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Applying a gender lens to biodiversity conservation in High Asia

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Community-based conservation efforts represent an important approach to facilitate the coexistence of people and wildlife. A concern, however, is that these efforts build on existing community structures and social norms, which are commonly dominated by men. Some biodiversity conservation approaches may consequently neglect women's voices and deepen existing inequalities and inequities. This paper presents two community case studies that draw upon the knowledge and experience gained in our snow leopard conservation practice in pastoral and agro-pastoral settings in Mongolia and India to better understand women's roles and responsibilities. In these settings, roles and responsibilities in livestock management and agriculture are strongly differentiated along gender lines, and significant gaps remain in women's decision-making power about natural resources at the community level. We argue that context-specific and gender-responsive approaches are needed to build community support for conservation actions and leverage women's potential contributions to conservation outcomes.

KEYWORDS

gender, snow leopards, pastoralism, rights, decision-making

1 Introduction

The roles of women and men in the management and governance of natural resources differ between and within cultures and settings (Abdelali-Martini et al., 2008; Coleman and Mwangi, 2013). Across the world, rural households pursue multiple livelihood strategies with the participation of both women and men. The contributions of women are

significant, and in 2020, women comprised over 37% of the world's rural agricultural workforce (FAO, 2020). In particular, they comprise almost half of the world's small-scale livestock managers (FAO, 2020), yet women still face gender-based barriers that constrain their potential as economic actors and limit their benefits (Kieran et al., 2015; Fortnam et al., 2019).

Human rights principles mandate that development and conservation programs should strive to include the voices and address the needs of groups that are marginalized on the basis of gender, class, or other socio-economic factors (Keane et al., 2016; Kaeser et al., 2018; Secretariat of the Convention on Biological Diversity, 2019). Women are equally entitled to lend their voice to conservation decision-making so that their specific needs and risks are addressed and so that they can also draw benefits from ongoing conservation programming. There is also evidence that engaging women in environment and conservation efforts can lead to improved outcomes (James et al., 2021). However, a range of context-specific factors constrain women's engagement in decision-making about conservation activities, reflecting wider social, cultural, and gender dynamics (Agarwal, 2001; Kieran et al., 2015; James et al., 2021). Community-based conservation tends to rely on male-dominated local power structures in mobilizing support for and leadership of priority actions (Agarwal, 2001). In traditional rural settings, women tend to remain on the margins of most conservation and development initiatives, beyond those that explicitly target them (Torri, 2010). As a result, conservation activities are at risk of unintentionally deepening existing gender-based and social inequalities (Torri, 2010; Keane et al., 2016).

Gender can influence the management and use of natural resources and the conservation of biodiversity in complex ways (Agarwal, 2009; Torri, 2010; Khadka and Verma, 2012; James et al., 2021)—for example, women and men usually perform complementary gender-differentiated tasks in rural settings and therefore experience natural resources and wildlife from different perspectives and gain a distinct set of skills and knowledge (Fortnam et al., 2019). Addressing these gender dynamics requires an understanding of the broader historical and social context (Resurreccion and Elmhirst, 2012). More attention is required to incorporate such gender dimensions in biodiversity conservation and the sharing of its benefits (Alvarez and Lovera, 2016; Fortnam et al., 2019)

Conserving species such as the snow leopard *Panthera Uncia* across High Asia requires addressing the needs of men, women and wildlife that share the habitat (Mishra et al., 2017; Young et al., 2021). The snow leopard's distribution spans 12 very diverse countries and includes vast landscapes where human agro-pastoral and pastoral communities continue to co-exist with the snow leopard (Mishra et al., 2009; Murali et al., 2020). These are multi-use landscapes that people use for crop production and livestock grazing purposes (Murali et al., 2020). As a result, a range of human–wildlife interactions take place, some of which are negative, including depredation of livestock and retaliatory killings of carnivores (Mishra et al., 2003). Community-based conservation represents an important approach to promoting coexistence and empowering people to sustainably manage biodiversity resources (Mishra et al., 2003; Mishra et al., 2017). A concern, however, is that these efforts build on existing community structures and social norms. They may neglect the role and voice of women in program planning and implementation, thereby spurning women's rights and potentially curtailing the effectiveness of biodiversity conservation efforts.

