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# How property rights influence equity, efficiency and sustainability of high-altitude rangeland management in Bhutan

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## Abstract

This paper explores how property rights arrangements affect the equity, efficiency and sustainability of high-altitude rangeland management in Bhutan from the perspectives of rangeland users. Property rights affect how natural resources are allocated to individuals, communities and institutions and how they are managed. In Bhutan, only grazing rights are granted to rangeland users, as ownership of rangeland lies with the State. Three case study areas were selected across Bhutan with different levels of rangeland degradation, governance arrangements and property rights regimes. Semi-nomadic yak herders, sedentary livestock farmers and government officials participated in 40 semi-structured interviews and nine focus group discussions between 2013 and 2014. Findings revealed that historical inequities exist with private leases and some communal leases, but government-supported leases with management rights are considered more equitable. All property rights systems can become unproductive and inefficient with increasing populations, but communal areas are at greater risk of sub-optimal resource use and conflicts. Respondents were concerned about the lack of management rights, uncertainty over future lease arrangements and climate change impacts. This research revealed that (i) assignment of incomplete property rights is detrimental to efficient and sustainable natural resource management; (ii) banning of traditional practices such as burning, clearing and cutting of shrubs and bushes could undermine conservation by triggering natural resource degradation; (iii) granting of management rights in the bundle of rights is vital to encourage provisioning and maintenance activities; and (iv) in the absence of official contracts, deeds or titles which provide tenure security and political legitimacy, equitable distribution, clear boundary demarcation with written norms and rules are not sufficient to foster long-term investment in provisioning and maintenance activities. We discuss the implications of the findings for delayed implementation of the Land Act 2007 aimed at a more equitable redistribution of use rights and improved high-altitude rangeland management in Bhutan.

**Keywords:** Degradation, Over-grazing, Semi-nomadic yak herders, Sedentary livestock farming, Tenure insecurity, Title uncertainties

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## Introduction

High-altitude rangelands in Bhutan have complex property rights arrangements as herders and farmers access and move between multiple and often small parcels of grazing areas. These areas are managed under different property regimes consisting of private, communal and mixed private-communal leases (Tenzing et al. 2017a). In accordance with the Land Act of 1979 and Forest and Nature Conservation Act, 1995, only grazing rights are granted to rangeland users (Moktan et al. 2008). The ownership of rangeland lies with the state (Gyeltshen et al. 2010). Alpine, sub-alpine and temperate meadows and forests located between 2500 and 5500 masl constitute high-altitude rangelands representing approximately 0.7% of the total rangeland area (Dorji 2011; Ura 2002). They provide pasturage to 41,918 yaks and yak cross supporting livelihoods of approximately 1039 semi-nomadic yak herder households (DOL 2019).

This paper explores how different property rights regimes of high-altitude rangeland in Bhutan affect natural resource management (NRM) outcomes in terms of equity,<sup>1</sup> efficiency<sup>2</sup> and sustainability<sup>3</sup> (EES) from the perspectives of rangeland users. According to Halpern et al. (2011, p.1499) ‘NRM generally tries to maximise the sustainable delivery of goods and services derived from natural capital while ensuring consistent supply of these natural resources’. NRM is inherently political in nature since it involves “the control, allocation, production and use of resources and the values and ideas underlying those activities” (Tria Kerkvliet 2009, p. 227) (see also Yeh 2013). NRM is advocated mainly for two reasons: (i) to improve livelihoods representing the developmentalists’ perspective (nurture) and (ii) to minimise environmental degradation to maintain important life-sustaining processes that generate ecosystem goods and services representing the conservationist perspective (nature) (Murphree 1993). Property rights are defined as specific entitlements or bundle of rights<sup>4</sup> granted by the

law to property owners or leasees (Bromley 1991; Schlager and Ostrom 1992). They affect the means through which natural resource allocation and distribution are assigned to individuals, groups, communities or firms and how it is implemented (Furubotn and Pejovich 1972; Rose 1996). The type of incentives individuals receive, the type of action they take and the outcomes they achieve are influenced by the kind of rights included in the bundle of rights (Schlager and Ostrom 1992). According to Schlager and Ostrom (1992), five aspects of property rights most relevant to the use of natural resources are access, withdrawal, management, exclusion and alienability rights. Ostrom (2003) notes the bundle of rights increases from minimal right of access to possessing full ownership rights, and empirical studies have shown that groups of individuals who possess at least the rights of proprietorship are able to govern and manage the natural resource system more effectively than presumed in the earlier literature (Ostrom 2003).

Regarding the allocation of property rights to natural resources, there are two schools of thought. Private property rights based on free-market neo-liberalism represented by Coase (1960) argue property rights can be apportioned by any person who has the necessary means to do so. Hence, the initial assignment of property rights is immaterial as long as voluntary bargaining and negotiation between the potential sellers and buyers are possible. In this way, property rights to natural resources will be allocated to those prepared to pay the market price and by the same extension one who can make the most efficient use of the property (Demsetz 2002). The second school of thought argues that equitability cannot be left to free-market forces (Anderson 2004; Bromley 1991; Rawls 1971) as it may result in systematic marginalisation and disenfranchisement of the poor (Mwangi 2006; Ravikumar et al. 2013). Demsetz (2002) also acknowledged that the allocation of property rights through market forces can lead to inequity and concentration of wealth. For example, in the 1960s when the Bhutan government decided to sell rangeland confiscated from the descendants of former feudal lords at market rates, semi-nomadic yak herders could not afford to buy rangeland rights. These semi-nomadic herders later ended up renting rangelands from absentee landlords and landladies who had the means to buy rangeland rights (Tenzing et al. 2017a). The allocation of property rights in Bhutan has evolved over the centuries according to market forces dominated by powerful monastic bodies and ruling families, thereby conforming to the latter failure of market forces to deliver equity (Ura 2002). Similarly, in South Africa and Zimbabwe, expropriated lands belonging to

<sup>1</sup>Equity refers to equitable distribution of both benefits and costs among NRM users (Baral 2012). For the allocation of scarce resources, equity can be interpreted in terms of distributive justice and procedural justice. Distributive justice pertains to fairness and equity consideration (Jost and Kay 2010), benefits, costs and impacts (Wiek and Larson 2012), whereas procedural fairness pertains to participation in the decision-making process and the distribution of outcomes (Jost and Kay 2010; Wiek and Larson 2012).

