

# Knowledge Brief

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# TOWARDS SUSTAINABLE RANGE RESOURCE MANAGEMENT IN PAKISTAN

## BACKGROUND

Rangelands are largest land cover category in Pakistan accounting for around 57% of the total land area. These are a broad category of lands and include different vegetation cover types, such as high elevation pasture lands, forest lands - used as grazing lands, shrublands, brushwood lands, grass lands and river banks as well as stream banks that are used for animal grazing. On a global level, these account for more than 40% of the land area. These lands are characterized by native plant communities, which besides providing forage resources to livestock, also provide a number of other goods and services and are therefore important for a large segment of society in Pakistan.

The growing human population also necessitates the need for more livestock products. Hence, improved and sustainable management of rangelands in the country becomes crucial to sustain the increasing number of livestock. Livestock rearing is also one of the major means of living and livelihoods for pastoralists and agro-pastoralists communities throughout Pakistan; across the mountainous regions in particular.

## WHY ARE RANGELANDS SO SIGNIFICANT?

Rangelands are multifunctional areas and produce a number of products and services, due to which they have economic, ecological, social and cultural importance. For instance, forage production is an important function of rangelands. In rural parts of Pakistan, rangelands are the backbone for the livestock industry - providing enormous economic opportunities along the value chain. Therefore, rangelands contribute significantly to the livelihoods of rural communities as well as to the over-all GDP of the country.

In addition to supporting livestock production, rangelands in Pakistan provide a number of other ecosystem goods and services which may include provisioning, regulating, cultural and supporting services.

**Provisioning Services** of rangelands include the products obtained from range ecosystems that can be directly harvested, and, in general, have a market value such as, food, fiber, fuel, and freshwater. The main ecosystem



goods produced in rangelands are forage to produce meat, milk, wool and leather; different medicinal and aromatic plants; minerals and stones; and freshwater for drinking and irrigation. The relationship between supply and demand for these products varies in different range land types and parts of Pakistan.

**Regulating Services** of rangelands are the benefits that humans derive from regulating ecosystem processes, such as climate regulation, air quality maintenance, water purification, and erosion control. Rangelands sequester and store large quantities of carbon, principally into the soil, and avoid carbon losses to the atmosphere that would occur if rangelands were to be transformed into croplands or severely degraded. The demand for carbon sequestration in rangelands is higher than the supply because rangelands alone cannot offset actual carbon emissions from human activities. Although, per unit area carbon sequestration in rangelands is comparatively lower compared to other land use categories, carbon sequestration in rangelands is important because of the area that rangelands occupy in Pakistan. Not only do rangelands account for a significant fraction of the global carbon cycle, but they also account for most of the interannual variability in the global carbon sink.

**Cultural Services** of rangelands are the non-material benefits that humans obtain from range ecosystems and they include knowledge systems and traditional way of living of pastoral communities, cultural diversity, spiritual, and religious values, and recreation. These involve both consumptive and non-consumptive services. Rangelands' cultural services in context of Pakistan are related to human experiences associated with activities such as traditional lifestyles, tourist ranching experiences and wildlife hunting. It is pertinent to note that the demand for cultural services of rangelands in certain parts of Pakistan is increasing with the passage of time.

**Supporting Services** are those that are necessary for the production of all other ecosystem services such as processes that maintain biodiversity to produce goods or cycle nutrients. In rangelands, supporting services are primary production, nutrient cycling, conservation of soils, and biodiversity, which represent a large storehouse of genetic, species, and functional diversity. Rangelands represent the natural ecosystem where annual grasses and legumes are most abundant and from where a large fraction of domesticated species originate. The key to sustaining biodiversity is harmonizing its protection with the delivery of as many other ecosystem services as possible. Land degradation, which in most cases results from overgrazing, weed invasions, energy extraction, and exurban development, directly affects the provision of supporting services. Arguably, rangeland degradation has a larger and more imminent impact than climate change on the ability of these systems to fulfill human needs.

## CURRENT PRODUCTIVITY OF RANGELANDS IN PAKISTAN

Forage production from rangelands, like other ecosystem goods and services from rangelands depends on the extent, health, productivity and adoption of proper grazing and management practices. Maintaining the health and productivity of rangelands in Pakistan requires that the physical and biological functioning of the rangeland ecosystems is kept intact; so that the integrity of the soil and the ecological processes of rangeland ecosystems are sustained.

Most of the rangelands in Pakistan are not in healthy condition and their ability to produce distinctive kinds and amounts of forage/vegetation is compromised on account of over-exploitative grazing practices and lack of resources invested into the protection, rehabilitation and restoration of degraded rangelands. As a result, the current forage and other ecosystem services production of rangelands are below their potential.