While socio-economic, cultural, legal, and political contexts vary enormously across High Asia, women usually play important roles as economic actors in their communities (Khadka and Verma, 2012). Many rural populations across Asia's mountains are involved in crop production or pastoralism, in which women hold specialized functions (Anand and Josse, 2002; Verma and Khadka, 2016). Women also have a stake in the management of natural assets, such as water resources (Murali et al., 2021). Their access to and control of land and other natural resources, however, are uneven, compared with men, and are often constrained by legal, social, and cultural barriers (Murali et al., 2021).

This paper focuses on gender roles and responsibilities, along with women's rights and access to natural resources, as critical factors to ensure comprehensive, relevant, and equitable natural resource management and conservation programs. We present two community case studies that focus on our experiences with snow leopard conservation in pastoral communities in Tost, Mongolia, and the agro-pastoral village of Kibber, India. We highlight how gender roles and rights related to agro-pastoral activities in these two settings can intersect with biodiversity conservation and wider ecosystem service management. We identify opportunities for further engaging women in community-based conservation.

2 Approach and examples

The Convention for Biodiversity (2019) proposed a conceptual framework (Figure 1) that recognizes differences and inequalities in gender roles and responsibilities and in rights and access to resources, which all serve as powerful determinants of biodiversity and ecosystem services. Our case studies focus on how the two primary domains, gender roles and rights, underpin and influence decision-making for conservation programming in two diverse settings. For each setting, we first describe gendered pastoral or agro-pastoral roles and responsibilities. We then consider gendered rights and access to pastoral or agricultural resources. Finally, we highlight how gendered roles, rights, and decision-making can influence biodiversity conservation activities.

Snow Leopard Trust and its partners, the Snow Leopard Conservation Foundation and the Nature Conservation Foundation, have been implementing community-based conservation programs in the Tost mountains and Kibber Village for over 14 years. Our community conservation programs follow an inclusive conservation approach that values equity and justice and seeks improved outcomes for both biodiversity and local communities (Mishra, 2016). This implies a strong focus on developing partnerships with existing community structures to take forward conservation action and attention to address the needs and concerns of all community members. Our longstanding community conservation experience, together with strong attention

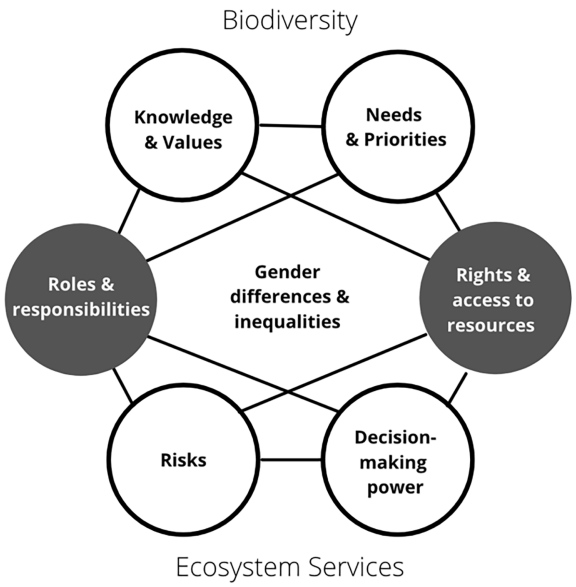

FIGURE 1
Gendered determinants of biodiversity conservation and ecosystem services based on the framework of the Convention on Biodiversity (Secretariat of the Convention on Biological Diversity, 2019). Gender differences and inequalities in roles and rights are shown as key determinants (dark gray) of biodiversity conservation and ecosystem services. These determinants are inter-related with other determinants: knowledge/values, needs/priorities, risk, and decision-making power (light gray).

to program documentation and monitoring, provides a useful basis for the community case studies presented in this paper.

