure, pastoralists will rearrange their flocks and households over different pasture areas, in a process that Glatzer describes as osmosis (Glatzer 1992, 296).

Glatzer and Casmir (Glatzer 1992, 297) describe how the state gave corporate rights over grazing lands to tribal chiefs in the nineteenth century. Later, in the early twentieth century, these rights were given to intermediaries that pastoralists used in their dealings with the outside world – *sarkhel* at camp level and *malik* at the regional level. These were honorary positions, not leadership positions with power and authority, but the state gave these intermediaries the responsibility to collect taxes and gave them written forms (*qawala*) which specified that these office holders and their followers had rights to specific wells and surrounding pastures. However, fifty years later, in the early 1970s when Glatzer was conducting his fieldwork, the members of the tribe that had received these rights had left, and other pastoralists had taken their place. In short, the state, with its desire to control nomads and extract rents, did not succeed in changing this open system of Pashtun pastoralism.

## 4. Discussion

There is considerable variation among these five cases discussed, including the rules that regulate access to common-pool grazing resources. However, in all cases the rules, some more formal than others, are designed to support the mobility and flexibility of the pastoral economy and facilitate pastoralists' access to common-pool grazing resources rather than deny them access. The Pashtun in Western Afghanistan, for example, do have a system of individual pasture rights that are transferred between hosts and clients, and in which the former have the right to be asked for access. However, because the resource distribution is highly variable in space and time, the tables are frequently turned and hosts become clients in other pasture areas. Among the Tuareg in Northern Mali, on the other hand, no one has the right to be asked and newcomers can set up their tents wherever they want. What the two systems have in common is the general principle of reciprocity that guides the management of common-pool grazing resources among pastoralists. There are a number of other characteristics that these systems have in common and that are critical to the functioning of open property regimes, which I list below.

### 4.1. Key characteristics of open property regimes

There are a number of key characteristics that all five cases from Cameroon, Mali, Sudan, Kenya, and Afghanistan have in common. I will first discuss those characteristics that concern the resource system and the use of the resources. Then I will

discuss the characteristics of the social system. It is clear that the characteristics of the resource system match those of the social system (Agrawal 2002; Moritz et al. 2013a).

First, the resource system is characterized by a strong seasonality, which results in significant variability in the spatiotemporal distribution of grazing resources. Second, pastoralists are highly mobile and frequently change their seasonal rounds in response to changes in the distribution of grazing resources, particularly during drought years. Third, land use is point centered around campsites or water points and the grazing radii of these points overlap. There are no territorial boundaries and the area governed by the open property regime is very large. Fourth, there is open access to common-pool grazing resources. Everyone has rights to grazing resources and the rule is that nobody can be excluded. Fifth, the rules that exist are designed to support pastoralists' mobility and flexibility and facilitate their access to grazing resources.

The social system of these five pastoral societies is well adapted to the nature of the resource system as the list of the next key characteristics shows. Sixth, households develop attachments to the places to which their animals are habituated. This results in heterogeneity in pastoralists' preferences for pastures. These attachments do not determine pastoralists' movements but lead to some predictability in movements. Seventh, households are autonomous units that make independent decisions about where and when to move. Eighth, the migratory process results in fission and fusion of migratory groups. As a result, pastoralists from multiple clans and ethnic groups use the same pastures. Ninth, a shared ethos and practice of pastoralism facilitates co-habitation of pastoralists from diverse backgrounds. The practice of sharing of pastures and transhumance routes leads to a process of ethnogenesis. In other words, ethnicity does not determine access to resources, but access to resources determines ethnicity.

Finally, open property regimes work as complex adaptive systems in which independent decision-making of highly mobile households results in an efficient distribution of the grazing pressure over available resources. Because of the spatiotemporal variability in rainfall and the autonomy, flexibility and mobility of individual pastoralists, the distribution of resources is generally matched by the distribution of grazing pressure as in an ideal free distribution. Elsewhere we have demonstrated that it is relatively easy for pastoralists to achieve such a distribution without collective or central decision-making (Moritz et al. 2015a). The idea is that when pastoralists make individual decisions about where to move with their animals they consider the distribution of grazing resources. However, each individual movement changes the distribution of animals and resources, which in turn changes the decision-making of other pastoralists. We have demonstrated, using an agent-based model, that this iterative process results very quickly in an ideal free distribution (Moritz et al. 2015a). While we have found that mobile pastoralists in the Far North Region of Cameroon distribute themselves in an ideal free distribution (Moritz et al. 2014a, 2014b), we do not have the data to examine this for the other four case studies. However, Roy Behnke and colleagues have

been studying pastoralists in Central Asia and found evidence that pastoralists in Turkmenistan also have open access to common-pool grazing resources and distribute themselves in an ideal-free like distribution (Behnke et al. 2016).

The characteristics described above – independent and mobile users harvesting resources that are highly variable in space and time – are common in pastoral systems and it is not surprising that we have found other cases of open property regimes in our comparative study of 30 African pastoral societies (Moritz et al. 2015c). However, I would argue that other production systems with similar characteristics also have open property regimes, for example, foragers (Myers 1982; Bliege Bird et al. 2016) and fishers (St. Martin 2001; Beitzl 2014). Of course, I am referring here to production systems that are primarily aimed at subsistence and which have low capital inputs, and not, for example, to industrial cod fisheries.