<sup>2</sup>Efficiency implies increased generation of welfare (benefits, outputs), based on optimal use of natural resources and other production factors (Hein 2010).

<sup>3</sup>Sustainability refers to using natural resources within its regeneration or replenishment capacity (Becker and Ostrom 1995).

<sup>4</sup>According to the bundle theory, property rights comprise “bundle” of entitlements or “sticks” that are granted by the law to property owners and change in law may result in adding or removing particular sticks from the bundle (see also Honoré 1961).

White Africans were redistributed amongst the majority poor native or Indigenous communities (Njoh 2013).

Similarly, efficiency and sustainability goals of NRM are contingent on the type and quality of property rights assigned to natural resources as they may incentivise investment and development of resources (Feder and Feeny 1991; Ostrom and Cox 2010; Quinn et al. 2010). According to Young (1992), for efficient resource use, it is necessary that each user's rights, entitlements and obligations are fully defined. The absence of clear property rights to a resource may generate ownership risks which induces a firm or an individual to overuse the stock of the resource because if they do not use it, somebody else will use it (Laurent-Lucchetti and Santugini 2012). Therefore, each individual tries to harvest as much as possible before others, leading to the phenomenon of *The Tragedy of the Commons* (Hardin 1968).

Gibbs and Bromley (1989) maintained that a well-functioning property regime is distinguishable by (i) minimum or absence of disputes and limited efforts to maintain compliance (efficiency), (ii) capacity to cope with progressive changes through adaptation (stability) [sustainability], (iii) capacity to accommodate surprise or sudden shocks (resilience) [sustainability] and (iv) a shared perception of fairness amongst the members (social justice) [equity]. By addressing the EES goals of NRM simultaneously, it may be possible to harness synergies while minimising potential trade-offs between EES goals (Hein 2010; Bennett et al. 2015). The EES goals resonate with the main goals of Agenda 21 of the Rio Earth Summit of 1992 which are social development (equity), economic development (efficiency) and environmental protection (sustainability) (Rogers 2014). Ecological economics similarly embraces EES as its three pillars (Neumayer 2004). Similarly, Halpern et al. (2013) posit that the triple-bottom-line outcomes of maximising conservation (sustainability) and social equity goals (equity) while overall costs are minimised (efficiency) remain a highly sought-after ideal in NRM.

The Land Act of Bhutan 2007 envisioned nationalising and re-leasing of rangelands to rectify the deficiencies inherent in the existing property rights arrangements that have created inequity (Ura 2002; Gyeltshen et al. 2010). The new Land Act has paved the way for more equitable redistribution of rangelands amongst natural resource users, and it gives preference to semi-nomadic herders who directly depend on yak rearing for their livelihoods. The leasing arrangement also permits provisioning and maintenance activities which were not permitted hitherto and which are critical for ensuring sustainable and efficient management of high-altitude rangelands. Hence, the Land Act of Bhutan 2007 represents a paradigm shift in terms of Bhutan government

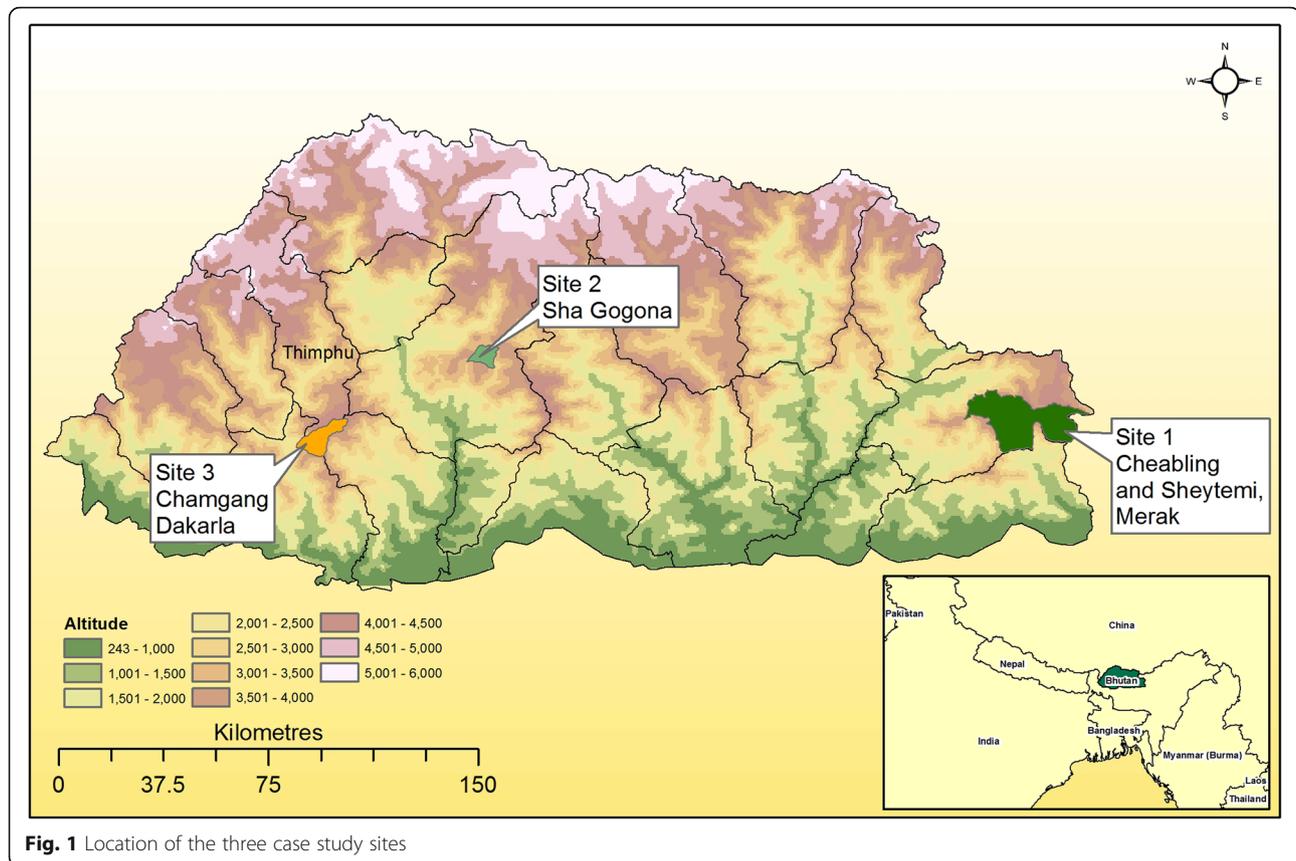
policy to encourage equitable, efficient and sustainable high-altitude rangeland management in Bhutan. However, the reallocation of property rights has not been completed and has caused uncertainty and conflict amongst rangeland communities (Tenzing et al. 2017b).

