



Research Article

Review for Range Land Enterprise Development with Transhumance in Malakand and Hazara Civil Divisions

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Abstract | The seasonal movement of people and their livestock between geographic or climate regions is known as transhumance. Men and women herders coordinate the movement of thousands of animals along traditional pastoral paths each spring and autumn. An enterprise is a business, in particular, or a difficult and significant plan, particularly one that will generate revenue. For the purpose of expanding income opportunities and supporting the livelihoods of rangeland communities, rangeland enterprises are of the utmost significance. The difficulties faced by rangeland resources have been exacerbated by the alteration of traditional grazing routes and fodder resources, primarily as a result of settlement expansion and commercial forestry practices. In eight sample plots in the Kaghan valley, a comparison of biomass from single cuts and multiple cuts revealed that biomass from single cuts was only 64% higher than that from three-cut times cuts. By supporting pastoralism's economic viability and restoring traditional grazing practices, rangelands can be made sustainable. KP Rangeland Circle has not created or implemented any community outreach programs. However, the number of livestock has increased by more than four times since 1999. The purpose of this article is to consider the current situation, the potential of rangeland resources, and the necessity of incorporating a participatory enterprise that can safeguard biodiversity and the well-being of pastoralist custodian communities. As a sustainable activity and as a proposal for the Rangeland circle and Rangeland Management Advisory Committee at the administrative level in KP in two forest-rich regions, as a trade-off with user groups for conservation and management, management of selected sites for the value addition of hay, and improved forage technology

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Keywords | Transhumance, Landless mobile pastoralist (LMPs), Enterprise, Sustainability, Rangelands, Rangeland management advisory committee



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Introduction

Malakand and Hazara civil divisions make up the northern mountainous region of KP (Pakistan).

During the year 1999, this region was home to approximately 5.07 million sedentary livestock heads in addition to a significant number of nomadic herds (Rafique, 2005). The number of sedentary livestock

heads was recorded as 21.95 million heads during 2021 (Livestock Baseline Survey, 2021). In rangeland management, community-based institutions, indigenous sociocultural and ecological knowledge, stakeholder participation with social and gender equity (KP Rangelands Policy, 2014). In Malakand and Hazara 11.5 % is alpine pasture, 53.5 % is Trans-Himalayan grazing lands, and 35% is Himalayan Forest and open grazing lands (Rafique, 2005). Transhumance is the most economical method and is well-liked in culture. Landless mobile Pastoralists, LMPs, in contrast to the community of agro-pastoralists, do not have feed reserves for the winter and spring. Due to the expansion of settlements and agriculture, the replacement of indigenous fodder trees by commercial forests, and the simultaneous closure of extensive grazing areas by the forest department as a result of mass afforestation in recent years, the traditional resting places and grazing areas of the LMPs have been significantly reduced (Inamur Rahim et al., 2015).

The two regions alpine pastures are significant water-producing regions that provide year-round water to rivers and streams. Soil erosion has accelerated as a result of overgrazing, which necessitates proper management for sustained forage and water supply (Rafique, 2005). The alpine pastures of Kaghan Valley were found to be most productive and three cuts in three months gave maximum production under controlled natural conditions (Ali et al., 2019). The subject of Range Management is allocated to the KP Forest Department in Rule of Business (1985). Other government departments like PFI, Wildlife have a practical role in the subject and closely related activities (Rangelands Policy, 2014). KP Forest Department has a mandate to focus on rangelands, marginalized groups, transhumant and women for ensuring their participation in Rangeland User associations and to entail the benefits from rangeland management intervention (KP Rangelands Policy, 2014). Although hay production is a regular feature in the area but no emphasis was made on its value addition and marketing. Involvement of the immediate forest community is emphasized in KP rangeland policy, and it can be achieved in an official way by involving them in their proffered activity of their farming system. This activity can entail trust building, as this is the only loophole true participation. For improved feed technology, raw material through management of grass cutting for hay can be taken up

