Economic Development in the Buffer Zone: An Imperative for Nature Conservation by the Example of Hustai National Park, Mongolia

Economic development is often seen in direct opposition to nature conservation. This paper argues, using Hustai National Park (HNP) in Mongolia as an example, that economic development and income diversification are key pathways to enable effective nature conservation. The buffer zones surrounding national parks harbour large communities. Around HNP, many herders settle with livestock. Reducing livestock numbers is crucial to lessen pressure on pasture, which is often lusher in and near the park and leads to frequent boundary infringements. The paper proposes a methodology to analyse various economic opportunities and activities for buffer-zone areas aligned with conservation, which may serve as additional income streams for surrounding communities. It stresses the importance of including border communities, buffer zones, and their economic development in effective conservation plans. The paper further advocates a broader view that effective conservation can only be achieved in collaboration with local communities, a symbiotic relationship leveraging synergies and thereby reducing pressures on the park. Sustaining local livelihoods may also sustain conservation for generations to come.

Keywords: *Buffer Zone, Economic Development, Conservation, Hustai National Park (HNP), Mongolia*

Introduction

Hustai National Park (HNP), located about 400 km west of Ulaanbaatar, Mongolia, spans over 50,000 hectares. It was originally designated a nature reserve in 1993 (under Resolution 83) to support the reintroduction of the Przewalski's horse (Takhi), successfully rewilded the same year. Following significant conservation achievements, it was upgraded to national park status in 1998 (Resolution 115). Since its inception, the national park is run by a non-governmental organisation, the Hustai National Park Trust, focusing on the preservation of the ancient horse species and its habitat. The NGO is mainly supported through its economic activities, namely eco-tourism, and contributions from international foundations and donors.

The Park employs a range of local rangers, scientists and hosts that run the conservation and tourism activities and conduct scientific research on the park and its local species. The local capstone species are the Przewalski horses, wolves and marmots. The national park is surrounded by a designated buffer zone inhabited by herding communities.

These communities engage in additional economic activities, namely community-based tourism, artisanal crafts, small-scale agriculture and dairy production. This paper proposes a methodology to assess these activities in line with the conservation objectives of the national park, using the following

criteria: environmental impact, cultural conservation contribution, community cohesion, economic potential and dependency/ risk.

Review of Key Concepts and References

Buffer zones became widely used in the context of biosphere reserves in UNESCO's Man and the Biosphere programme in the 1970s. The initiative used buffer zones as managed areas surrounding a strictly protected core, designed to reduce pressure on the core while allowing compatible activities such as research, monitoring, education, and limited resource use. The concept was meant to connect conservation with human use rather than separate them completely, making the buffer zone an interface between strict protection and the wider landscape. While there is no commonly agreed definition[1], the following describes the core aims of a buffer zone: *Any area, often peripheral to a protected area, inside or outside, in which activities are implemented or the area managed with the aim of enhancing the positive and reducing the negative impacts of conservation on neighbouring communities and neighbouring communities on conservation.*[2]

Building on the Vth IUCN World Parks Congress's theme of "benefits beyond boundaries" in 1982 and the resulting Handbook on "Managing Protected Areas in the Tropics" several countries introduced buffer zones, often with land use restrictions and additional benefits for the residents.[3] In the following decades, the twin objectives of conservation and development became more prevalent in these schemes, including the incorporation of cultural, social, and socio-economic factors into broader protected area management.[4]

These zones relate to key international ambitions around nature conservation, exemplified by Article 8 of the Convention on Biological Diversity (CBD) of 1992, on In-situ conservation:*8e) Promote environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering protection of these areas.* The expansion of protected areas globally is reflected under Target 3 of the Kunming-Montreal Global Biodiversity Framework (GBF), commonly referred to as the "30×30 target." It aims to ensure and enable that by 2030 at least 30% of terrestrial, inland water, coastal and

[1]Martino, D. (2001). Buffer zones around protected areas: A brief literature review. *Electronic Green Journal*, *1*(15). https://doi.org/10.5070/G311510434

[2]Wild, R. G., & Mutebi, J. M. (1996). Conservation through community use of plant resources: Establishing collaborative management at Bwindi Impenetrable and Mgahinga Gorilla National Parks, Uganda. *People and Plants Working Paper, 5*. UNESCO.

[3]MacKinnon J., MacKinnon K., Child G., Thorsell J. (1986). *Managing protected areas in the tropics*. International Union for Conservation of Nature about Environmental Law, Guidelines, International Cooperation.