Our first example focuses on the Tost–Tosonbumba (Tost) mountains of Southern Mongolia (43° N, 100° E), where we have been working with communities since 2008. The Tost mountains are located in Gurvantes soum (district) of Omnogovi aimag (Province) and form an extension of the Gobi-Altai mountain range, characterized by rugged mountains, desert steppe, and semi-desert grasslands. Snow leopard and other wildlife populations are known to inhabit the Tost area. In 2016, the Tost mountains and surrounding steppe were designated as a State Nature Reserve (in 2022 encompassing 8,965 km^2). Semi-nomadic pastoralists who rely on livestock (goats, sheep, camel, and horses) for their livelihood live in the area and derive most of their income from the sale of cashmere (Mijiddorj et al., 2020). The dominant religious beliefs in the area are based on Tibetan Buddhism and shamanism. Significant economic changes are taking place in the area. Notably, the number of livestock has changed in Tost, doubling from 31,400 in 2012 to 62,000 in 2019 and subsequently declining sharply to 43,000 in 2021 following a drought. In the same period, the district has also experienced a mining boom, primarily for coal and gold. Mining now contributes 90% to the district's overall gross domestic product.

Our second example concerns an agro-pastoral setting in Kibber Village, Spiti Valley, Himachal Pradesh, India (31°35′ to 33°0′ N and 77°37′ to 78°35' E), where we have been working since 1998. Kibber Village is situated at an elevation of approximately 4,200 m in the Indian Trans-Himalaya. Communities share space with a unique biodiversity assemblage such as the snow leopard, Tibetan wolf *Canis lupus chanco*, and blue sheep *Pseudois nayaur*. This setting is characterized by large temperature variations, a limited growing season, and limited precipitation, which restrict the availability of arable land and the type of crops that can be grown. Agricultural land is estimated to occupy 0.2% of the valley's area, with limited scope for further expansion due to the shortage of water (Murali et al., 2017). There are an estimated 80 agro-pastoral households in Kibber (Murali et al., 2022). Most households in the village are followers of Tibetan Buddhism. The main cash crop is green pea, *Pisum sativum*, which is grown alongside barley *Hordeum vulgare*, used primarily for household consumption. Crop production is the primary source of household income alongside livestock grazing (Murali et al., 2017).

We draw on published documents, data from the operations of our community-based snow leopard conservation programs, and relevant insights from key informants. In Tost, Mongolia, we organized key informant interviews with three program staff and five community members (including a senior government representative, a member of the Soum Women's Association, and three female herders). The key informants were identified based on their roles and interviewed by one of the authors (TNM). All were women. The key informants provided information on the participation of women in local decision-making processes and in livestock herding and natural resource management practices. We also accessed meta-data from the Gurvantes government records and the Women's Association, including campsite registrations and the number of women residents registered in the district. In Kibber, India, relevant information and insights on the roles and rights of women were available from two recent studies of gendered governance systems (Tsering, 2014; Murali et al., 2021). Additional data sources for Kibber comprised program records and a recent evaluation (Alexander et al., 2022). We also drew on the insights of the program staff (CL and DS authors), especially regarding pastoral roles. We focused on collating information relating to two domains of the conceptual framework: gendered roles and rights (Figure 1).

3 Pastoral rights and roles in Tost, Mongolia

3.1 Gendered pastoral roles and responsibilities in Tost

Women play an important role in Mongolian pastoral systems (Ahearn, 2018). The workload is shared among herder household members in a flexible manner, according to specific tasks, family and neighbor relations, availability of pastures, and critical events such as droughts (Voltolini et al., 2015; Ahearn, 2018). Nonetheless, a distribution of pastoral tasks along gender lines is found in Tost, as reported in the wider South Gobi area (Daley et al., 2018). In Tost, according to key informants, men are primarily responsible for herding livestock, fixing winter corrals, selecting pastures and campsites, moving between winter and summer campsites,

slaughter of livestock, and business management. The women's tasks are focused on milking and preparing dairy products, cashmere combing, and helping with livestock births.

The key informants highlight that the busiest period for herder households in Tost is between March and May, corresponding to the birth of young livestock and combing of cashmere goats. These activities require the effort of both men and women to ensure that the animals survive, and cashmere is combed rapidly in order to meet market demand. Women are also busy in the summer processing dairy products, while men have another peak of activity in the late fall when they move camp to winter locations and slaughter animals for sale.