with the indigenous immediate forest community in designated forests and LMPs in alpine pastures, which can provide a possible and safe window of enterprise development in the shape of improved hay marketing mechanisms and better storage and transportation (Project Reports SFDP, 1994). The range lands in the study area are 35 % of the total land cover, and include Himalayan Forest and open grazing lands located inside the designated forests (Rafique, 2005). The management of these pastures in designated forests and in alpine pastures on scientific bases will result trust building with the immediate forest communities and LMPs (Inamur et al., 2015) and will assist to achieve objectives like reduction in bush and forest fire hazards, laconic solution to the fragile ecosystems and addresses LMPs marginalization, true gender coverage, better storage and transportation of hay will boost to green circular economy, readily available as part of their culture. A writ of the government cannot be established without community participation. Facilitating stakeholder immediate forest community' will address immense need through improved fodder storage for severe winter and better transportation as a tradeoff through site-specific controlled range use as an indirect contribution to forest and biodiversity (Project Reports SFDP, 1994). Based on indigenous knowledge and practices involved in rangelands of forest ecosystems relating to grass cutting and hay production, and exploring the modes of investment as a tradeoff to unnoticed indigenous economic activity pertaining to the hay business, is given emphasis. So, it is a laconic and readily available practice and in line with the Khyber Pakhtunkhwa Range Land Policy (2014).

Materials and Methods

The principal land use of the region is rangelands, followed by agriculture and natural forests. The ranges in the region are classified as Alpine pastures, Trans-Himalayan grazing lands, and Himalayan forest and open grazing lands (Rafique, 2005).

Dutch-funded Malakand Social Forestry Project MSFP and German-funded Siran Forest Development Project SFDP component of Range Management were properly addressed simultaneously in the early 1990s. Village Land Use Planning VLUP through the PRA approach pioneered by MSFP is an obligation under the Rangeland Policy (2014), for devising rangeland management activities. During the 1990s,

both projects through PRA conducted the situation analysis of the rangeland component in Hazara and Malakand, and lessons learned are considered in the article. VLUP is the Land-use Planning Module for people involved in the assessment of forestlands and their economic, social, and environmental potential for various land uses. The module provides basic and more detailed information on the importance of land-use planning in forestry and offers guidance on the main activities involved in a land-use planning framework (FAO, 2007). Real community participation means minimizing the role of government, and in the present scenario, investing mechanisms in hay-related rural economy can be the best option for getting tipping point. Khyber Pakhtunkhwa R Rangeland Policy (2014), reports of post-post-foreign-aided projects in northern regions of Hazara and Malakand, and allied research conducted were considered to have workable enterprise development as a policy guideline.

Results and Discussion

Various sources and studies yielded differing estimates concerning the extent of rangeland in KP as shown in Table 1. Additionally, aside from the officially recognized rangelands, there are grazing zones (Table 2) within degraded open forests, cultivable wastelands, and non-arable lands, which suggest that the actual grazing territory is substantially larger than what is officially reported.

Area of the grazing lands located in different geo-ecological Zones (Figure 1). The comparison of documented Khyber Pakhtunkhwa livestock population during 1999 and 2021 shows that the livestock population has increased fourfold. According to Dr. Mohsin Kiani, Sector Specialist for Livestock,

Food Security and Climate Change at Planning Commission of Pakistan, Islamabad (2023), the livestock sector has emerged as the largest contributor to Pakistan's agriculture, accounting for 62.68 percent of the agriculture value added and 14.36 percent of the national GDP grew at 3.78 percent during FY 2022-23. Some systems show underuse of rangeland, due to different reasons. Through proper land use planning by local people, one can come to sound management of rangelands. In case of overuse, it seems that protection can improve the quality and quantity of rangeland vegetation within one to two years (NARC, 2012). The livestock keepers (especially gujars, tenant and ajars) in the system are generally facing forage scarcity during winter and have to purchase from elsewhere or decrease their livestock numbers (Centre for Development and Environment, 2012). Human and livestock populations are rapidly increasing, coupled with invasive species proliferations, massive plantation of non-fodder trees with subsequent closure of grasslands resulting in overgrazing and overexploitation of available rangelands in excess of their sustainable productivity (MSF Project Reports, 1995).