In this paper, we outline the three case study areas, the qualitative methods employed and then present findings on the respondents' perceptions of the equity, efficiency and sustainability of rangeland management in relation to different property rights arrangements. We discuss the implications of the findings for implementation of the new Land Act 2007 and improving high-altitude rangeland management in Bhutan. Key learnings from the research that may be useful for other high-altitude rangeland contexts are summarised.

### Study areas

Three case study sites were selected in the eastern (site 1), west-central (site 2) and western regions (site 3) of Bhutan with different levels of rangeland degradation, property rights arrangements and governance characteristics (see Fig. 1). Degradation here refers to diminishing rangeland (pasture) quality mainly due to overgrazing and encroachment by unpalatable woody tree species and forbs. Rangeland degradation is more severe in site 1 due to higher livestock numbers, less grazing area and remoteness. Site 2 is a pilot leasing programme for improved pasture, more intensive dairying plus rangeland grazing and has a committee of management. Site 3 was selected because rangeland degradation is less severe and traditional governance is maintained as with site 1. High-altitude rangelands in the three case study sites are managed under a mixture of communal, private and mixed leases (Tenzing et al. 2017a) (see Table 1).

Case study site 1 represents a traditional rangeland system involving many semi-nomadic yak herders known as Brokpa, within a protected area with significant NRM problems and previous conflicts with downstream communities. It is divided into (1) upstream yak herding communities (Cheabling and Sheytemi under Merak Gewog or sub-district) and (2) downstream communities (Radhi, Phongmey and Shongphu) under Tashigang district. Cheabling and Sheytemi are winter grazing areas for yaks and dzo (male yak/cattle cross) and dzom (female yak/cattle cross) located at an altitude of 2800 to 3200 masl (meters above mean sea level). These areas are used by 80 and 14 families, respectively. Cheabling is a communal winter grazing area, whereas Sheytemi is a winter grazing area rented from an absentee landlady by a group of 10 herders and managed as a de facto communal grazing area for its members. In addition, four herders from Sheytemi have rangelands which are managed privately.



**Fig. 1** Location of the three case study sites

Customary norms and rules guide the management of these winter rangelands (Tenzing et al. 2018). Brokpas practise centuries-old rangeland and yak management systems that have undergone very little change over the years. Traditionally, yak herding involves migration between summer and winter rangeland transiting through spring and autumn rangeland. Summer rangelands are located at higher elevations (4000–5000 masl) and winter rangelands at lower elevations. Pastures at elevations between 2000 and 3000 masl are used by cattle for summer grazing and yaks for winter grazing (Gyamtsho 1996). It is not uncommon for a yak herder and a family from a downstream community to have grazing rights over the same area. Land degradation problems are severe in Cheabbling and Sheytemi (Turkelboom, F., and T. Wangchuk. 2009).

The downstream communities of Radhi, Phongmey and Shongphu are one of the most densely populated *gewogs* in the country with a total number of households in each *gewog* in excess of 900 households. These three downstream communities are situated immediately below Cheabbling and Sheytemi and have come into conflicts with upstream herders over rangeland property rights. Moreover, landslides and flash floods which

usually start in the upper reaches of the watershed directly affect downstream communities in the form of destruction of paddy fields and houses and loss of human lives. Hence, the involvement of participants from downstream communities in the research was important to get a better understanding of historical and ongoing conflicts.