[4]Lynagh F. M., Urich P. B. (2002). A critical review of buffer zone theory and practice: A Philippine case study. *Society & Natural Resources*, 15(2), 129–145. https://doi.org/10.1080/08941920275340331 9

marine areas are effectively conserved and managed. This goal was adopted by the 196 parties to the Convention on Biological Diversity (CBD) in late 2022[5]

Given the global diversity of ecosystems, conservation areas and legal frameworks, the nature of buffer zone establishment is highly situational and generally considered a long-term intervention Its success depends on stakeholder inclusion and the integration of ecological, social, economic and institutional parameters.[6] South Africa, for example, introduced a national People and Parks Programme in 2003, a multi-stakeholder initiative bridging the gap between biodiversity conservation and the socioeconomic needs of local communities. The programme has the explicit goals to invest in infrastructure development and biodiversity conservation for economic benefits, ensure that local communities are involved in the management of protected and surrounding areas and ensure the promotion of biodiversity values in the proclaimed protected and surrounding areas.[7]

Currently, there is no unified approach to assess the economic activities in the buffer zones surrounding protected areas. Only very few examples exist where the economic activities in the buffer zone were analysed in detail and in direct relation to conservation objectives.

A rare example is a study on the buffer zone around Chitwan National Park in Nepal from 2024 that evaluates how income diversification training (a conservation incentive) affects household welfare. For the 728 surveyed households the study found that income diversification training (in e.g. small business entrepreneurship, handicrafts/ traditional crafts and agricultural diversification did not significantly increase household income, while specific tourism development training resulted in a 52% income growth. Generally, the per capita household income for buffer zone households was 19% higher than outside the zone. The study evidenced how conservation can strengthen the economic development and welfare of local communities in the buffer zone areas. It further showed that training effectiveness depends on type of training provided and most effective when it connects households to protected area-linked economic activities (like tourism).[8]

[5]Convention on Biological Diversity. (2022, December 19). *Kunming-Montreal Global Biodiversity Framework: Decision 15/4*. https://www.cbd.int/doc/decisions/cop-15/cop-15-dec-04-en.pdf

[6]Ebregt, A., & de Greve, P. D. (2000). *Buffer zones and their management: Policy and best practices for terrestrial ecosystems in developing countries*. Wageningen University and Research Centre.

[7]Department of Forestry, Fisheries and the Environment, South Africe. (n.d.). *People and parks programme*. https://www.dffe.gov.za/about-people-and-parks-programme

[8]Kandel, P., Pandit, R., & White, B. (2024). Impacts of buffer zone policy on household income: Evidence from Chitwan National Park, Nepal. *Land Use Policy*, *146*, Article 107249. https://doi.org/10.1016/j.landusepol.2024.107249

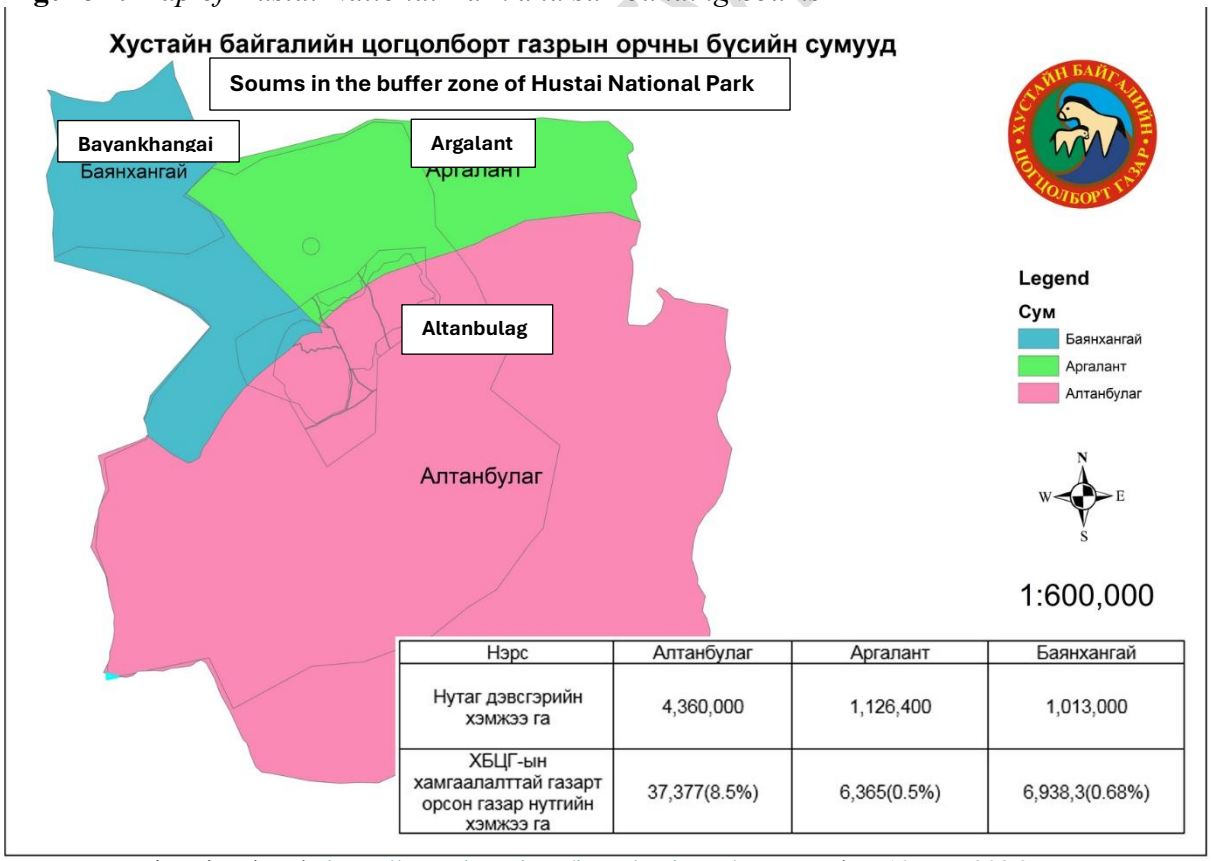
Hustai National Park and its Buffer Zones
Buffer Zone Definition