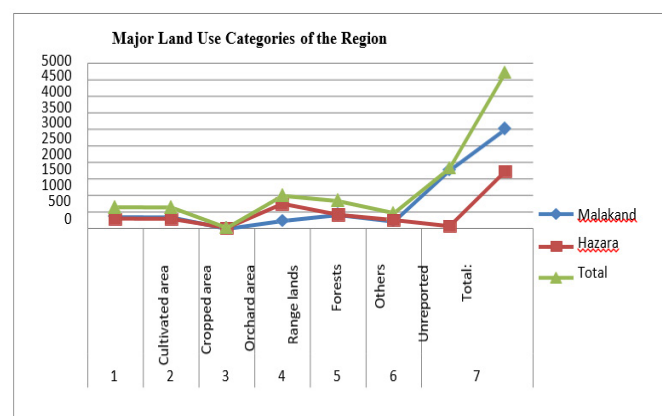


Figure 1: Major land use categories of the region.

Table 1: Extent of range lands in KP.

S. No	Source	Year	Extent of area	Percentage	Remarks
1	Forestry sector master plan	1992	4.894 mil.ha	48.1	Including FATA
2	Natural rangeland resource study (PFI)	2004	4.73 mil.ha	46.5	Including FATA
3	National landuse plan	1999	3.848 mil.ha	27.5	Including FATA
4	Land cover atlas of Pakistan(PFI)	2012	1,978 mil.ha	26.5	Excluding FATA

Source: (KP Rangelands Policy, 2014).

Table 2: Area of the grazing lands.

The rangelands area in the province (ha)	Rangelands located within designated forests (ha)	Percentage of rangelands in designated forests
16,95,637	2,50,284	15 %

Source: (KP Rangelands Policy, 2014).

Animal husbandry is a critical economic activity for rural dwellers in Pakistan, with over 8 million rural families engaged in livestock production and deriving from 35 to 40 percent of their income from this sector. Additionally, the net foreign exchange earnings of the livestock sector contribute around 2.1 percent of the total exports in the country. However, no accurate counts exist for herbivorous wildlife. Area of the grazing lands located in different geo-ecological Zones (Figure 2). Transfer of successful technologies from other countries of the region was emphasized for range improvement, fodder production, and forage/fodder conservation (Rafique, 2005).

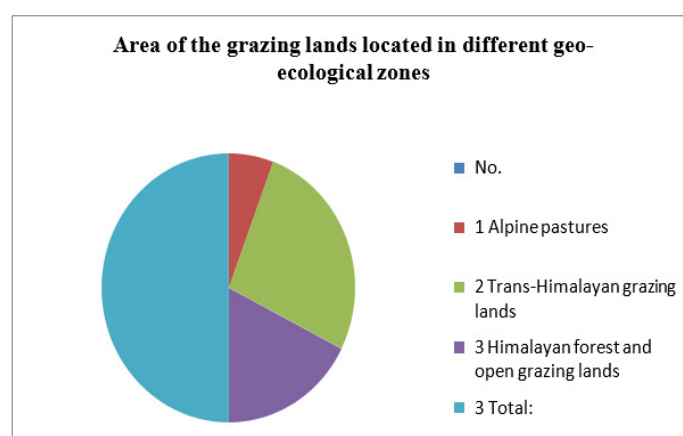


Figure 2: Area of the grazing lands located in different geo- ecological zones.