Case study site 2 comprises a combination of yak-herding and sedentary livestock farming. Here the government has intervened in order to ‘improve’ the traditional rangeland management by leasing and allocating government land which was used for communal grazing purpose to individuals to incentivise improved pasture development to support yak herding and sedentary dairy cattle in Sha Gogona. Sha Gogona was selected as a case study site for this research because it is the only place where the Bhutan government has trialled a new governance arrangement of leasing on a group basis. This pilot scheme was implemented in 2004 prior to the enactment of the Land Act of Bhutan 2007. Sha Gogona is located at 3100 masl under Gangtey *gewog* in Wangdi district in west-central Bhutan. It serves as winter pasture for yaks and all-season grazing for cattle. As of 2013, there were three yak-herding and 27 sedentary

**Table 1** Summary of the capacity of property right regimes found in three case study sites to achieve EES goals

| EES goals/<br>property<br>rights | Case study site 1  |  | Case study site 2   |   | Case study site 3   |
|----------------------------------|--|--|---|---|---|
|                                  | Cheabbling   | Sheytemi   | Sha Gogona  | Pilot leasing<br>component  | Chamgang  |
| Dominant farming system          | Yak and cattle herding   | Yak herding  | Yak herding   | Cattle farming  | Yak herding   |
| Property rights regime           | Communal use rights  | Private use rights (herders, absentee landlady)  | Private use rights (local temple)   | Mixed or hybrid type (pilot leasing programme)  | Private use rights (herders, absentee landlords)  |
| Equity                           | High<br>Members of Cheabbling community have equal access to communal <i>tsa-drog</i>  | Low to medium<br>A group of 10 herders rent private <i>tsa-drog</i> and manages it as a de facto communal<br>Members have equal access<br>Members pay rent | High<br>Community members have equal access to <i>tsa-drog</i> belonging to the local temple<br>Users pay rent                | High<br>Each member household received a 2.5-Ha plot for improved pasture development   | Low<br>Some herders have access to less private use rights <i>tsa-drog</i> compared to their counterparts     |
| Efficiency                       | Low-medium<br>No management rights<br>Have community norms (Turkelboom, F., and T. Wangchuk. 2009) and rules such as entry-exit timing, appointment of community steward on a rotational basis, penalty system                               | Low-medium<br>No management rights<br>Need prior approval from the absentee landlord<br>Rest same as Cheabbling  | Low-medium<br>No management rights  | Medium-high<br>Have management rights<br>Individual plots allotted to members<br>Boundary fencing<br>Have a group constitution and by-laws  | Low-medium<br>No management rights  |
| Sustainability                   | Low<br>No management rights<br>No restriction on the number of livestock one is allowed to graze<br>Indiscriminate lopping of fodder trees from state forest for supplementary fodder<br>Land degradation issues—landslides and flash floods | Low<br>Same as Cheabbling  | Low to medium<br>No management rights<br>Less grazing pressure as there are only three herders left (one herder quit in 2012) | Medium to high<br>Have management rights<br>Members developed improved pasture<br>Fodder conservation (silage making) expected to reduce lopping and free-ranging in state forest | Low to medium<br>No management rights<br>Less grazing pressure due to fewer number of herders (20 households) |

livestock farmer households. Rangelands belong to the local temple, and semi-nomadic herders and sedentary livestock farmers pay rent to use it. Individual pasture plots (2.5 ha per household) were leased to the members of a farmer group comprising 30 households including the three remain semi-nomadic yak herder households for improved pasture development. The pilot leasing programme exhibits characteristics of a mixed property regime having features of both private and communal property arrangements (Tenzing et al. 2017a).

Case study site 3 is the winter rangeland of Chamgang at 3100 masl under Dakarla *gewog*, Thimphu district, in western Bhutan and represents a traditional, more extensive rangeland system with fewer yak herders. The winter grazing area of Chamgang and its surrounding areas are grazed by yaks belonging to the Wang-dro sub-group of 20 herders' households from Dakarla and are managed under private use rights arrangements. Herders, absentee landlords and *dratsang* (the central monastic body) hold private use rights to winter rangeland located in and

around the Chamgang area. There are fewer yak herders in Dakarla with larger herd sizes and a more extensive rangeland system in contrast to their counterparts in eastern Bhutan. Herders reported some rangeland degradation due to encroachment by unpalatable tree species such as dwarf rhododendrons and junipers, but there have been no major landslides or flash floods.

## Methods

Qualitative research methods were used to explore the perceptions of stakeholders on how existing rangeland property rights arrangements influence EES goals. A random sampling method (Bryman 2012) was used to identify potential interviewees. In total, 151 participants comprising semi-nomadic herders, sedentary livestock farmers and government officials participated in interviews ( $n = 40$ ) and focus group discussions ( $n = 9$ ) (see Table 2). Open questions were asked such as "what are some of the changes in high-altitude rangeland condition you have observed during the last 20 years?" and

**Table 2** Research participants

| Case study sites                                | Semi-structured interviews |        | Focus group discussions |        | Total by site | % by site |
|---|----------------------------|--------|-------------------------|--------|---------------|-----------|
|   | Male                       | Female | Male                    | Female |               |           |
| Case study site 1: (i) Cheablung                | 6                          | 3      | 14                      | 15     | 38            | 25%       |
| Case study site 1: (ii) Sheytemi                | 4                          | 1      | 8                       | 3      | 16            | 11%       |
| Case study site 1: (iii) Downstream communities | 6                          | 0      | 25                      | 5      | 36            | 24%       |
| Case study site 2: Sha Gogona                   | 5                          | 1      | 5                       | 20     | 31            | 21%       |
| Case study site 3: Dakarla                      | 2                          | 3      | 3                       | 3      | 11            | 7%        |
| Government agencies                             | 9                          | 0      | 8                       | 2      | 19            | 13%       |
| Total by gender                                 | 32                         | 8      | 63                      | 48     | 151           | 100%      |
| % by gender                                     | 80%                        | 20%    | 57%                     | 43%    | 100%          |           |

“what do you think are the drivers of such change in rangeland conditions?” More women participated in focus group discussions as they were too shy to be interviewed individually. This is a cultural factor and a limitation of the doctoral researcher being male.

Focus group discussions were used to collect feedback and seek consensus amongst a wider audience on salient points that were highlighted in the semi-structured interviews such as historical and contemporary disputes and conflicts, nationalisation and leasing programme. Interviews and focus group discussions were conducted in Dzongkha language for respondents from west (case study site 3) and west-central Bhutan (case study site 2) and the local dialect known as Sharchop for respondents from east Bhutan (case study site 1). The interviews and focus group discussions were carried out between February to April 2013 and in April 2014. All interviews and focus group discussions were recorded with a digital recorder, translated into English and transcribed for analysis.