#### **4.2. No tragedy in systems in disequilibrium**

In our study of mobile pastoralists in the Logone Floodplain we have found no evidence of overgrazing or rangeland degradation, i.e. a tragedy of the commons (Moritz et al. 2013a). One of the main reasons is that there is a weak coupling between herbivores and vegetation in the floodplain as the vegetation is controlled by flooding and naturally protected against overgrazing because up to two-thirds of the biomass is stored underground and the vegetation is inaccessible during at least four to six months of the year (Scholte 2007; Scholte and Brouwer 2008). In other words, flooding determines the vegetation, not grazing. Moreover, the “root bank” generates forage every year after the floods. This “root bank of perennial grasses” is similar to the “seed bank of annual grasses” in the Sahelian rangelands, in which there is also a weak coupling between herbivores and vegetation (Hiernaux et al. 2016). Another reason for the absence of a tragedy of the commons is that it is an open system and that pastoralists are able to move to wherever the grazing resources are; they are not restricted to one seasonal grazing area.

However, I am not able to show that there is no tragedy of the commons in the four other cases, simply because there is no ecological evidence in the ethnographies to support that claim, but nor is there any evidence of overgrazing and rangeland degradation in these ethnographies. Nevertheless, there is a strong argument to be made that a tragedy of the commons is unlikely in the four cases because their rangelands are probably in disequilibrium. Rangelands are said to be in disequilibrium when the vegetation dynamics are driven by climate rather than by grazing (Behnke et al. 1993; Ellis and Swift 1988). Longitudinal and interdisciplinary studies of the South Turkana Ecosystem Project (STEP) have shown how frequent droughts keep livestock populations well below carrying capacity (Little and Leslie 1999). The droughts function as Malthusian checks on livestock populations and this is the main reason why there is no evidence of a tragedy of the commons among the Turkana (McCabe 1990). Rangelands are likely to be in disequilibrium when there is high variability in rainfall (Behnke

and Scoones 1993), which is the first key characteristic that I identified above for open property regimes.

In her working paper *Open Access Without Tragedy of the Commons*, Gunnvor Berge (1997) makes the same argument as McCabe (1990) explaining that because the rangelands in Northern Mali are in disequilibrium livestock populations of the Tuareg never reach carrying capacity. She argues that climate is the regulator in the social-ecological system of the Tuareg and that there is no need for social regulations in the form of social and spatial boundaries (5). On the contrary, mobility, flexibility, and accessibility are critical for pastoralists' survival when rangelands are in disequilibrium (see also Behnke 1994). Finally, while Berge presents no ecological evidence to support the argument that there is no tragedy of the commons, the empirical fact that Tuareg pastoralism in Northern Mali has persisted for centuries in the harsh environment of the desert is strong evidence that open property regimes do not lead to a tragedy of the commons.

While we have discussed the implications of open property regimes in pastoral systems for the governance of common-pool grazing lands elsewhere (Moritz et al. 2013b), I want to briefly discuss one aspect that is directly relevant to the theory of the commons. Fernández-Giménez has introduced the idea of the paradox of pastoral land tenure, which is that pastoralists have “conflicting needs for secure resource tenure and socially and spatially flexible patterns of resource use” (2002, 49). In the context of Mongolia where Fernández-Giménez studied pastoral systems, pastoralists seek secure access to pastures in the winter when forage is scarce, while they have open access to pastures in the summer when resources are plentiful. In the context of pastoral open property regimes in West Africa, it is important to recognize that “secure resource tenure” refers to security from non-pastoralists seeking to convert rangelands into alternative land uses and that “socially and spatially flexible patterns of resource use” refers to flexibility among pastoralists. In other words, open property regimes efficiently and equitably regulate access to common-pool grazing resources among pastoralists, but they do not regulate access to these resources between pastoralists and non-pastoralists (Sayre et al. 2013). In order to protect common-pool grazing resources, it is necessary to create social and spatial boundaries between pastoral and non-pastoral users, but, again, not *among* pastoralists. Pastoralists should be allowed to move freely and have open access to common-pool grazing resources within pastoral zones. In a sense, one could argue that pastoralists also need security from policy makers who may attempt to replace open property regimes with common property regimes that limit their mobility and flexibility.

## 5. Conclusion

The case I made for open property regimes is based on theoretical arguments and empirical evidence. In pastoral systems where mobile pastoralists use common-pool grazing resources that are highly variable in space and time, an open property regime is appropriate because it is equitable, efficient and sustainable. In



open property regimes everyone has equal rights and no one can be excluded. Moreover, open property regimes work as complex adaptive systems in which independent decision-making of highly mobile households results an efficient distribution of the grazing pressure over available resources. Finally, open access does not have to lead to a tragedy of the commons, certainly not in mobile pastoral systems. On the contrary, there is evidence that the opposite, restricting open access and enforcing social and spatial boundaries, results in a tragedy of the commons because it limits pastoralists' mobility and flexibility (Sylla 1995; Scoones 1999). Mobility and open access are critical for sustainable management of common-pool grazing resources that are highly variable in space and time. The case studies described above show that open access is not the absence of rules; open access is the rule. It is time that theoretical models are updated to reflect this empirical reality. If scholars want to describe a situation in which there is no property regime, they should simply call it "no regime" and not "open access" because in an open property regime there are rules that facilitate open access for all.

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