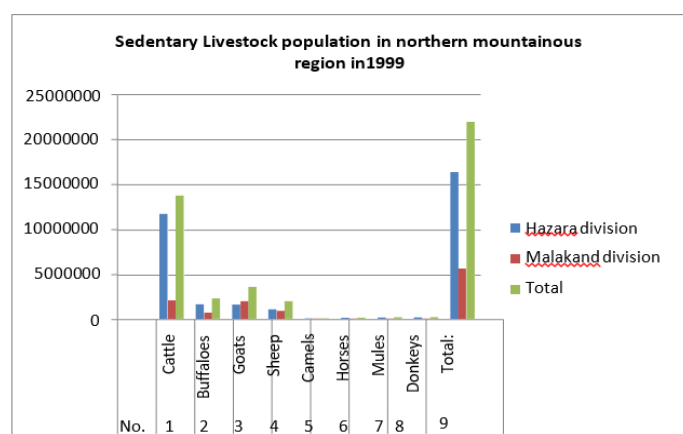


Figure 3: Sedentary livestock population in northern mountainous region in 1999.

Since the lower altitude grazing lands are limited in area and the livestock population in these areas far exceeds the carrying capacity, the practice of summer migration to the higher altitude alpine meadows has become necessary to sustain the number of livestock (Pharma Innovation Journal, 2019). In Himalayan Forests and open grazing lands, fodder supply from rangelands is 65%, in the form of hay, and grazing

is coming from the guzara forest and private waste lands, and 35 % from state forest land. Some 50% of non-commercial Guzara forests and private waste lands are used for open grazing, and based on average annual forage yield, 1.5 m.tones dry matter/ha. In addition, some 50% of noncommercial forests and private waste lands are closed during the monsoon for hay making. Sedentary livestock population in northern mountainous region in 1999 as can be seen in Figure 3 and Sedentary Livestock population in northern mountainous region in 2021 in Figure 4.

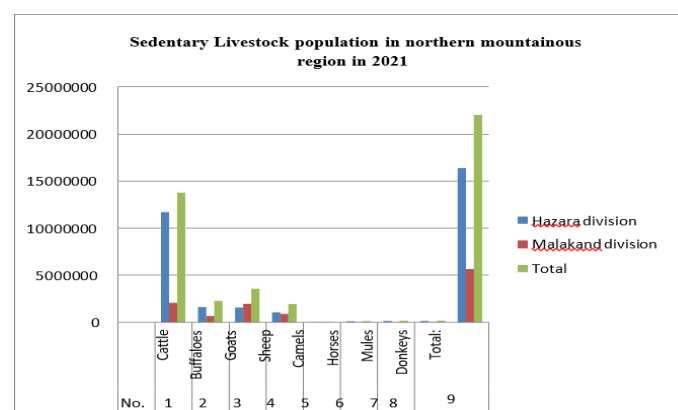


Figure 4: Sedentary livestock population in northern mountainous region in 2021.



Figure 5: Traditional hay storage and the size of Dathi prevailing in the Himalayan Forest and open grazing lands. Photograph by Arshad Khan, Ex Deputy Ranger Wildlife, February 2023.

Economic activity of sale and purchase of hay and local units used for bargaining of hay in the Himalayan Forests and Open grazing lands are Dathi, Gaddi, and Pahari. A rope of seven stretched arms long is called "Khabri" and is the main unit used for the bargain relating to hay, and is well embedded in the culture. These units need to be adopted by the Forest Department in Trans Himalayan grazing lands, also, which are also part of rural culture, readily available, and acceptable. The Figure 5 showing the traditional hay storage and the size of Dathi prevailing in the Himalayan Forest and open grazing lands.

Photograph by Arshad Khan, Ex Deputy Ranger Wildlife, February 2023.