Data analysis comprised three stages: (i) coding, categorisation and thematisation (Charmaz and Bryant 2008); (ii) cross-case analysis and consolidation (Yin 2008); and (iii) conceptual or theoretical abstraction (Berg 2009). In the first stage of analysis, the interview and focus group discussion transcripts were systematically read and coded with the assistance of the computer-assisted program NVivo (9 and 10 editions). The thematic areas from the semi-structured interview questions provided the analytical scaffolding and guided the research analysis. In the second stage of analysis, themes and categories from the three case study sites were compared and contrasted to identify points of convergence and divergence (Charmaz 2005). The third stage of analysis involved theoretical reflections with the focus on reconstructing or re-enacting the ‘big or global’ picture based on the main empirical findings and conclusions from the research (Bryman 2012).

**Results**

This section presents the perceptions of stakeholders on how the different property rights regimes impact the EES goals of NRM. These perceptions were the following. Historical inequities due to elite capture and absentee landlordism undermine herders’ livelihoods and well-being. Equitable redistribution of important natural asset is critical for social justice and livelihoods. Lack of management rights and banning of traditional management practices such as burning and clearing of bushes and shrubs triggered rangeland degradation with socio-economic and environmental consequences. Allocation of management rights is critical to incentivise provisioning and maintenance activities. The pilot leasing programme demonstrated that EES goals can be tackled in an integrated manner for optimal results.

**Historical inequities in resource allocation**

For the allocation of scarce resources, equity can be interpreted in terms of distributive justice and procedural justice. Distributive justice pertains to fairness and equity consideration (Jost and Kay 2010), benefits, costs and impacts (Wiek and Larson 2012), whereas procedural fairness pertains to participation in the decision-making process and the distribution of outcomes (Jost and Kay 2010; Wiek and Larson 2012). Herders considered having equitable access to rangeland as vital for improving their livelihood and well-being. For them, yak herding in the high mountainous areas of Bhutan is untenable without having access to rangelands. However, inequity in the allocation of rangeland resources is considered a major problem facing yak herding communities according to a 59-year-old male herder from Cheablung:

Some have huge rangeland be it summer, winter, autumn or spring *tsa-drog* (pasture) whereas others have only limited *tsa-drog* although with a large

family. The allotment system is not fair, equitable or balanced.

Those herders who do not have sufficient rangeland rent grazing areas from fellow herders, landlords, absentee landlords or institutions, often paying high rent. Payment of rent in the form of butter and cheese depletes herders' already meagre stock/income, thus undermining their livelihoods and well-being. Moreover, tenants are more vulnerable to economic exploitation by landlords and landladies, and they have to live in constant fear of being evicted without prior consultation or at a short notice.

On the one hand, herders and livestock farmers said communal grazing areas (communal rights) are amenable to achieving the equity goal since members enjoy equal rights to communal rangeland. Social distributive justice, fairness, equity and equality are guaranteed at least in principle. On the other hand, some herders and livestock farmers ( $n = 30$  or 75%) argued that local elites, the rich, vocal and dominant members of the community by virtue of having more livestock, derive more benefits from the communal rangeland and therefore further marginalising the poor.

Views of herders and livestock farmers of Sha Gogona on the pilot leasing programme managed under a mixed type property regime (private use rights with a communal management framework) were generally positive regarding equitable redistribution of grazing land. According to a 63-year-old male farmer from Sha Gogona:

When it is done on individual basis, it has become so convenient; people know which one is mine and which one is yours [...] the difference is almost like *sa dha nam* (like the earth and the sky). It is very convenient because now we have the control and authority over it.

Under the pilot leasing programme in Sha Gogona, case study site 2, individual plots measuring approximately 2.5 ha each were demarcated using a modern cadastral method and distributed to members of a farmers' group. Equitable redistribution of natural resource assets leads to the empowerment of the poor. Procedural fairness or equity in terms of the decision-making process under the pilot leasing programme is operationalised through the group's general assembly and management committee. The roles and responsibilities of the members and office bearers are clearly defined and codified in the form of group constitution and bylaws which facilitated smooth day-to-day management of the group activities. On the other hand, traditional management systems are based on traditional knowledge, customary norms and verbal

agreements based on trust which make them more open to conflict.

#### **Low input-output system**

The efficiency goal refers to the increased generation of welfare (benefits and outputs) from the optimal utilisation of natural resources. Rangeland management in Bhutan is a low input-low output system, and herders invest very little in terms of development and maintenance activities. This is because rangelands are state property and herders are granted grazing rights only, foreclosing any provisioning and maintenance activities. There has been an observed general decline in rangeland productivity across all property rights regimes. Herders and livestock farmers attribute rangeland degradation to natural causes such as flash floods and landslides and greater competition over rangeland resources due to the increase in livestock population and other anthropogenic activities. Diminishing quantity and quality of pasture coupled with increasing livestock population lead to conflicts amongst herders and oftentimes bring herders in conflict with forestry officials.

Respondents' perceptions of 'efficiency' came from their statements on changes to productivity and carrying capacity, milk production and weed encroachment by unpalatable species. According to herders and livestock farmers, rangelands managed under communal property regimes are less efficient due to members failing to take responsibilities as explained by this 46-year-old male herder from Cheabbling:

When it is a communal pasture ... People tend to develop the attitude "leave it, it is not my responsibility only; it is everybody's responsibility". In the process people fail to take initiative to manage it properly...