Mongolia's law defines four main categories of protection: *Monuments, Nature Reserves, National Parks and Strictly Protected Areas*[9]

Buffer Zones are defined around these areas, per national regulations on "Special protected area buffer zones." Article 3 defines their purpose as follows: *"Buffer Zones are established by taking into account to minimize, eliminate and prevent actual and potential adverse impacts to Strictly Protected Areas (SPA) and National Park (NP), to increase public participation to protect such areas, secure their livelihood and establish requirements for the proper use of natural resources."*

Hustai National Park is surrounded by three main Soums: Altanbulag, Argalant and Bayankhangai.[10] Jointly, these three Soum administrations submitted a proposal for defining the boundaries of the Hustai National Park Buffer Zone area.

Figure 1. *Map of Hustai National Park and surrounding Soums*



Нэрс	Алтанбулаг	Аргалант	Баянхангай
Нутаг дэвсгэрийн хэмжээ га	4,360,000	1,126,400	1,013,000
ХБЦГ-ын хамгаалалттай газарт орсон газар нутгийн хэмжээ га	37,377(8.5%)	6,365(0.5%)	6,938,3(0.68%)

Source: Hustai National Park, https://www.hustai.mn/introduction-o/ , accessed on 10 May 2026 (amended with translations).

[9]Mongolia's Law on Special Protected Areas, as summarized in WSCC's "Key Biodiversity Areas" page and the CBD Mongolia country profile.
[10]"Soum" is the subunit under the province, provinces are referred to as "aimag."

The Table is summarised here for ease of reference:

Name	Altanbulag	Argalant	Bavankhangai
Area, hectares	4,360,000	1,126,400	1,013,000
Area of land included in the protected area of the national park, hectares	37,377 (8.5%)	6,365 (0.5%)	6,938.3 (0.68%)

In November 2000, the size of HNP's buffer zone was officially laid down based on the Buffer Zone Law for Special Protected Areas in Mongolia. The law itself had been ratified by national parliament in October 1997.[11]

The buffer zone of 462,000-ha encompasses half of the territory that was ceded by each of the three villages on behalf of the reintroduction of the Przewalski horses. Around 300 herdsmen families live in the buffer zone area today.

Buffer Zone Committees, with seven to nine members each, were established soon after in each Soum. These consist of the Soum representative khural speaker, the Soum Governor, local herders and the Hustai National Park director and managers. Since 2005, 39 herder groups were established that jointly work on diversifying their income within the three Soums.[12]

These committees come together under the Buffer Zone Council, ensuring integrated and coordinated development. Council objectives are involvement of local communities in conservation, the support of sustainable livelihoods, strengthening capacities, increase and diversify income and support social institutions such as schools, hospitals and kindergartens.

Each Committee and the Buffer Zone Council have funds available to support these objectives through soft loans. In the Soums, the Buffer Zone funds can distribute up to one million Mongolian Tugrik per household (around 280 USD), and the Buffer Zone Development Fund on Council level can award up to 20 million Mongolian Tugrik (around 5 600 USD).

Between 2004 and 2017, the Buffer Zone Developing Fund provided the Hustai National Park Trust with approximately 600 million tugrik (around USD 167,800) in loans (at a rate of 0.5% per month) to support Buffer Zone initiatives, such as green gardens for six communities, fences, berry bushes, fairs, potato seeds, training, materials and equipment.[13]

[11] Przewalski Horse Foundation. (n.d.). *The development of the buffer zone around Hustai National Park*. https://przewalskihorse.nl/hustai-national-park/overview-of-current-projects/the-development-of-the-buffer-zone-around-hustai-national-park/

[12] Przewalski Horse Foundation. (n.d.). *The development of the buffer zone around Hustai National Park*. https://przewalskihorse.nl/hustai-national-park/overview-of-current-projects/the-development-of-the-buffer-zone-around-hustai-national-park/

[13] For the conversion, the rate on 10 May 2026 was applied, when 1 Mongolian Tugrik equalled 0.28 US Dollar.