Conclusions and Recommendations

There is a Quran e Majeed verse that suggests that when people are faced with such a difficult situation, Allah will say: Wasn't the land of God large enough that you could have migrated? (Surah 4:97). This verse indirectly suggests that those who have authority and power should take care of refugees. Being a Biodiversity hotspot area, initially KP Forest Department can focus on 35% of the rangelands Himalayan Forests, and open grazing lands. Facilitating hay production and packaging in bales (like wheat straw bale) through a mechanized baler is a good option for better storage and resource diversification, and above all, this activity will provide summer employment for older children and women folks for leisure time in their seasonal calendar (GTZ Project Report SFDP, 1995), potential for excellent returns, a laconic management tool. The mechanized balers can be introduced by the department for efficient packages, transportation, and storage. For this purpose, hay can be purchased from the user groups identified on local units. Site selection for hay harvesting on technical grounds should be made jointly by the Forest/ Wildlife departments, and RLAs will serve the integrate the forest and wildlife departments effectively. In KP Rangeland Associations, RLAs are to be organized. RLA's primary objective is awareness and enabling their participation in the planning and management of range resources. RLAs will be registered with the Forest Department. Efforts for coordination and supporting relevant organizations, or other groups already in existence, especially the wildlife department already managing alpine/sub-alpine pasture and National Parks, rather than to create new or duplicative programs, have been emphasized (KP Climate Change Policy, 2022). Double-compressed hay is easier to chew and digest than regular hay, which can prevent choking, colic, and other digestive problems. Double-compressed hay also has less dust and allergens than regular hay, which can reduce respiratory issues and allergies (Andy by Anderson Hay, 13-Sept-2023). Getting into cash hay has many benefits. One can make more money on hay land compared to the same amount of land that would be used for grain production, so you don't need to increase your land base to remain profitable (Manitoba Forage Council, 2008). Fodder Banks should be created for better production and

seed source to farmers and user groups. Rangeland communities should be encouraged to increase production for winter (Khan, 2024). This improved management in forest range land will entail increased soil fertility, fewer weeds, and improved soil structure (Manitoba Forage Council, 2008). In the Himalayan Forest and open grazing lands, cube bales compatible with the local unit of rope length of seven stretched arms of a common man is called *Khabri* in vernacular and well recognized local unit in hay business and is workable, because local units are embedded in the culture for centuries (GTZ Project Preparation Report SFDP, 1993). Marketing options in two regions can vary depending on the specific products or services being offered and the target audience. Besides exploring other marketing options, sales points on migratory routes can be a workable option for confidence building with user groups. Subsidy may be provided to registered LMPs (registered with the KP Forest and Wildlife department) on hay bales. Regularization of transhumant and transboundary movements of pastoralists can be regulated through devising rules and regulations. Coordination with concerned organizations across provincial boundaries will be made to know in advance the influx of nomadic herds, their routes, and timings in order to monitor, facilitate, and properly manage the entire process (KP Rangelands Policy, 2014). To attain better management of range lands and designated forests in KP, official recognition of migratory routes in the shape of an official notification regarding permitted routes for transhumant migration, opening/closing dates of Routes, and resting places each year by the KP Forest department in newspapers and social media have paramount importance, which can halt the degradation of alpine pastures. Range surveys should be conducted for the evaluation and classification of grasslands. Permanent quadrats and line transects should be established (Khan, 2024). Baseline data on forage production in various types of Range lands in the fixed quadrat by clip quadrat method for the forage production (GTZ Project Report SFDP, 1995). Monitoring the impacts of management monitoring by the dart method introduced from America, used in the 1990s by (GTZ Project Report SFDP, 1995), is proposed.

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Novelty Statement

This study uniquely integrates transhumance practices with rangeland enterprise development in KP, proposing participatory management and value-added forage strategies to enhance pastoral livelihoods while conserving biodiversity in forest-rich regions.

Author's Contribution

Muhammad Shakeel conceived the study, developed the research framework, and led the overall writing and revision of the manuscript. Kifayat Ullah Baloach contributed to data collection, field assessments, and analysis of rangeland biomass and transhumance practices. Akhlaq Ahmad assisted in literature review, interpretation of results, and drafting of key sections related to rangeland enterprise development. RazaUllah supported data compilation, technical inputs on forage management, and proofreading of the manuscript. All authors read and approved the final manuscript.

Generative AI and AI-assisted technology statement

The authors declare that no generative AI and AI assisted technology was used in the creation of this manuscript.

Conflict of interest

The authors have declared no conflict of interest.

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