In addition, over-fragmentation due to subdivision of communal rangeland amongst family members can also pose management challenges. For example, herders of Cheabbling, Merak, willingly bequeath family shares from the communal pasture to their daughters, and as a result, the number of right holders and claimants to Cheabbling has grown over the years. As per the local tradition, only sons inherit family *tsa-drog* (pastures) with private use rights, and daughters are expected to be provided for by their spouses.

Respondents from the pilot leasing programme at Sha Gogona said they were able to manage rangeland pasture more efficiently due to having well-defined boundaries and management rights. Ownership security is critical to spur provisioning and maintenance activities according to a 41-year-old male livestock farmer from Sha Gogona:

Since the leasing began, now people have more sense of ownership, accordingly they take proper care of it. They give extra attention to its management.

Herders and livestock farmers said having regular interactions, sharing of views and ideas during the monthly meeting and putting in place a group constitution and by-laws have discouraged cattle encroachment and helped reduce conflicts following the introduction of the leasing programme.

### Withdrawal of management rights

The sustainability goal emphasises meeting current generation needs without diminishing the resource base for future generations. Respondents talked about rangeland sustainability in terms of lack of management rights, lease ownership uncertainty and climate change impacts. Weed encroachment was an important issue across all property rights regimes as a result of the withdrawal of management rights. Traditional rangeland management practices such as burning and cutting of bushes and shrubs were banned with the promulgation of the Forestry Act of 1969 and the Land Act of Bhutan 1979. According to a 63-year-old male herder from Sha Gogona:

Government and forestry people do not allow us to burn *tsa-drog*. Pasture comes up quite well after burning but nowadays, due to ban on burning we are not allowed to burn *tsa-drog*. When we do not burn *tsa-drog*, different types of trees grow.

To overcome winter fodder shortage, herders are compelled to indiscriminately lop fodder trees from surrounding State forests for supplementary livestock fodder. In addition to indiscriminate lopping of fodder trees, herders and outsiders also harvest firewood for cooking and heating purposes, as well as harvesting of timber for housing from the surrounding forest, exacerbating the degradation of forests and triggering flash floods and landslides in the area. The pilot leasing programme for improved pasture development had a positive impact on the natural environment by reducing free grazing and lopping of fodder trees from State forests.

Semi-nomadic yak herders and sedentary livestock farmers across the three case study sites suggested that the effects of climate change were mainly in terms of less or no snowfall, drying of water or erratic rainfall pattern, increased incidence of landslides and flash floods, and flowering of bamboo. In the case of Dakarla, a 26-year-old female herder mentioned:

“Nowadays there is less and less snow during winter. Before, there used to be heavy snowfall both in the mountains (summer *tsa-drog*) and here (winter *tsa-drog*).

Following the nationalization of grazing rights of private and communal grazing lands to enable rational redistribution of rangeland resources to herders and livestock farmers whose livelihoods are dependent on livestock rearing as per the provisions of the Land Act of Bhutan 2007, the lack of clear implementation guidelines or mechanisms has created a general sense of uncertainty and insecurity among semi-nomadic yak herders and sedentary livestock farmers. Respondents have expressed concerns about the long-term continuity and sustainability of yak herding and livestock farming in Bhutan. In this light, yak herders and sedentary livestock farmers want clear ownership and tenure security of rangeland to incentivise, provisioning and maintenance activities to enhance productivity and ensure future sustainability. For example, herders should be allowed to grow improved pasture and carry out maintenance activities as in the case of the pilot leasing programme in Sha Gogona.

In order to enhance the sustainability of high-altitude rangeland, most of the government officials interviewed suggested allocating rangeland under a leasing programme based on the carrying capacity of the rangeland. A herder from Merak suggested the need for a concomitant reduction of the unproductive animal population to optimise returns from improved pasture development programme and help ease farm labour shortages. Cordoning off degraded rangeland to allow natural regeneration and stabilisation and hence sustainability of rangeland was also proposed. Both herders and government officials saw the need to put some kind of time limit or restrictions on the duration of grazing on rangeland to reduce overgrazing and degradation and to enhance rangeland sustainability. The urgency of preventing landslides and rehabilitating landslide-affected areas as a means of securing herders and livestock farmers' long-term survival and livelihoods was emphasised.

## Discussion

### Equitable redistribution for social justice

The findings show that equity in rangeland access and management, regardless of property rights typology, has a direct impact on herders' natural asset endowment level and their livelihoods. Not only is equity important for spreading production assets such as land, water and rangeland (important for livelihood), it is equally important for the creation of social capital, an influential factor in community-based NRM (Cozzolino 2011). Equity is

promoted as an instrument for economic growth and development (World Bank 2006). The need for the equity goal is consistent with Rawls' (1971) observation that the initial endowment of resources is important since it will influence the ultimate distribution of welfare across members of the society. Addressing the equity goal provides a strong basis for promoting efficient and sustainable natural resource governance. Some authors (Boyce 1994; Neumayer 2004) agree that NRM users must first have equitable access to a resource before the goals of efficiency and sustainability can be met. Once the issue of equitable allocation of natural resources such as rangeland is settled, efficiency and sustainability goals may be achieved by instituting mechanisms such as a group constitution and by-laws to guide the actions of herders and livestock farmers as exemplified by the Sha Gogona case study (Tenzing et al. 2018). It can be argued that achieving efficiency and sustainability goals depends on individual choices, initiatives and technology within the overall framework of the property rights regimes (private, communal or mixed) and other existing relevant laws and regulations.