The three core surrounding soums, Altanbulag, Argalant and Bayanhangai each received a total of 515.7 million tugrik between 1995 to 2010 (around USD 144,258) grants from the Buffer Zone Developing Fund. [14]

Mongolia's herding economy

The core economic activity in Mongolia is husbandry, and most herders keep sheep, cattle, goats and horse, some camels. In 2025, around one fourth of all Mongolian households were involved in herding, per Table 1.

Table 1. *Mongolian Households in 2025*[15]

Mongolian Households in 2025	
Location	**2025**
Total	1.011.078
Urban	708.227
Rural	302.851
Herding Households	247.950

With the end of the communist period in the early 1990s, the economic situation of Mongolia's herders changed drastically. Under the centrally planned economy, herdsmen collectives ("Negdels") had been the determining factor in their social and economic existence. Negdels provided facilities, such as communal winter stores, water pumps and veterinary care, planned migration routes and controlled livestock volume. These provisions disappeared with the change towards a capitalist economy. [16]

The Soviet Union and its member states were Mongolia's closest export markets for meat, wool, leather, dairy and other related products. As unemployment rates rose in the cities, herding became a welcome alternative, and the number of herdsmen families increased from 17 to 35 % of the population, and the livestock population from 25 to 35 million.

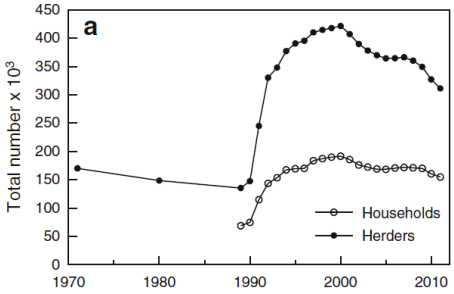
This drastic economic change occurred during the time of the Thaki rewilding efforts in the early 1990s in the area that Hustai National Park is today.

[14] https://www.hustai.mn/to-develop-buffer-zone/

[15] Mongolian National Statistics Office, via https://www.1212.mn/en/statcate/table-view/Population,%20household/1_Population%2C%20household/DT_NSO_0300_006V5.px and https://www.1212.mn/en/statcate/table-view/Population,%20household/3_Herdsmen/DT_NSO_1001_022V4.px

[16] https://przewalskihorse.nl/hustai-national-park/overview-of-current-projects/the-development -of-the-buffer-zone-around-hustai-national-park/

Figure 2. *Herders and herder households 1990 to 2010*[17]



With Mongolia's free movement principle, herders settle wherever they find suitable pastures for their livestock. This principle is upheld since the end of the Soviet Union up until today. Paired with the lack of restrictions on livestock numbers, these movements resulted in overgrazing and overpopulation, thereby undermining the self-restoring capacity of the steppe ecosystem. Hustai National Park has therefore unintentionally become an exclusive oasis in the middle of a desolation of overgrazed grassland.[18]

This land degrading, ecological crisis stems from multiple factors. Since Mongolia's transition to a market economy in 1992, growth driven by mineral and agricultural exports has intensified pressures on land. Overgrazing and activities such as coal mining have accelerated land degradation, while climate change has increased the frequency of droughts. Rising temperatures, declining precipitation, and degraded land have created a persistent drying trend.[19]

According to the UN Convention to Combat Desertification, approximately 90% of the Mongolian territory is in arid, semi-arid, dry, and sub-humid climatic regions that are susceptible to desertification. [20]Many factors aided the desertification process such as temperature increase, reduced rainfalls and increased evapotranspiration and soil dryness as well as widespread land degradation due to overgrazing and human activities.[21]

Through Climate Change, Mongolia's four distinct seasons have been significantly disrupted, with a rise in recurrent summer droughts and subsequent harsh winters. These pose a threat to livestock-based livelihoods, in particular,

[17]Twenty Years After Decollectivization: Mobile Livestock, Husbandry and Its Ecological Impact in the Mongolian Forest-Steppe, Dorjburgedaa Lkhagvadorj & Markus Hauck & Choimaa Dulamsuren & Jamsran Tsogtbaatar, 2013, based on data of Mongolia's National Statistics Office

[18]https://przewalskihorse.nl/hustai-national-park/overview-of-current-projects/the-development-of-the-buffer-zone-around-hustai-national-park/