Women with school-aged children usually stay in the district center, Gurvantes, during the school year (from September to June) (Ahearn, 2018; Mijiddorj et al., 2019). Women in Tost are increasingly taking on other town-based livelihood activities, such as those related to mining, trading, retail, and government work (Murali et al., 2020). The key informants described how most women in herder families continue to be actively involved in supporting livestock rearing in their spare time. Pastoral livelihoods in Tost, however, are changing related to livelihood diversification and resource shifts in response to multiple social, economic, and environmental factors (Mijiddorj et al., 2019). The trends towards increased herd size and a greater variety of animals, together with transitions into the market economy, have led women in Tost and the wider region to take on new tasks dealing with animal husbandry and cashmere production, often combined with other livelihood activities (Voltolini et al., 2015; Ahearn, 2018; Murali et al., 2020).

3.2 Gendered rights and access to pastoral resources in Tost

As in other parts of Mongolia, herders in Tost rely on a wide range of resources to sustain their herds, including seasonal pastures, shelters/corrals, campsites, water sources, and mineral licks (Appendix 1). The possession and access rights associated with each resource are varied and complex (Fernández-Giménez, 2002; Ahearn, 2016). Overall, the rights to possess and use pastoral resources are susceptible to gender bias associated with male-dominated collective structures, household structures, and land ownership and inheritance patterns (Fernández-Giménez, 2002; Daley et al., 2018).

Under the Mongolian Law on Land (2002), women and men have equal rights of access to land and assets. However, the law does not specifically address gender issues (Bagdai et al., 2009). Pastureland is given a special status, and the private ownership of pastureland and related water points, wells, and mineral licks is prohibited (Law on Land, Article 6.2.1). The Government allows collective possession and use of pastureland solely on the basis of a contract or land possession certificate (Law on Land, Article 27). The government also issues formal certificates of "possession" for seasonal campsites (Law of Mongolia on Land, 2002). The certificates usually only specify one name (typically the senior herder in the camp or male head of household). Herders whose names do not appear on formal certificates may have weaker claims to campsites and, consequently, nearby pastures (Fernández-Giménez, 2002; Ahearn, 2016). Corrals and shelters, on the other hand, can be privately owned by individuals or households (Fernández-Giménez, 2002). Herders tend to use the ownership of shelters to claim *de facto* rights to the surrounding campsites and pastureland.

Local authorities are responsible for the implementation of the law and preservation and use of pastureland. In Tost, government sources explained that the district and province authorities, in cooperation with the Tost Nature Reserve and relevant professionals, allocate land for possession and use, taking into consideration land use traditions, previous family use, rational land use, and conservation requirements. Individual herders or herder collectives can obtain land possession rights for winter campsites. The Tost data indicate that only 43 out of 211 campsites (20%) are registered under an individual woman's name (Appendix 1). These are mostly women who are in unofficial partnerships or widowed.

3.3 Links between gender and conservation efforts in Tost

The current legal frameworks in Mongolia protect women's rights to communal resources such as pastureland and water sources. In practice, however, women tend to be underrepresented in the registration process for the possession of assets. The gender bias in land possession certificates negates women's entitlements and may lead to positioning women in a secondary role in efforts related to the conservation of pastureland. Women also account for a small minority of livestock ownership registrations and, consequently, of ownership of predator-proof corrals built as part of the snow leopard community conservation program (Appendix 1).

Nowadays, women in Tost spend less time herding than men. The men's dominance in decisions is ascribed to their purported greater knowledge about herding resources, with women considered to be less familiar with and less interested in these issues, leading to the risk of excluding women from discussions and policies about natural resource management (Hawkins and Seager, 2010; Voltolini et al., 2015). There is evidence, however, that women in Tost show a keen interest in local livestock management and conservation. Our community conservation records show that women serve as active participants in community conservation planning, with a particular focus on the insurance of livestock against predator losses (a key snow leopard conservation intervention)—for example, 30% of livestock insurance program members are women. In addition, women have been assigned leadership positions for four out of the seven (57%) livestock insurance committees. This interest needs to be harnessed towards increased engagement in and sustainability of conservation programs.

