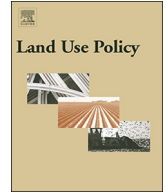




Contents lists available at ScienceDirect

Land Use Policy

journal homepage: www.elsevier.com/locate/landusepol

Are goats the new elephants in the room? Changing land-use strategies in Greater Mara, Kenya

Mette Løvschal^{a,b,1,*}, Dorthe Døjbak Håkonsson^{b,c,d,1}, Irene Amoke^{e,f}

^a Department of Archaeology and Heritage Studies, Aarhus University, Højbjerg, 8270, Denmark

^b Interacting Minds Center, Aarhus University, Aarhus, C 8000, Denmark

^c Department of Management, Aarhus University, Aarhus, C 8000, Denmark

^d Department of Business Development and Technology, Herning, 7400, Denmark

^e Kenya Wildlife Trust, Nairobi, P. O. Box 86–005200, Karen, Kenya

^f Maasai Mara Wildlife Conservancies Association P.O. Box 984 – 20500 Narok, Kenya

ARTICLE INFO

Keywords:

Pastoralism
Land-use strategies
Land privatization
Dispositive
Conservation policies
Grasslands
Goats

ABSTRACT

Land privatization and rapid land-use transformation are drastically reducing the pristine eco-cultural habitat across vast areas of East Africa. To avert what could become a classic tragedy of the commons, comprehensive solutions are needed. To date the conservancy model has provided a viable solution for securing long-term sustainable integration of cattle management alongside wildlife conservation. But new groundbreaking research shows that cattle numbers are stagnating and that flocks of sheep/goats are expanding on an unprecedented scale. We argue that the risks posed by increased numbers of sheep and goats have not been adequately recognized, since sheep and goat management bypasses the traditional approaches to thinking and governing land in the Greater Mara. Sheep and goat ownership therefore has the potential to develop disproportionately if they are not immediately integrated into conservancy management policies.

1. Introduction

The Greater Mara ecosystem in Kenya's southwest corner is known worldwide for its annual great migration, rich biodiversity, and Maasai pastoralist culture. In recent years, however, the area has grown into a myriad-complex space, and a wide array of recent studies have demonstrated extreme declines in wildlife populations in Greater Mara, as well as multi-causal increases in human-wildlife conflicts (Ogutu et al., 2011). Declines in wildlife numbers and increasing human-wildlife conflicts raise a series of fundamental questions relating to the continued coexistence of humans and wildlife, under accelerating ecological and cultural pressure.

The people living in this area are predominantly pastoralists, and the Maasai refer to themselves as *itung'ana loo ngishu*, meaning “people of cattle” (Homewood and Rodgers, 2004). The Maasai's semi-nomadic lifestyle is traditionally dependent on seasonal grazing, and with minimal labor investment, seasonal grazing reduces the otherwise fatal consequences of drought. Maasai pastoralism has commonly relied on collaborative forms of managing cattle, echoing Oström's (1990) concept of common property regimes (CPR), where communities cooperate to manage a common-pool resource, in this case grass. Cattle play a

crucial role in the coordination of land use, but they are also intrinsically associated with most of the other aspects of life—status, social power, rites, and concepts of what to do and what not to do (Homewood and Rodgers, 2004). In this sense, the role of cattle in Maasai culture can be compared to that of a *dispositive*. A dispositive is the basic blueprint of social, institutional, physical, juridical, administrative, and architectural structures and prescriptions that shape and organize social life and reality, with the dispositive establishing links between these elements (Foucault, 1994; Rabinow and Rose, 2003; Agamben, 2007). Since dispositives are highly habitual in the sense that they—at least partly—determine what is taken for granted and what can be imagined, they can also be incredibly stable over time.

In this paper, we articulate how the rapidly expanding number of sheep/goats (shoats) in the Greater Mara essentially escape the cultural norms and collective regulations associated with cattle. This constitutes a major ecological and cultural challenge, and we suggest that current conservancy policies need to increasingly recognize and integrate sheep and goat ownership while continuously relying on community embeddedness.

* Corresponding author at: Department of Archaeology and Heritage Studies, Aarhus University, Højbjerg, 8270, Denmark.