[19]Han J, Dai H, Gu Z. Sandstorms and desertification in Mongolia, an example of future climate events: a review. Environ Chem Lett. 2021;19(6):4063-4073. doi: 10.1007/s10311-021-01285-w. Epub 2021 Jul 24. PMID: 34335128; PMCID: PMC8302971. https://pmc.ncbi.nlm.nih.gov/articles/PMC8302971/

[20]Vova O, Kappas M, Renchin T and Degener J (2015) Land Degradation Assessment in Gobi-Altai Province. Proceedings of the Trans-disciplinary Research Conference: Building Resilience of Mongolian Rangelands, Ulaanbaatar Mongolia, June 9–10, 2015. ESC Paper Style

[21]Han J, Dai H, Gu Z. Sandstorms and desertification in Mongolia, an example of future climate events: a review. Environ Chem Lett. 2021;19(6):4063-4073. doi: 10.1007/s10311-021-01285-w. Epub 2021 Jul 24. PMID: 34335128; PMCID: PMC8302971.

vulnerable herder households with limited coping strategies.[22] *Dzud*, a severe winter phenomenon in Mongolia, is an example of a compound event, when multiple climatic and social drivers contribute to its occurrence. Frequency and intensity of *dzud* events are rising due to this combination of climate change and variability, most notably summer drought and severe winter conditions, in addition to socioeconomic dynamics such as overgrazing.[23] *Dzud* may have devastating consequences for herder families. In 2010, for example, Mongolia faced a severe *dzud* that resulted in the loss of approximately 25 per cent of the 'country's livestock population, ca 10.3 million heads of livestock, impacting around one third of 'Mongolia's population. 220,000 herding households were affected, with 44,000 households losing their entire herds, and 164,000 losing more than half.[24]

According to the Intergovernmental Panel on Climate Change (IPCC) Mongolia is "extremely prone" to natural disasters, and the situation will likely worsen in the future. Consequences of *dzud* include rising poverty rates and significant rural-to-urban migration in Mongolia, especially by herding families that lost their livestock and thereby their economic livelihood. Herding families then often relocate to central regions and Ulaanbaatar.[25]

Economic Activities in the Buffer Zone of Hustai National Park

Reflecting Mongolian culture, the local communities in the Buffer Zone are mainly herders, with a nomadic lifestyle that involves changing pastures with the needs of the herd. The herds consist mainly of cattle, goat, sheep and horses in this mountain steppe landscape. In other regions of Mongolia, camels are also part of the herding culture.

An average herder family in Mongolia has five members and around 155 animals. Their livestock income is about USD 25 per person per month, with another USD 9 from pensions, social support, and natural resource sales, for a total of roughly USD 34 per person per month. This is only slightly above the poverty line of about USD 30 per person per month, leaving many households just above subsistence level, with a monthly income of around 170 USD per month and around 2040 USD per year. These herder households are highly vulnerable to

[22]UN 2024 DZUD EARLY ACTION AND RESPONSE PLAN https://reliefweb.int/report/mongolia/mongolia-2024-dzud-early-action-response-plan-dec-2023-may-2024

[23]Haraguchi, M., Davi, N., Rao, M. P., Leland, C., Watanabe, M., and Lall, U.: Estimating return intervals for extreme climate conditions related to winter disasters and livestock mortality in Mongolia, Nat. Hazards Earth Syst. Sci., 22, 2751–2770, https://doi.org/10.5194/nhess-22-2751-2022, 2022.

[24]UN 2024 DZUD EARLY ACTION AND RESPONSE PLAN https://reliefweb.int/report/mongolia/mongolia-2024-dzud-early-action-response-plan-dec-2023-may-2024

[25]IPCC Case Studies https://www.ipcc.ch/site/assets/uploads/2018/03/SREX-Chap9_FINAL-1.pdf Murray, V., G. McBean, M. Bhatt, S. Borsch, T.S. Cheong, W.F. Erian, S. Llosa, F. Nadim, M. Nunez, R. Oyun, and A.G. Suarez, 2012: Case studies. In: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC). Cambridge University Press, Cambridge, UK, and New York, NY, USA, pp. 487-542.

climate shocks, debt, and extra expenses such as school and transport costs.[26] For reference, the monthly average income in Mongolia in 2024 was around 748 USD, 2672000 MNT.[27]

The only way to increase income used to be by enlarging the herd, thereby further increasing pressures on the pasture. In the areas surrounding the national park, the higher number of grazers led to increased encroachment into national park territory, where pastures are much richer. Thereby, the herding stood in clear contrast to the conservation goals of the national park, that preserves pasture for the benefit of the capstone species and local wildlife.