In addition, women have taken on formal roles in local affairs, including biodiversity conservation, through their engagement as elected representatives of the district government (Hawkins and Seager, 2010). The participation of women in such processes reflects

Mongolia's progress over the last 20 years to enhance the education and political representation of women (Sachs et al., 2022). The responsibilities of these representatives include taking decisions on the local application of regulations for the protection of biodiversity and natural resource management and overseeing their implementation. It is notable that women make up 11 out of 33 (33%) of the district government representatives. The Gurvantes district governor is a woman who has been in a position of authority since 2012. In addition, a new female Tost Nature Reserve director was appointed in 2022. In 2022, eight out of 34 (24%) directors of protected areas managed by the Ministry of Environment and Tourism across Mongolia were women. This number has increased from three women in 2017. The representation of women in formal structures can serve as an oversight mechanism for women's concerns to be taken on board in the management of natural resources and conservation at the local level.

The trend for women taking on town-based income-generating activities can also support community-based conservation—for example, women may provide important support for improved pastoral practices such as sustainable cashmere production, building on their active roles in cashmere production and trading. The support of women for the further diversification of household livelihoods in Tost will be critical for increasing community resilience to environmental shocks, such as severe climatic events that lead mass livestock to die off.

4 Agro-pastoral rights and roles in Kibber Village, India

In Kibber, social hierarchies remain strong determinants of property rights and access and shape the distribution of agricultural tasks (Murali et al., 2021). A minority of households are recognized as *Khangchen* households, which means that they are considered to be the descendants of the original inhabitants of the valley (Tsering, 2014; Murali et al., 2021). They own most of the arable land and largely control the water resources. Other households, including the historically landless and other socially marginalized households, have less control over these resources (Murali et al., 2021).

4.1 Gendered agricultural roles and responsibilities in Kibber

Gender-differentiated agricultural roles and responsibilities are embedded in local social and family structures and power relations (Tsering, 2014; Murali et al., 2021). In the *Khangchen* households, women do most of the farm labor (in terms of the time spent in the field), especially managing the water resources and weeding. Men from *Khangchen* households are mainly involved in ploughing and harvesting of the crops. Thus, the involvement of men in agricultural activities is time-limited, and many are involved in other livelihoods such as jobs in offices, tourism, infrastructure industry, and entrepreneurship. A similar gendered division of labor is observed among other non-*Khangchen* social groups. Women from these groups tend to work as laborers, with a focus on the irrigation system, on behalf of *Khangchen* households. Many men from non-*Khangchen* social groups also work as laborers, with a focus on ploughing and carrying manure to the fields. Harvesting of peas and barley is done by men and women together (Tashi Tsering, 2014).

The pastures are primarily managed by men (Murali et al., 2022), who are responsible for herding livestock (yaks, horses, cow–yak hybrids, cattle, donkey, sheep, and goat). In the experience of the program staff, men from all livestock-owning households take turns to accompany the village *Lugzi* (herder) in herding the livestock. Women are responsible for corralling the livestock in the evening, and during the winter months they milk, feed, and water the livestock when they are in stalls. Men and women both collect fodder used for feeding livestock. Women are also responsible for collecting dung from the pastures to be used as fuel for heating and cooking. Men manage finances related to agriculture and livestock rearing such as sale of produce, procurement of seeds and herbicides, and wages for agricultural laborers. Women manage certain decisions in the pastures, which the community considers of "lesser" importance, such as the harvest of plants.

Women, as a group, play a critical role in the management of the area's complex irrigation system—for example, women build embankments to guide the flow of water to the fields and manage the irrigation process (Murali et al., 2021). Women from *Khangchen* households are in charge of inspecting and monitoring the condition of water channels and of informing the village head when repairs are needed (Murali et al., 2021). Women from *Khangchen* households are also involved in decision-making related to the time and duration of the irrigation cycles. Both men and women from all households provide labor to maintain the irrigation channels (Tsering, 2014; Murali et al., 2021).

4.2 Gendered rights and access to agricultural resources in Kibber

The Indian Constitution asserts non-discrimination on the basis of sex as a fundamental right. Property inheritance and ownership laws, however, are complex and vary based on religion, region, type of property, and the relationship to the deceased. Such laws can directly or indirectly propagate gender inequality (Agarwal et al., 2021). In Kibber, agricultural roles and land inheritance are based on traditional social structures. Men from the historically privileged *Khangchen* households hold the rights to most of the arable land and irrigation sources (Tashi Tsering, 2014; Murali et al., 2021). A system of male primogeniture prevails. If there are only daughters in a family, the husband of the oldest daughter acquires the property. Other social groups have access to land that they own or rent or are gifted by the village (with the Himachal Pradesh Nautor Land Rules Act of 1968, which extended land rights to the landless, thus marking a major shift) (Tashi Tsering, 2014; Murali et al., 2021).