E-mail addresses: lovschal@cas.au.dk (M. Løvschal), dod@btech.au.dk (D.D. Håkonsson), irene.amoke@kenyawildlifetrust.org (I. Amoke).

¹ These authors contributed equally to this work.

<https://doi.org/10.1016/j.landusepol.2018.04.029>

Received 5 October 2017; Received in revised form 12 April 2018; Accepted 13 April 2018
0264-8377/ © 2018 Elsevier Ltd. All rights reserved.

2. Current challenges

A wide array of recent studies have demonstrated extreme declines in wildlife populations in Greater Mara, as well as multi-causal increases in human–wildlife conflicts (Ogutu et al., 2011). While studies pre-2000 show stagnating values for cattle and shoats (Ottichilo et al., 2000), recent studies suggest a radical increase in shoats. Shoats have traditionally served as a strategy in times of drought and hardship (Homewood and Rodgers, 2004; Lamprey and Reid, 2004), and also served as an important source of milk and meat, and as a wealth store that can be more quickly exchanged than cattle. Based on aerial monitoring data, Ogutu et al. found that wildlife populations have declined progressively in the Mara region (Ogutu et al., 2016). Due to recurrent drought, land-use changes, changed settlement patterns, illegal hunting, and livestock incursions into protected areas, almost all wildlife species declined by 75 percent in the period 1977–2009. Cattle numbers also decreased by 25.2 percent, shoats, however, increased by 76.3 percent. In the period 2011–2013 livestock biomass was 8.1 times greater than wildlife biomass, compared to 3.5 times in the 1977–1980 period.

Last year, Bedelian and Ogutu (2017) presented even more disturbing results: between 1977 and 2014, cattle numbers in the Mara increased by 0.8 percent, but shoats by 235.6 percent. There are now more than twice as many shoats as there are cattle in the Mara. This fits with the general trend across many parts of Africa of shoats becoming increasingly important in pastoralist livestock herds (Degen, 2007).

The recent increase in shoats is due to several trends. Some landowners benefitting from conservancy income use their profit to buy more livestock (Ogutu et al., 2016). The rapid increase in human settlements in the Mara has also expanded the market for goat meat: Maasai tend to prefer goat meat over beef, making the sale of goats more lucrative. In addition, living standards have improved, and with that increased expenditures for medicine, food and school fees. In this connection, shoats serve as an increasingly important source of petty cash as they are more readily sold compared to cows that are more expensive. With increased droughts due to climate change, shoats have proven a more resilient source of income. In tropical regions, goats can breed every six-eight months, and tend to get one to three offspring, compared to the most dominant cattle type, Zebu, that have gestation periods of approx. 12 months, and usually only get one calf (Mukasa-Mugerwa, 1989). The introduction of a new sheep breed (Dorper) has also caused an increase in the number of sheep, since the Dorper has a high lambing percentage (can breed every eight months), is disease resistant, and mature early (Cloete et al., 2000).

Large flocks of shoats (Fig. 1) can be much more damaging to grasslands than cattle. Goats in particular can cause grassland deterioration as their sharp hoofs pulverize the protective crust of soil that is formed by rainfall and that naturally checks wind erosion (Brown, 2011). Goats' prehensile lips enable them to eat grass close to the roots (Lu, 1988), thereby accelerating over-grazing. Finally, their versatility in harvesting forage also means they can feed on the degraded environment that forms subsequently (Lu, 1988).

These trends pertaining directly to increases in shoats branch out into yet a broader series of issues pertaining to demographic and land use changes.

Land privatization processes commenced already in the 1970s with the subdivision of group ranges (Grandin, 1991; Mwangi, 2007; Bedelian and Ogutu, 2017). However, Løvschal et al. (2017) found that as a consequence of rangeland privatization, fences have only recently started being used to secure land in the Mara and that at an accelerating rate (Fig. 1). Fences are cutting off the large historical migration routes of wildebeests and elephants. They are also reducing previously collectively governed grasslands and turning them into smaller, impassable fenced plots or so-called “grass banks” that are used to feed

shoats and cattle. Moreover, natural-access corridors to salt licks and watering-points are under pressure. These trends have motivated individual landowners to try to protect their own individual land-tenure security and advance their livelihoods through tourism and intensified agricultural cultivation, further pushing a cultural drift toward sedentarism. The introduction of fenced oligo-cultural and monocultural cultivation units is making conservation of the open savanna ecosystem much harder, since this is dependent on high mobility of both wildlife and humans (a requirement of both ecotourism and adaptive herding). Directly contrary to intentions, decreasing grassland areas are also somehow reinforced by the presence of the conservancies since grasslands are now delimited within administrative entities with larger sensitivity toward oscillating populations. In addition, the increased monetary liquidation from conservancy incomes means that shoat populations are paradoxically encouraged to expand.