The equity goal is inherently political and controversial compared to the efficiency and sustainability goals as it invariably produces winners and losers in terms of resource allocation and whether the pattern of distributive consequence is fair or just (Young 2016). Allocation of natural assets has strong social justice overtones and may be highly emotive and political in nature and is inherently a zero-sum game (i.e. one has to take rangeland from some herders in order to give it to others) (Tria Kerkvliet 2009). The findings of this research demonstrated that the assignment of well-defined property rights and equitable distribution of natural assets alone may not be sufficient to incentivise investment and development as research indicates. For instance, herders and livestock farmers of Sha Gogona emphasised tenure security (e.g. official deed titles or lease contract) as indispensable to encourage investment and development of lease land. Currently, Sha Gogona herders and livestock farmers do not have any official documentation to legitimise their lease rights, thus triggering fear and uncertainties amongst the leasees (Tenzing et al. 2017b). In the context of agricultural land, Feder and Feeny (1991) claimed that any uncertainty or risk to property rights (i.e. ownership risk) decreases the incentive to make investments in development and maintenance activities, thereby generating inefficiencies in the allocation of resources. These inefficiencies lead to what is known in economic terms as rent dissipation (i.e. accruable benefits or income foregone which is a sign of inefficiency) leading to sub-optimal management of natural resources (Anderson 2004).

Distributing rangeland of the same or similar quality and reconciling a diversity of priorities and demands of various stakeholders can be challenging. In his study of rangeland privatisation amongst Tibetan communities in southeast Tibet, China, Yamaguchi (2011) maintained that allocation of plots with more or less equivalent grass quality, availability of watering points and market accessibility is inherently difficult (see also Yan et al. 2005). Similarly, Cao et al. (2013) based on their study in China, recognised the difficulty of dividing up the heterogeneous rangeland resources in an equitable way, and it may introduce inequality in terms of range quality and water access. Adjudicating multiple interests can be challenging (Mwangi 2009). Stakeholder involvement at every stage of governance is crucial to reach consensus, cooperation and collective action as exemplified by the Sha Gogona experience.

#### **Environmental degradation and poverty nexus**

Property rights regimes that concentrate natural resources in the hands of the few (e.g. elites or absentee landlords) may lead to systematic marginalisation and disenfranchisement of the poor (Mwangi 2006; Ravikumar et al. 2013). Distributional consequences may instigate instability and conflicts leading to breakdowns in efficient use (Runge 1986). Under resource scarcity situations, herders and livestock farmers tend to put livelihood imperatives and satisfying socio-economic interests before conservation. Lopping of fodder trees from State forests by herders of Cheabling and Sheytemi for sustaining their livestock is a case in point. Similarly, herders' decision to put additional animals on their communal rangeland is better explained by livelihood and survival needs rather than mere competition inspired by self-interest and greed according to the theory of *The Tragedy of the Commons* (Hardin 1968). This finding is in line with Fratkin and Roth (2005) who observed that lower herd productivity, due to degradation of rangeland, instigated the pastoralists of Marsabit district, Kenya, to increase their herd size to meet household needs which in turn accelerates environmental degradation and probability of poverty.

Sun et al. (2006) based on their study in Borona, Ethiopia have found that growth in human and animal populations, coupled with diminishing rangeland resources both in terms of productivity and availability have precipitated rangeland degradation. These findings seem to confirm the earlier research findings that poverty is one of the causes of environmental degradation (Boyce 1994; Devlin and Grafton 1998; Gadgil 1989) but with clear empirical examples of how lack of sustainable options forces herders to act unsustainably, and imperilling their own long-term livelihood and the health of the environment. Similarly, Boyce (1994) argued that poor

people are willing to trade present benefits and costs for future benefits and costs and are compelled to degrade the environment for the imperatives of day-to-day survival. He suggested that if the poor are themselves the principal victims of this environmental degradation, the poor grow steadily poorer in a vicious cycle. According to Devlin and Grafton (1998), until poverty is alleviated, citizens of developing countries such as Bhutan will not have the ability to partake fully in activities designed to stop environmental degradation. Equitable redistribution of rangelands as envisioned in the new Land Act 2007 is expected to have a positive impact on poverty alleviation, especially amongst semi-nomadic yak herders.

### Management rights integral to NRM

Bhutan government's decision to grant use rights only without management rights may have inadvertently triggered the rangeland degradation process with economic, social and environmental consequences (Tenzing et al. 2017b). For instance, banning of use of fire and clearing and cutting of bushes and shrubs precipitated encroachment of rangelands by unpalatable woody species (Dorji 2011; Gyeltshen et al. 2010; Turkelboom and Wangchuk 2009). Harvesting of benefits without commensurate contribution towards the development and or maintenance of natural resources such as rangeland can lead to overexploitation (Libecap 2009). Amongst all the bundle of rights, granting of management rights is vital to motivate and incentivise efficient and sustainable rangeland management (Schlager and Ostrom 1992). For instance, farmers of Grindelwald, Switzerland, that make use of common alpine pasture must carry out maintenance activities or face fines (Baur et al. 2014). In the case of Bhutan, similar interventions are needed to halt communal rangeland degradation. Management rights must be given to herders to enable provisioning and maintenance activities.

The pilot leasing programme demonstrated that clear demarcation of boundary and delineation of responsibilities reduces ownership risks, uncertainties and conflicts amongst members of the farmer's group (Tenzing et al. 2018). In addition, Sha Gogona farmers underscored the importance of issuing an official lease agreement, in order for incentivising investment and development of the lease pastureland. Well-defined and well-enforced property rights institutions provided an interactive platform to foster dialogue, compliance and cooperation amongst the members of the farmers' group of Sha Gogona. Sjaastad and Bromley (2000) suggested altering the penalty and reward structure in order to induce behavioural change for the assignment of rights and or duties to be effective. Strategic behaviour such as free-riding is deterred where property rights are clearly defined and enforced diligently (Ostrom 2003) and

therefore are less vulnerable to wilful alteration (Quinn et al. 2010).