As with the property rights, the rights for use and control over key agricultural resources are socially determined (Murali et al., 2021). The *Khangchen* households own most of the draft animals (yaks) and ploughs (Tsering, 2014). Similarly, control rights over

irrigation water reside with the women of *Khangchen* households (Murali et al., 2021). Women from all households have use rights. It is the responsibility of the women from the *Khangchen* households to ensure that land rented from them by the other households is also irrigated. In practice, the land belonging to the *Khangchen* households is usually irrigated first, after which the land rented by the other households is irrigated. In this system, women from the *Khangchen* households are involved in formulating collective choice and operational choice rules—for example, deciding the days and amounts of irrigation (Murali et al., 2021).

4.3 Links between gender and conservation efforts in Kibber

Overall, *Khangchen* men in Kibber remain the key decision-makers at the village level—for example, at the village council—and manage farming-related activities (Tsering, 2014). They also wield power in terms of agricultural labor relations as they are responsible for hiring laborers, men as well as women (Tsering, 2014). While agricultural tasks are generally distributed to both men and women, the timing of these activities is decided mostly by men (again especially men from the *Khangchen* households)—for example, the date of plowing is decided in a village meeting attended by a male representative (Tsering, 2014). Men thus appear to be the primary decision-makers about most matters related to the management of the environment at the village level.

Notwithstanding longstanding power structures biased in favor of men, women's agricultural and pastoral responsibilities provide them with unique knowledge and skills that can be leveraged in conservation activities (Abdelali-Martini et al., 2008)—for example, women have specific experiences and interests related to crop production. These formed the impetus for the intervention to prevent crop-raiding by ungulates in Kibber, a key component of the community-based snow leopard conservation program. Similarly, women's stake in protecting livestock has been instrumental in taking forward the building of corrals for the prevention of carnivore depredation. In addition, women's role as primary managers of the irrigation system gives them specialized knowledge on cropping patterns, the creation and maintenance of water channels, and weather changes (Upadhyay, 2003; Tashi Tsering, 2014; Murali et al., 2021). Their role in this regard is critical given that agricultural production in Kibber remains largely dependent on the waters of snow melt (Murali et al., 2017). Women can, therefore, serve as essential partners in planning and managing climate-resilient ecosystem services.

At the same time, it is important to recognize the interactions between social structures and gender roles—for example, the dates of the irrigation cycles after the first cycle are collectively decided by the women under the leadership of the historically privileged *Khangchen* households (Murali et al., 2021). In addition, two water managers are selected on a rotation basis from the women belonging to the *Khangchen* households. Consideration of these gender–power structures is essential to ensure that the benefits of community-based conservation accrue to all community members, especially those with the greatest needs.

While women's concerns have formed the basis of certain snow leopard conservation interventions in Kibber, the participation of women in formal decision-making about such interventions remains limited—for example, the program records show that no women are part of the livestock insurance or crop raiding program committees. To address this gap, opportunities are underway to promote dialogue with women, including those of socially disadvantaged groups, in a culturally sensitive manner—for example, the Shen program, a conservation-linked social enterprise effort, has reached out to women to involve them in conservation work in Kibber and neighboring villages (Mishra, 2016; Alexander et al., 2022). Gender-sensitive and flexible approaches were successful in mobilizing a broad section of women (23%–37% of all women in these villages) in local conservation action over the last 10 years (Alexander et al., 2022). Program-derived income is low relative to overall household income but remains under the control of women (Alexander et al., 2022). The program staff suggest that this is valued given that women do not generally manage finances related to agriculture and livestock. The Shen program also addresses the concern that women give less value to wildlife than men in line with their roles largely within the village (Murali et al., 2019).