A core goal of the buffer zone is income diversification. With support of Buffer Zone Development Funds, herder groups worked towards income diversification, thereby reducing the pressure on the national park and the local pastures. Under the Buffer Zone Development initiative, emphasis is set on training to improve local communities' capacities to diversify incomes. Themes include felt making, sheep wool processing, budgeting, community-based tourism, training of horse guides for tourists and designing Mongolian regalia, vegetable cultivation and preservation, sea buckthorn cultivation and farm management.

These trainings resulted in the development of different income strands, mainly:

- Community-based Tourism

The activities focused on making the rich Mongolian herder culture accessible to (international) tourists that frequent the national park. Consequently, different events were developed, such as felt making workshops, a mini Naadam festival[28], including showcasing of horse-riding skills, a local Sheep Festival and playing of the traditional ankle bone game.

These experiences can be procured through Hustai National Park and can be directly linked to a visit of the conservation area and the local capstone species.

- Artisanal Crafts

Capacity building and training for Soum women artisans was supported to strengthen the market opportunities for traditional felt products. This included the craft itself, for example focusing on the selection of suitable materials according to quality requirements and the organisation of the women artisans in local producer groups. The materials are largely sourced from local herdsmen to strengthen the economic linkages within the community and ensure the effective use of livestock products. The women producer groups exhibit their products locally, in the shop of Hustai National Park, and provide make to order services.

In addition, they organise felt making workshops under the community-based tourism program, where visitors can learn how to produce felt and felt products and exchange with the women groups.

- Small-scale agriculture

[26]Swiss Agency for Development and Cooperation. (2009). *Asia brief: Cash for herders – A modern emergency response in Mongolia*. Federal Department of Foreign Affairs FDFA. https://reliefweb.int/report/mongolia/asia-brief-cash-herders-modern-emergency-response-mongolia-partnership-resu lts

[27]General Authority for Social Insurance of Mongolia. (2025). *Average wage: Fourth quarter of 2024 report*. https://downloads.1212.mn/qiklc6_BYL_EsS-_NO2rlqTdI8qeOsUqNa0bQ23e.pdf

[28]Naadam is the Mongolia's traditional festival encompassing wrestling, horse racing, and archery. It is part of UNESCO's Representative List of the Intangible Cultural Heritage of Humanity: https://ich.unesco.org/en/RL/naadam-mongolian-traditional-festival-00395

Summer green houses, vegetable gardens, fruit gardens for sea buckthorn and green fodder storages were introduced. In addition to supporting income diversification, these also support the food security of the herdsmen and their families. For the livestock, fodder storages proved valuable additions for rural development.

- Dairy Production

Two milk and yoghurt factories, as well as three gouda cheese factories were introduced in the buffer zone, funded through the Buffer Zone Development Fund. Their introduction was accompanied by skills training for the local communities. Building directly on the core herding activity, this related line of income also supported food security goals for buffer zone communities.

Method

This paper proposes an assessment matrix for the four main economic activities of the Hustai National Park Buffer Zone. It applies five criteria: environmental impact, cultural conservation contribution, community cohesion, economic potential and dependency/ risk. It aims to identify and highlight the importance of diversifying income sources that also support the conservation of local traditions and community cohesion.

Environmental impact refers to the potentially negative, environmental externalities of the activity such as pollution of water, air and land, emissions generation or further land degradation. The level may range from low, to medium or high depending on the extent of negative environmental externalities.

Cultural conservation contribution analyses the relevance of the activity for local heritage preservation, such as the preservation of local arts and crafts. These analytics may range from low (activity not or very limited part of the tradition), to medium (strengthens link to the tradition) or high (core tradition that is strengthened through the activity).

Community cohesion refers to the social benefit of the activity for the buffer zone societies. This criterion references the number of community members involved and may range from low (up to five members), to medium (five to 20 members) or high (over 20 members).

Economic potential refers to the income potential and scalability the activity offers for the community. Low, in this case, refers to income that can only be generated in the local community and is not scalable. Medium has a higher potential of scaling from the local community to the regional and surrounding communities. High in this context refers to the potential to attract national or even international customers, thereby scaling further.

Dependency/ Risk is included to assess the potential vulnerability of the activity through external factors that are beyond the control of the buffer zone communities (such as numbers of visitors/ tourists/ climatic conditions etc.). Low dependency/ risk refers to a high level of control over the potential income generation, medium to limited control and high to very limited to no control over these factors.

Below Matrix applies the five criteria across the four economic activities and assigns respective labels of low, medium or high. The discussion section below further contextualises the activities and labels assigned.