### Synergies and trade-offs

This study demonstrated that optimising synergies while minimising trade-offs is important for achieving the EES goals. All three goals are important; it is a matter of getting the priority right depending on the local sociologies and ecologies (Turner 2011). The tension amongst values represented by different objectives such as social equity, economic gain or loss and conservation lie at the heart of the perceived and real trade-offs (Halpern et al. 2011). Questions of equity, efficiency and assurance are closely connected in practice over time (Runge 1986). Adger et al. (2005) argued there are trade-offs and complementarities between EES goals and the relative importance or weight of each goal emerges from societal processes of consent and action. They maintain that the balance between these goals is dynamic, as they are promoted or contested by societies depending on the priorities these societies give to EES goals. For example, although an efficiency goal might dictate using scarce resources where they bring the greatest net benefit, an equity goal requires allocating resources towards programmes that benefit a needy group (Ostrom 2008). National goals such as biodiversity conservation and ecosystem services are often long term, intangible and therefore run the risk of being negated by local authorities as these may not be economically attractive or viable (Hein 2010).

Triple-bottom-line (i.e. EES) outcomes may be achievable if adequate consideration is given to addressing equity issues besides the traditional focus on minimising costs and maximising conservation objectives (Halpern et al. 2013). Loehman and Kilgour (1998) observe that issues of fairness (equity), sustainability and social costs (information, incentives and transaction costs) (efficiency) are crucial for the selection of appropriate management institutions, organisations and policies for environmental and resource management. However, they also concede that environmental scale (local, regional, national or global) and political and cultural conditions will shape the type of institutions, organisation and policies which are most appropriate (Loehman and Kilgour 1998). The mixed or hybrid property regime trialled in Sha Gogona provides an interactive platform for the individual households, the community and the government to work collaboratively to achieve EES goals.

An enabling rangeland policy and a practical implementation mechanism are needed to translate the vision enshrined in the Land Act of Bhutan of 2007 into concrete actions. For a successful implementation of the leasing programme as envisioned in the new Land Act

2007, redistribution of rangeland must be as equitable as possible in order to create a sense of parity, justice and fairness amongst resource users, which is critical for fostering community participation and instilling a sense of ownership of the leasing programme. Hence, it makes both socio-economic and ecological sense to make equity as the cornerstone of any mechanism to implement the leasing programme. Granting individual rights is critical to incentivise investment and development (Rogers 2014) within the overall framework of prior agreed community rules and regulations for the governance of rangelands. In this regard, the mixed/hybrid property right regime having the characteristic features of both private and common property regimes allows taking advantage of good features/characteristics of both private and common property regime that might be informative and useful. For example, individual ownership mimicking the main feature of the private property regime is considered important to incentivise provisioning and maintenance activities while at the same time, members are bound by group by-laws and constitution exhibiting some features of common property regime. Herders of Sha Gogona suggested it is much easier to bargain and mobilise resources from the government and prospective donors by a group than by individual households. The pilot programme demonstrated the primacy of providing training in participatory planning, problem-solving, conflict management, group cooperation, group dynamics and record-keeping to group members. Such a training programme reinforces democratic norms and principles to guide the functioning of the group activities and its management. Adopting a group approach provides an interactive platform for resource users to meet and flag issues, resolve disputes and manage conflicts in a participatory and on the basis of consensus and cooperation. The group is responsible for the successful implementation and monitoring of group activities. By handing over the proverbial stick, the success or failure of the leasing programme and other group activities rests solely with the group. The government role is to provide administrative, technical, financial support especially during the initial period and provide overall oversight functions and provide an adjudication function whenever the group is not able to resolve conflict at their level. All these are expected to motivate and incentivise group members to implement planned group activities without fail. It is important to provide leasing deeds or contract which resource users consider as the *sine quo non* for the successful implementation of the leasing programme. Lessons learned from the pilot leasing programme in Sha Gogona might provide valuable clues for a successful implementation of the Bhutan government national rangeland leasing programme.

This research revealed the following: (i) assignment of incomplete property rights is detrimental to efficient and sustainable natural resource management; (ii) banning of traditional practices such as burning, clearing and cutting of shrubs and bushes done in the interest of conservation could in fact undermine conservation by triggering natural resource degradation process; (iii) granting of management rights in the bundle of rights is vital to encourage provisioning and maintenance activities; and (iv) in the absence of an official contract, deeds or titles which provide tenure security and political legitimacy, the equitable distribution, clear boundary demarcation with written norms and rules are not sufficient to foster long-term investment in provisioning and maintenance activities.

### Conclusion

This research demonstrated that high altitude herders prefer equitable redistribution and leasing of high-altitude rangelands to ensure a sense of parity, justice and fairness. Herders consider granting of management rights and issuance of official leasing agreement or titles for tenure security as important to encourage investment and rangeland development. Similarly, consideration for participatory planning and organisational capacity building of herders prior to implementing the leasing programme is critical for fostering positive group dynamics and cooperation. Lessons learned from the pilot leasing programme may provide useful clues on successfully operationalising the leasing programme to bring the greatest benefits to the greatest number of beneficiaries. An enabling rangeland policy and a practical implementation mechanism tailored to local ecologies and sociologies cannot be emphasised enough.

### Abbreviations

DOL: Department of Livestock; EES: Equity, efficiency and sustainability; NRM: Natural resource management

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### Authors' contributions

The authors read and approved the final manuscript.

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### Declarations

#### Ethics approval and consent to participate

The aim and purpose of the research were explained to community members during informal informational meetings. Participants were

informed that they can choose to withdraw from the interview or focus group discussions without fear of reprimand or reprisal. Informed consent forms were signed or thumb imprinted before volunteers were allowed to participate. This research was approved by the Ethics in Human Research Committee vide the protocol number 410/2013/02, School of Environmental Sciences, Charles Sturt University, Elizabeth Mitchell Drive, Thurgoona, Albury, NSW 2640, on 19 May 2015.

#### Consent for publication

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#### Competing interests

The authors declare that they have no competing interests.

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