Pastoral traditional knowledge in East Ujimchin Banner, Inner Mongolia

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Abstract

In the face of significant socio-economic and environmental challenges, traditional ecological knowledge (TEK) systems globally have shown remarkable resilience. This study investigates the resilience of traditional ecological knowledge by analysing three pastoral practices—mobile grazing, herd breeding and herd sharing—in East Ujimchin Banner, Inner Mongolia, China. Using interviews, participatory mapping and surveys, we delve into the dynamic nature of these practices, noting both changes and continuities. Our findings reveal that, while some elements of these three practices have changed, many others have persisted and remain active. For instance, in the context of mobile grazing, despite the changes in moving distance and frequency, herders still practise strategic seasonal movements within the limited pastures they have available. Another important finding is that each of the practices analysed serves diverse functions, such as restoring herd productivity, maintaining ecological balance and adapting to changing climate. Furthermore, the practices under study also have overlapping functions, aiding each other in aspects like climate adaptation. For instance, mobile grazing facilitates access to better pastures in harsh weather conditions, while herd sharing offers a collective approach to managing risks.

Introduction

A large body of research demonstrates the critical role traditional knowledge systems play in maintaining the resilience and sustainability of socio-ecological systems. These systems impact on environmental conservation, agriculture, health and community governance (Berkes et al. 2000, Molnár et al. 2023). Despite these advances, a hierarchical separation persists between scientific and traditional ways of knowing, rooted in colonial legacies and compounded by educational systems, policies, market economies, urbanisation and globalisation. These factors, alongside environmental and socio-ecological changes, challenge local traditional communities' ability to perceive, function and sustain themselves as their ancestors did. This challenge is reflected in extensive literature that often reports the loss or erosion of traditional knowledge systems (Fernández-Llamazares et al. 2023). Reporting on this loss can highlight vulnerabilities and mobilise global support to protect these cultural legacies. However, viewing these knowledge systems solely as fading risks their 'museumification', reducing them to static knowledge from the past rather than recognising them as dynamic and adapting entities (Berkes et al. 2000, Reyes-García et al. 2014).

This study examines the resilience of the TEK system among pastoral herders in East Ujimchin Banner, Inner Mongolia, China, focusing on the intrinsic resilience mechanisms within TEK. We analyse three traditional herding practices—mobile grazing, herd breeding and herd sharing—to see how these practices have historically enabled herders to adapt to past environmental changes and how they may continue to support adaptation to contemporary socio-environmental challenges.

Methods

This study is based on nine months of fieldwork in East Ujimchin Banner, Inner Mongolia, China. Three villages were selected as study sites. We combined both qualitative (semi-structured interviews and participatory mapping workshops) and quantitative methods (survey) for data collection. To gain a comprehensive understanding of traditional practices in the area, the study began with interviewing three key participants. Through these interviews, we identified mobile grazing, herd breeding and herd sharing as the practices that contributed the most to adapting to climate variability. To delve deeper into the details of these practices, semi-structured interviews were conducted with other elders (n=40). We also conducted three participatory mapping workshops in each village with 12 local elders to document historical mobile grazing practices. To collect data on current application of the three practices, we used data from semi-structured interviews to design both individual and household survey. Additionally, we organised household participatory mapping workshops with 30 randomly selected households to understand current mobile grazing practices. For data analysis, a mix of qualitative and quantitative methods was used.

Results

Mobile grazing practice

Regarding the motivations, according to interview responses, mobile grazing was core to maintaining livestock health and productivity, ecological balance and climate adaptation. Comments made during household mapping of current movements show that nowadays herders continue practising mobile grazing primarily to rest and regenerate pastures (93%). Seven participants cited the improvement in livestock health through varied pastures as their motivation, while two participants noted the importance of maintaining tradition.

Traditionally, mobile grazing in the area was characterised by frequent movement, careful selection of seasonal pasture locations, strategic timing of movements and long-distance mobility during extreme weather events. Regarding when to move, participants mentioned that changes in temperature, pasture quality or productivity of grazing areas determined the timing of seasonal movements. Participants also reported that, in the past, East Ujimchin herders also employed long-distance mobility to cope with severe winter events that severely restricted access to pastures.

Since 1984, mobile grazing has experienced significant changes, characterised by reduced movement frequency, fewer seasonal pastures and diminished long-distance grazing. Despite these changes, a key element of mobile grazing has persisted: seasonal utilisation of pastures. Data from 30 participatory household mapping sessions show that households with over 1333 ha of land typically have three seasonal pastures. The households managing pasture areas ranging between 667 and 1333 ha have two seasonal pastures. Among participants with less than 667 ha, micro-mobility is the predominant strategy. As in the past, the type and number of seasonal pastures continue to be influenced by the available pasture area and landscape characteristics.

Herd breeding practice

In terms of the motivations, participants reported traditional breeding traits for selecting male livestock helped ensure that the livestock are productive, well suited to the local climate and reflective of cultural values. According to the survey data, a large majority of participants, 94% (n=213), believe that, in general, breeding practice now significantly contributes to restoring herd productivity. Moreover, 78% (n=178) of participants view breeding as crucial for enhancing their livestock's resistance to winter disasters. Similarly, most participants agree on the ability of breeding to enhance livestock resistance to drought (76%, n=173). When considering the importance of breeding to increase resilience to pasture shortage, levels of agreement were more varied, but still most informants agreed (62%, n=141).