Assessment matrix for economic activities in HNP Buffer Zones

Activity/ Criteria	Environmental Impact	Cultural conservation contribution	Community cohesion	Economic potential	Dependency/ Risk
Community-based tourism (Mini Nadaam festival, cultural workshops)	Low	High	High	High	High
Artisanal crafts (felt making)	Low	High	Medium	Medium	Medium
Dairy production (cheese, milk, yoghurt factories)	Medium	High	High	Medium	Medium
Small-scale agriculture (fruit/ vegetable gardens, green fodder)	Low	Low	Medium	Low	Medium

Discussion

Community based Tourism, such as the mini Nadaam festival and cultural workshops, like *ger* building and traditional meal preparation stands out for its high-economic potential. According to a 2013 presentation of Hustai National Park Trust, out of the 39 initial herder communities 26 were still existent and 6 of which engaged in Community based tourism, generating an income of 10 000 USD.[29] This high income potential comes with a high dependency on national and international tourists that visit the conservation area and procure these experiences locally. Especially during the Covid-19 pandemic in 2020 and 2021,

[29]Tserendeleg, D. (2013, November 14). *Tourism development of Hustai National Park of Mongolia* [Presentation]. "Hustai National Park" Trust of Mongolia. https://www.env.go.jp/nature/asia-parks/pdf/wg2/APC_WG2-07_Dashpurev%20Tserendeleg.pdf , presented by Hustai National Park Trust at the 1st Asia Parks Congress in Sendai, Japan, on 14 November 2013.

when travel was restricted, this dependency became apparent.[30] While the travel comes with a certain level of environmental considerations, especially international and national flights and transportation to the conservation site, the activities themselves show very limited negative environmental externalities. Many of the *ger* of the herdsmen are equipped with renewable energy, mainly solar power that support their nomadic way of life. For the Mini Nadaam festival, horses are engaged and the skilled communities that showcase their riding, wrestling and archery skills. In addition, among the herder groups engaged in this activity, community cohesion increased as multiple group members are involved in respective activities and activities are bundled. Visitors may join the communities for the Mini Nadaam festival, where some community members showcase their skills, which is then followed by a meal with the herder group that involves yet other members. By jointly offering and enjoying the economic benefits of this activity, the community is strengthened overall. The monetisation of these traditional activities further has a high contribution to cultural conservation and enables customs and traditions to be showcased and rewarded.

Artisanal crafts stand out through their high cultural conservation contribution, as felt making and *deel* sewing are activities traditionally conducted by the women of herdsmen communities. As mainly women are involved in these activities, the community cohesion potential is high among them, but somewhat limited for the overall group. The raw materials stem from the livestock herds directly and offer a separate income potential from selling the meat or live animal. As these activities do not require an enlargement of the herd itself and are conducted with no or very limited machinery (maximum of a sewing machine), the environmental impact remains low. The goods are sold onsite to visitors and the local community and made to order online or via phone. The economic potential is therefore medium, as the reach is increased but the demand limited due to the durability of the products. The dependency on high quality materials and continued costumers is medium, as these factors can only be controlled to a certain extent.

Dairy production, in local cheese, milk and yoghurt factories has a comparatively higher effect on community cohesion, as more community members are involved throughout the sourcing and production process (compared to artisanal crafts or small-scale agriculture). The environmental impact is medium, as more machinery is deployed and a significant number of resources required from the livestock herds (like raw milk). The cultural conservation contribution of these activities is high, as the range of dairy products is a key feature of Mongolian culture, with variations and new additions that were included in the case of the HNP Buffer Zone with Gouda production. The economic potential is medium as these goods may also be sold to surrounding communities and to the capital, Ulan Baatar due to the vicinity of Hustai National Park. The dependency is equally medium, as the production depends on sufficient raw materials in good quality, equipment and demand from local and urban customers.

[30]HNP was able to attract documentary filming during this period, that sustained the national park economically.

Small scale agriculture, such as fruit and vegetable gardens and green fodder cultivation have, due to their scale, a low environmental impact. Due to the localisation of their market their income potential is equally low but can substantially support the communities in their food security considerations. This form of agriculture is not part of Mongolia's herdsmen traditions; therefore, the cultural conservation contribution remains low. Due to the number of community members, across gender, involved in these activities the cohesion factor is at medium. While being dependent on the local market and favourable climatic conditions, the risk remains medium.

The assessment highlights that the five criteria are at the core of these activities and while some hold high income potential, come with high risk. Balanced with other activities, that hold high value in cultural conservation and community cohesion, these offer additional benefits for the herders in the buffer zones. Overall, the more diverse portfolio enables the herder communities to not only be dependent on their income from livestock but expand their economic opportunities. This makes them more resilient to the potentially detrimental effects of *dzud* or other extreme weather events.

This assessment is limited to the steppe ecosystem in Mongolia, in the buffer zone around Hustai National Park. Economic income potential depends largely on the natural conditions the respective ecosystem in the buffer zones offers and which customs and traditions prevail. The matrix has not yet been applied to other geographies or ecosystems where potential cross-learnings could be identified.