Another challenge is increasing population numbers. Lamprey and Reid (2004) found the number of *bomas* in the Koyaki Group Ranch to have increased at 6.4 percent per annum in 1983–1999, while the human population increased at 4.3 percent per annum. Population increases have brought new periurban settlements across a larger part of the Mara (Nyariki et al., 2009; Bedelian and Ogutu, 2017). Livestock herd sizes are being pushed here into ever-decreasing areas, exposing land to overuse and degradation and heightening the risk of disease (Lamprey and Reid, 2004). In their study in Narok county, Nyariki et al. (2009) found that in these smaller grazing areas a large percentage of cows were non-lactating—meaning that they had not conceived calves—and that calf mortality was high.

Hence, a growing body of research suggests that the ecological conditions of the Greater Mara are changing rapidly. These changes should, however, not be seen only as ecological problems; they are also of deep cultural and social concern. Maasai livelihoods and collaborative forms of governance are currently undergoing transformations at an unprecedented rate. And the new trends are encouraging short-term profit-maximizing behavior and more individualistic ways of thinking and governing, with collaboration dependent upon optimization of individual interests.

In this context, shoats represent a resource from which the individual pastoralist can benefit from the self-determination and autonomy that they afford. However, they could potentially also become a resource that expands unproportionally and untenably since they slip outside the cattle dispositive. This is further endangered by the fact that shoats are currently not included in conservancy management plans. If shoats are primarily kept outside conservancy management and hence tend to concentrate in the settlements at the edges of the conservancies, there is a pressing risk of their grazing pattern creating ‘conservancy islands’ surrounded by broad, heavily grazed zones.

3. Existing and potential solutions

The challenges in the Greater Mara are manifold but the solutions too seem complicated, and intrinsically embedded in ecological and cultural issues.

Various authors have pointed to the challenges inherent in keeping a stable socio-ecological state with a sustained common resource-pool (Hardin, 1968; Oström, 1990). The pressures to convert a common resource to individual private ownership seem ubiquitous and it is often easier for government administration and the legal system to deal with individual ownership. Therefore, structures are called for that enable administrative and legal systems to recognize and facilitate common resource management. Such top-down support is crucial in times when the commons are under pressure, as many Kenyan pastoralist populations are at the present time. Given top-down support and integration of bottom-up governance structures, we advocate that conservancies represent one of the most promising overarching and wide ranging



Fig. 1. Scenarios representing challenges in the Greater Mara. Upper: Fencing in the periphery of Mara North Conservancy. Lower: Goat/sheep grazing in Mara North Conservancy (MNC). (Photos by Mette Løvschal, December 2016).

solutions alongside inherent challenges.

The Mara currently consists of fifteen registered conservancies (Fig. 2). Together, the conservancies cover an area of 114,855 Ha (1149 km²), almost the size of the gazetted reserve.

One example of the conservancy model is the Mara North Conservancy (MNC), established in 2009. It serves as a partnership between twelve camp-owners and 800 landowners and works in close partnership with the Maasai Mara Wildlife Conservancies Association (MMWCA). Ecotourism is a key priority in this zone, and the area is managed to ensure wildlife abundance and diversity. Like most other conservancies, the MNC limits *marvattas* (settlements) and fencing, and has livestock grazing management plans. Thanks to these policies, the savannah environment still has a rich wildlife, with many large

mammals. It represents a unique tourist destination and a developing livestock enterprise.