5 Discussion

Our experiences around the conservation of snow leopards in two specific settings in High Asia illustrate the diversity of women's roles and rights with respect to the management of natural resources. The two community case studies presented underline the importance of context-specific approaches to engage women as equal partners in biodiversity conservation (Mishra et al., 2017) in order to protect their rights and enhance conservation program uptake and sustainability (James et al., 2021). Improved conservation outcomes are also expected as has been demonstrated in other settings (Agarwal, 2009; Leisher et al, 2016). It is difficult, however, to demonstrate that specific measures to engage women are correlated with improved program outcomes in the absence of dedicated evaluation efforts (Woodhouse et al., 2015).

Our case studies underscore that different approaches can be followed to leverage women's specific experiences, knowledge, and skills for biodiversity conservation in snow leopard landscapes—for example, the role of women in Kibber Village in controlling irrigation systems puts them at the center of snow-related ecosystem services that are under threat from climate change. In Tost, women's engagement can serve to shore up the community's resilience to livestock losses related to carnivore depredation or weather shocks through recognizing and strengthening their share in diversified livelihoods.

Governance arrangements for conservation at different levels are important arenas for promoting gender-responsive conservation. The Kibber Village example underlines how the participation of women in decision-making about natural resources takes place within a social

structure that is shaped by gender relations and also class status, ethnic group, age, and other social identities (Agrawal and Gibson, 1999; Murali et al., 2021; Murali et al., 2022). Women are not a homogenous group, and different social identities can result in different lived environmental experiences and power asymmetries (Murali et al., 2021). In designing conservation interventions in such settings, the intersections between gender and social identities must be identified and opportunities offered to all women to participate with a view to promote relevance and inclusiveness (Agarwal, 2010). In Tost, as elsewhere in Mongolia (Mijiddorj et al., 2019), there are encouraging signs that women are in key positions to influence snow leopard conservation. In such settings, changes in women's status through improved education and increasing participation in governance structures provide opportunities to involve them in community conservation affairs. Further focused research efforts on factors that influence women's decision-making power would serve to support efforts to engage women more purposively in conservation programs.

The situation, status, and role of women in High Asia are changing, requiring flexible approaches to mobilizing women's potential contributions to community conservation efforts. Agro-pastoral and pastoral communities are being exposed to globalization, changes in land use, new market forces, and new information and ideas. New aspirations, opportunities, and challenges for conservation and development are emerging (Khadka and Verma, 2012). In particular, climate change is putting additional pressures on high mountain ecosystems and exacerbating risks to livelihoods and wellbeing (Mijiddorj et al., 2020; Murali et al., 2022). Ongoing changes are profoundly affecting how people view and value their environment and how they use, control, and manage natural resources (Anand and Josse, 2002; Jodha, 2005). Similar shifts are expected in Tost and Kibber; these require tracking so that community-based conservation can respond and adapt. As new conservation opportunities emerge, care should be taken to adopt inclusive approaches that respect and protect women's rights and address their specific interests and needs.

6 Conclusion

In this article, we applied a gender lens to explore differences and inequalities in relation to roles and rights that might influence conservation efforts in snow leopard landscapes. Drawing on our conservation practice in two specific settings, we demonstrate the diversity of women's roles and rights related to local pastoral and agro-pastoral resources in High Asia. We explore how these roles and rights can influence priorities and decision-making processes related to community-based conservation. We propose leads for leveraging women's potential contributions to snow leopard conservation efforts at the local level, in ways that take into account underlying social and political structures and gender–power relations. We argue that a better understanding of gender dynamics related to rural livelihoods can serve to improve inclusion and equity and to increase relevance, acceptance, uptake, and sustainability of conservation programs. It can also help avoid exacerbating existing gender and social biases. Such efforts are particularly relevant for large carnivore conservations programs that seek to secure harmonious wildlife–human co-existence in multi-use landscapes.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

In accordance with the local legislation and institutional requirements, key informants were informed of the aims of the research and provided verbal informed consent for the use of the data. Participation was voluntary and anonymisation was guaranteed at all points of the study. No incentives or rewards were provided to participants.

Author contributions

JA and RM designed the study. JA, RM, TM, BA, and KS led the data acquisition and interpreted the results. JA, RM, and JY wrote the manuscript. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fcosc.2023.1006052/full#supplementary-material

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