Conclusion

This paper proposes a methodology, the assessment matrix for economic activities in buffer zones, and first applies it to the case of Hustai National Park, Mongolia. The matrix enables an overview of the economic activity portfolio of the buffer zones communities and the identification of overdependency or diversification limitations.

The matrix offers the opportunity to be applied on a case-by-case basis across different protected areas' buffer zones, responding to their specific ecosystems and traditions. Thereby, the methodology offers scope for a certain level of comparability among diverse ecosystems, countries and systems. This may, in future, lead to the evidence basis to draw on lessons learned, informing buffer zone development policies to further strengthen conservation areas and their surrounding communities.

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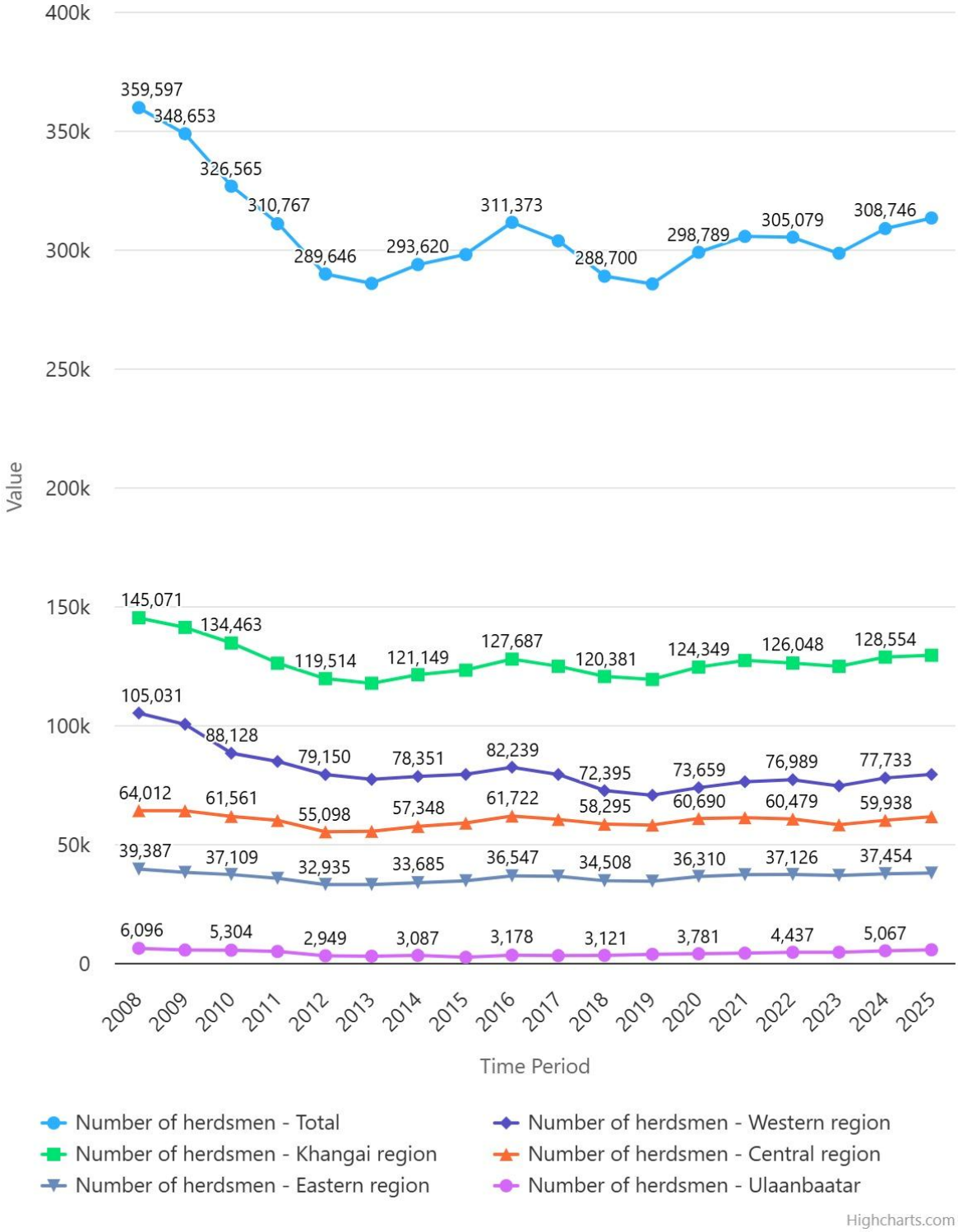
Annex

Figure 3. *Number of Herdsmen across Mongolia 2008 - 2025*



Source: Mongolian National Statistics Office, 2026 via https://www.1212.mn/en/statcate/table-view/Population,%20household/3_Herdsmen/DT_NSO_1001_022V1.px

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