Furthermore, as part of its long-term management plan, MNC pays close attention to cattle management. Since August 2013, an agreed rotational grazing model has been in operation. The grazing model divides the conservancy into zones, based on community proximity, core conservation areas without grazing zones, camp locations, and watering-points. Each zone is divided into smaller sub-zones, with cattle rotated between these every week. Grazing banks are established on the conservancy peripheries, set aside for the dry season and the peak tourism season. Conservancy edges are left unmanaged, and grazing is allowed all year round. The grazing schemes are decided communally by grazing committees. This has helped to build

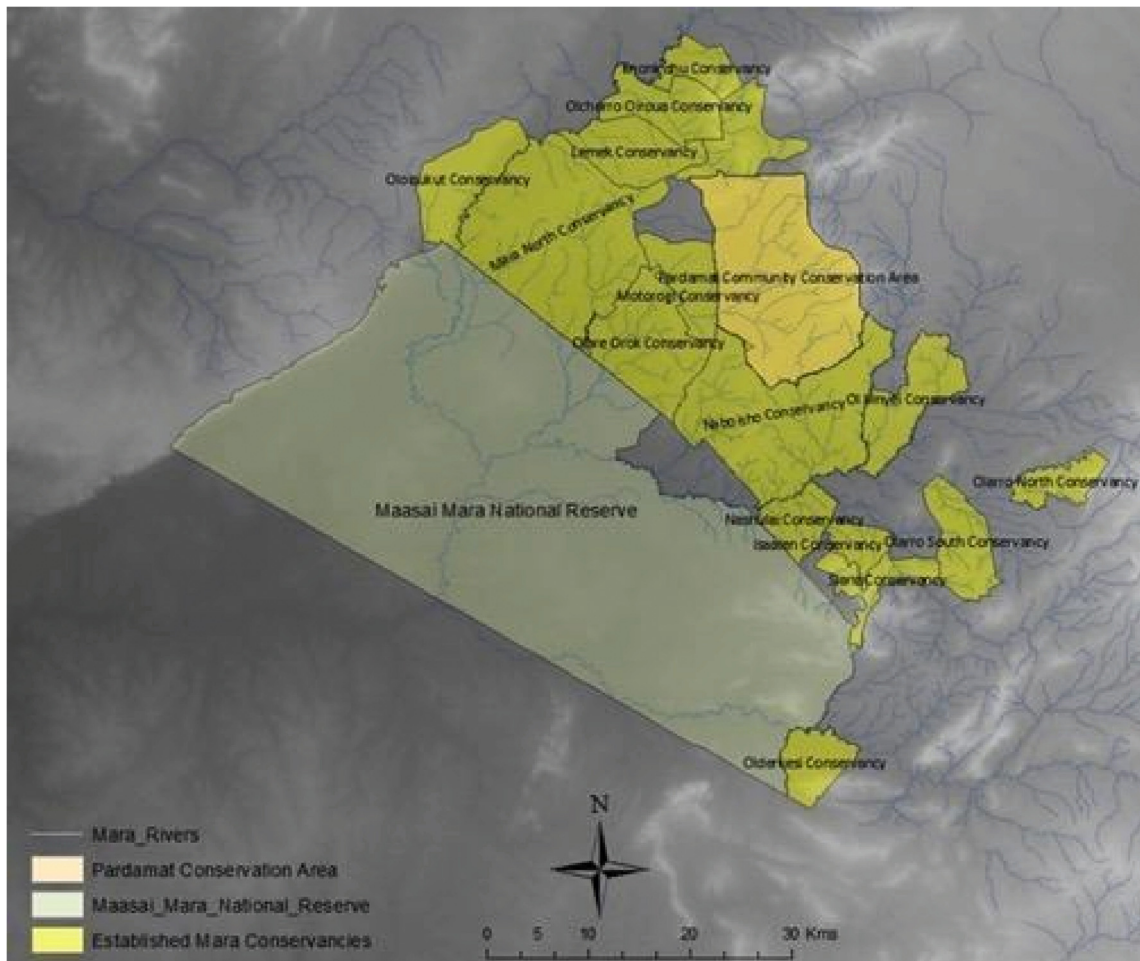


Fig. 2. The Greater Mara conservancies and conservation areas (Graphics by Irene Amoke, 2018).

community resilience to drought through establishing grass banks. It has ensured that conservancy landowners attach value to the conservancy.