Through interviews, we identified 19 traits across the five types of livestock, each serving different functions, including enhancing productivity, improving climate resistance and preserving cultural values. Regarding the functions of identified breeding traits, high productivity is particularly emphasised, with six key traits across different livestock types specifically valued to maintain productivity. Climate resistance traits are also considered crucial to ensure that livestock can withstand harsh weather conditions. Beyond their practical functions, the participants noted the physical traits of livestock also embody unique cultural identities and beliefs.

Parallel to changes observed in mobile grazing, breeding practices in East Ujimchin have also undergone significant transformations since 1984. Certain selection traits, such as 'single-colour selection' of stallions and bulls and 'born in the middle of lambing season' of rams have a noticeable shift in awareness and use. Moreover, bucks and bulls are now preferred without horns. Despite these changes, 30 traditional traits continue to be sought, although their use varies. For selecting a ram, most participants follow four traditional breeding traits: selecting animals with big and even tails (84% of survey participants), long and straight backs (84%), wide hips (84%) and the (82%). Stallion selection continues to value traits such as lineage (86%), square hip (71%) and long back (70%). In the case of bulls, traits such as lineage (72%), thick body skin (69%) and balanced and even horns (48%) remain important.

Herd sharing practice

As participants reported, traditionally, this practice contributed to fostering societal equality. During the collective era, it was also practised to maintain herd-pasture balance, address labour shortages, minimise climatic risks, sustain herd growth, and help herders with few or no animals to increase their herd size. Household survey results show that the primary reason for engaging in herd sharing now is to mitigate land shortages, cited by 38% of households. Other significant reasons include helping families in need and addressing labour shortages (18% each). Additionally, 15% of households use herd sharing to increase their herd numbers, and 7% of participants use it as a strategy to adapt to severe climatic events. A smaller portion, 3%, view herd sharing as an important tradition that should be preserved.

In the past, families with larger herds would share some of their livestock with families with fewer or no livestock. In return, the sharing families paid the labour of caring for the livestock by offering some of their livestock, along with meat and dairy products, to the host families. Later during the 1950s, when a family wanted to share part of its herd, there was a requirement that 60–70% of the herd be female, with 30–40% of the newborn offspring belonging to the host family after one year.

Survey data show that most households (81%) know about the herd-sharing practice, and 25% of the households either have shared their livestock with other families or received livestock from others. Compared to past practice, now it is more common to receive/pay money rather than take/give back offspring. Overall, based on survey data, herd sharing is perceived positively for its ability to address several critical challenges faced by herders. A significant portion of households (82%) believes that herd sharing can help herders manage land shortages; 73% of households also recognise its role in dealing with current labour shortages. Additionally, 70% of households perceive herd sharing as an effective strategy to combat land degradation, and more than half of them (52%) reported it helpful in mitigating severe climatic events.

Discussion

One of the main findings from our work is that, while various elements of all three practices have changed, many others have persisted and remain active. In the context of mobile grazing in East Ujimchin, despite the changes in moving distance and frequency, herders still practise strategic seasonal movements within the limited pastures they have available. They do so by careful observation of the subtle signs in the pastures, the landscape and changes in vegetation. For families with insufficient pasture area to support distinct seasonal grazing, micro-mobility is adopted. Aligning with these findings, despite the sedentary or semi-sedentary reality of many pastoralists globally, it is crucial to remember that mobility remains an integral component of herding life (Varga et al. 2020, Na et al. 2018).

Another important finding from our study is that each of the practices analysed serves various functions. Historically, these practices have been multifunctional, addressing the past needs. Currently, as environmental and socio-economic conditions evolve, new functions are also emerging, allowing these practices to adapt and respond effectively to contemporary challenges. If we imagine East Ujimchin pastoral knowledge as an ecosystem, then different types of knowledge can be understood as organisms within this ecosystem. Just as species populations in an ecosystem perform diverse roles—from nutrient cycling to climate regulation—also different types of traditional knowledge perform multiple functions. Research suggests that ecosystems with greater functional diversity are more resilient to disturbances and changes, as this diversity enables multiple adaptive responses to environmental fluctuations, thereby maintaining ecosystem stability and facilitating recovery after disturbances (Días & Cabido 2001). Similarly, we argue that the diverse functions of TEK may contribute to the resilience of the knowledge system itself, ensuring it remains dynamic and capable of withstanding socio-environmental shifts.

Another finding is that the studied practices play common functions together. TEK systems are inherently holistic and complex; within them, diverse knowledge and practices work synergistically to adapt to and manage the natural environment effectively (Iaccarino 2003). For example, in adapting to climate variability, herders do not simply rely on weather forecasts, but also emphasise strategic herd breeding to select traits that improve livestock's drought tolerance and productivity. In East Ujimchin, the three practices also complement each other in terms of climate adaptation. Mobile grazing is crucial during severe weather events, allowing herders to move their livestock to more suitable pastures. Breeding is vital for climate adaptation, focusing on traits that improve weather resilience. Herd sharing offers a community-based approach to managing climate risks. This functional complementarity of knowledge allows pastoral communities to approach challenges from various angles. But more importantly, we argue that the interplay and synergy among functions may contribute to the resilience of the knowledge systems through maintaining the essential ecological, economic and socio-cultural functions of these systems.

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