MNC has also launched a number of ongoing smaller-scale initiatives focused on cattle. For instance, the Obel Foundation has funded a mobile *boma*: a livestock enclosure made of metal fencing that can be easily moved. Frequent moving of herds is expected to reduce overgrazing and trampling, allowing areas to recover sooner (Riginos et al., 2012). Another initiative is breeding programs and live weighing, which aim to transform cattle into a more stable monetary source. In an effort to improve the genetics, breeders are working with the Maasai community to introduce new types of higher-quality beef breeds. Live weighing the cattle allows the pastoralists to follow the growth progress of the new breeds.

Hence, the conservancy model represents a governance structure that, in principle, is able to integrate landowners and tourism investors in a sustainable solution. It aims to build top-down support for a collaborative governance model that is consistent with the Maasai dispositive — livestock grazing plans and policy guidelines are collaboratively formulated by grazing committees, building on traditional pastoral collaborative forms of land governance. In this sense, the conservancy represents a promising management model because it constitutes a way of scaling communal governance to a macro level.

To succeed as an inclusive, power-balanced and culturally-embedded project - also in practice - challenges still remain. Many of the CPR structures suggested by Oström and others are deeply integral to

Maasai pastoralism—including frequent communication, coordination of resource-sharing (through grazing meetings), and value systems that condemn violations of agreed practice. These community-based structures could be strengthened and pursued further in the organisation of the conservancies. First, by actively investing in the creation of commons as a counteract to privatization, the conservancies would serve to make the area less vulnerable to fluctuating herd sizes. Second, by continued effort to integrate individual conservancies into a larger conservancy model, they would expand the common grazing areas. Third, by increasing the mobility for not only cattle but also shoats via joint conservancy regulations and grazing committees, which we anticipate toward would reduce problems related to overgrazing. Fourth, by working more equal gains in liquidating cattle and shoats as well as quality rather than quantity of the livestock.

4. Conclusions: the elephant in the room

We believe that the conservancy model currently provides the most viable solution, but a number of unresolved challenges remain.

First, even if conservancies retain grass banks during dry seasons, at the same time they restrict access to larger areas of former communal land (Bedelian and Ogutu, 2017). This means that if policies are not developed to deal with the peripheries of the conservancies, these, in a worst case scenario, will end up as small, enclosed natural habitats, preventing large-scale migration between them.

Second, the conservancy model has shown a strong focus on cattle-

management forms. But we argue that a, as yet largely hidden but potentially much more worrying, challenge is the increasing population (numbers) of shoats.

Third, beyond the ecological issues we have already mentioned, our concern is that shoats pose a particularly severe challenge from a cultural point of view. Shoats are not supported by social or cultural codes, they are not consistent with the Maasai dispositive of pastoralism, and they carry far less prestige. The trend toward greater reliance on small stock indicates that more people are depending on shoats as their main income source. As shoats are more accessible for less moneyed pastoralists, this trend will likely lead to further inequality. Shoats are currently not included in the collaborative agreements on communal land governance. What is more, their very existence is relatively unnoticed, and the explosion in their population numbers has been largely ignored.

We are concerned that this livestock-wildlife imbalance poses a serious risk to the sustainable governance of the Greater Mara savannah environment. We therefore urge that the conservancy model become increasingly community embedded - and extended so as to integrate shoat management. Including shoats into conservancy management would make a resilient framework for regulating flock numbers and grazing schemes on a collective basis, and hence induce sustainable solutions for the benefit of both pastoralists and wildlife. It is essential that the exploding number of shoats is articulated, not only as an ecological problem, but also as a cultural and social issue.

Funding

Financial support came from Independent Research Fund Denmark, Interacting Minds Center, Aarhus University, The MMSDI, Aarhus University and Maasai Mara Wildlife Conservancies Association through funding from The Nature Conservancy.

Acknowledgments

We would like to thank Lars Bach, Peder Klith Bøcher, Pernille Kallehave, David Noosaron, Jesper Stagegaard and Jens-Christian Svenning, for long-term cooperation and discussion of livestock, fencing and land-use changes in the Greater Mara. We also thank the participants at the Maasai Mara Science and Development Initiative (MMSDI) research seminar, held at Karen Blixen Camp, November 2016 for useful information and feedback. Thanks to Lucy Seton-Watson for language revision.

References

- Agamben, G., 2007. *Qu'est-ce qu'un dispositif?* Rivages Poche, Paris.
- Bedelian, C., Ogutu, C., 2017. Trade-offs for climate-resilient pastoral livelihoods in wildlife conservancies in the Mara ecosystem, Kenya. *Pastoralism* 7, 10.
- Brown, L., 2011. Why healthy soil matters to civilization. *Futurist Washington* 45 (4), 23–30.
- Cloete, S.W.P., Snyman, M.A., Herselman, M.J., 2000. Productive performance of Dorper sheep. *Small Ruminant Res.* 36 (2), 119–135.
- Degen, A.A., 2007. Sheep and goat milk in pastoral societies. *Small Ruminant Res.* 68, 7–19.
- Foucault, M., 1994. *Le jeu de Michel Foucault*. In: Foucault, M. (Ed.), *Dits et écrits* 3 (1977), Paris, Gallimard.
- Grandin, B.E., 1991. The Maasai: socio-historical context and group ranches in Maasai herding: an analysis of the livestock production system of Maasai pastoralists. In: Bekure, S., de Leeuw, P.N., Grandin, B.E., Neate, P.J.H. (Eds.), *Eastern Kajiado District, Kenya*. ILCA, pp. 21–39.
- Hardin, G., 1968. Tragedy of the commons. *Science* 162, 1243–1248.
- Homewood, K.M., Rodgers, W.A., 2004. *Maasailand Ecology: Pastoralist Development and Wildlife Conservation in Ngorongoro, Tanzania*. Cambridge University Press, Cambridge MA.
- Løvschal, M., Bøcher, P.K., Pilgaard, J., Amoke, I., Odingo, A., Thuo, A., Svenning, J.C., 2017. Fencing bodes a rapid collapse of the unique Greater Mara ecosystem. *Sci. Rep.* 7.
- Lamprey, R.H., Reid, R.S., 2004. Expansion of human settlement in Kenya's Maasai Mara: what future for pastoralism and wildlife? *J. Biogeogr.* 31, 997–1032.
- Lu, C.D., 1988. Grazing behavior and diet selection of goats. *Small Ruminant Res.* 1, 205–216.
- Mukasa-Mugerwa, E., 1989. A Review of Reproductive Performance of Female Bos Indicus (zebu) Cattle, I L C A Monograph No. 6. Addis Ababa, Ethiopia. .
- Mwangi, E., 2007. The puzzle of group ranch subdivision in Kenya's Maasailand. *Dev. Change* 38, 889–910.
- Nyariki, D.M., Mwang'ombe, A.W., Thompson, D.M., 2009. Land-Use change and livestock production challenges in an integrated system: the Masai-Mara ecosystem, Kenya. *J. Hum. Ecol.* 26 (3), 163–173.
- Ogutu, J.O., Owen-Smith, N., Piepho, H.P., Said, M.Y., 2011. Continuing wildlife population declines and range contraction in the Mara region of Kenya during 1977–2009. *J. Zool.* 285 (2), 99–109.
- Ogutu, J.O., Piepho, H.P., Said, M.Y., Ojwang, G.O., Njino, L.W., Kifugo, S.C., Wargute, P.W., 2016. Extreme wildlife declines and concurrent increase in livestock numbers in Kenya: what are the causes? *PloS One* 11 (9), e0163249.
- Oström, E., 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge Univ. Press, Cambridge, UK.
- Ottichilo, W.K., De Leeuw, J., Skidmore, J., Prins, H.H., Said, M.Y., 2000. Population trends of large non-migratory wild herbivores and livestock in the Masai Mara ecosystem, Kenya, between 1977 and 1997. *Afr. J. Ecol.* 38 (3), 202–216.
- Rabinow, P., Rose, N., 2003. *Foucault today*. In: Rabinow, P., Rose, N. (Eds.), *The Essential Foucault: Selections from the Essential Works of Foucault, 1954–1984*. The New Press, New York vii–xxxv.
- Riginos, C., Porensky, L.M., Veblen, K.E., Odadi, W.O., Sensenig, R.L., Kimuyu, D., Keesing, F., Wilkerson, M.L., Young, T.P., 2012. Lessons on the relationship between livestock husbandry and biodiversity from the Kenya long-term enclosure experiment (KLEE) pastoralism: research. *Policy Pract.* 2, 10.