The National Rangeland Policy 2010 recognizes this fact and based on the baseline analysis done by the then Ministry of Environment (now the Ministry of Climate Change) for the preparation of the National Policy, states that the current productivity of the majority of rangeland varies from 25-50% of their potential. [Table 01 below gives the existing production potential from different rangeland types in Pakistan].

Moreover, there is an adverse trend in the species' composition found on these rangelands. Non-palatable weed species which are not consumed by the livestock are now occupying up to 40% of the land area in rangelands. It is estimated that the spread of weeds and toxic plants has increased by 30%. Besides, the foliar cover of the majority of rangelands has decreased and gone down to as low as 27% of the potential. These negative trends contribute to not only the low productivity of rangelands, but also other negative effects on rangelands such as higher rates of soil erosion.

**Table 1: Current productivity and production potential of different rangeland types in Pakistan**

Rangeland Type	Area (million ha)	Current per ha Dry Matter production (tons/ha)	Total Dry Matter Production under existing conditions (metric tons)	Potential per ha Dry Matter production (tons/ha)	Total Dry Matter Production under improved conditions (metric tons)	Total Increase in Dry Matter production due to improvement measures (metric tons)
Alpine Pastures	1.68	1.5	2.52	2.50	4.20	1.68
Trans-Himalayan Grazing lands	3.50	0.6	2.10	2.00	7.00	4.90
Himalayan Forest Grazing lands	0.67	0.6	0.40	3.00	2.01	1.61
Pothowhar Scrub rangelands	1.68	1.5	2.52	4.00	6.72	4.20
Desert rangelands	7.97	0.5	3.98	2.00	15.94	11.96
Kohistan rangelands	2.38	0.4	0.95	2.00	4.76	3.81
Central Balochistan rangelands	8.00	0.5	4.00	1.00	8.00	4.00
Eastern Balochistan rangelands	5.00	0.4	2.00	1.50	7.50	5.50
Western Balochistan rangelands	18.50	0.3	5.55	0.80	14.80	9.25
Sulaiman Mountain rangelands	1.50	0.3	0.45	2.00	3.00	2.55
<b>Total</b>	<b>50.88</b>	<b>-</b>	<b>24.47</b>		<b>73.93</b>	<b>49.46</b>

Source: Mohammad, Noor. 1989. Rangeland Management in Pakistan and Ministry of Environment. 2010. National Rangeland Policy of Pakistan.

## LIVESTOCK DEPENDENCE ON RANGELANDS IN PAKISTAN

Total livestock feed requirements in the country are estimated at 103.12 million tons of Total Digestible Nutrients (TDN) and 9.36 million tons of Digestible Protein (DP) for an estimated livestock population of 212.9 million heads. These feed requirements have been calculated at 70 to 80 percent of the potential requirements to exploit the full genetic resources of the livestock breeds of the country. The estimated feed requirements exceed the availability of feed from different types of lands due to their low production despite their higher production potential. Therefore, the availability of feed resources from different types of land, especially rangelands is an important concern for the promotion of the livestock sector in the country, which needs to be addressed on a priority basis.

Livestock feed is obtained from a variety of sources. These include grains and fodder crops grown on farmlands as well as grazing of livestock on stubs of harvested agricultural crops, livestock grazed in rangelands and alpine pasture lands, and livestock grazing in other lands which include forest lands, wastelands, roadsides and river banks. Available livestock feed resources in Pakistan are estimated to be 81.1 million tons of total digestible nutrients (TDN) and 7.2 million tons of digestible protein (DP). Thus, the existing feed resources cater to only 78% of the feed needs of the livestock breeds found in Pakistan.

Of the available feed supply sources, it is estimated that the crop sector contributes about 60% of the TDN, while the rangelands and other lands (forest lands, wastelands, river banks and roadsides) respectively contribute 13% and 27% of the total dry matter. Thus, over-all about 40 % of the feed resources for livestock rearing come from lands under the management responsibility of provincial forest departments. The dependence of livestock

on rangelands, however, varies by type of livestock. For certain types of livestock, such as goats, sheep and equines in mountainous areas, the feed resources primarily come from rangelands, forest lands, wastelands, river banks and roadside. For buffaloes and cattle raised on dairy farms and other cattle farms, livestock primarily comes from farmlands. At the country level, the shares of different feed sources in nutrient supply for livestock is given in the Figure 01

Figure01. Share of different feed sources

**51%**  
**Forage**

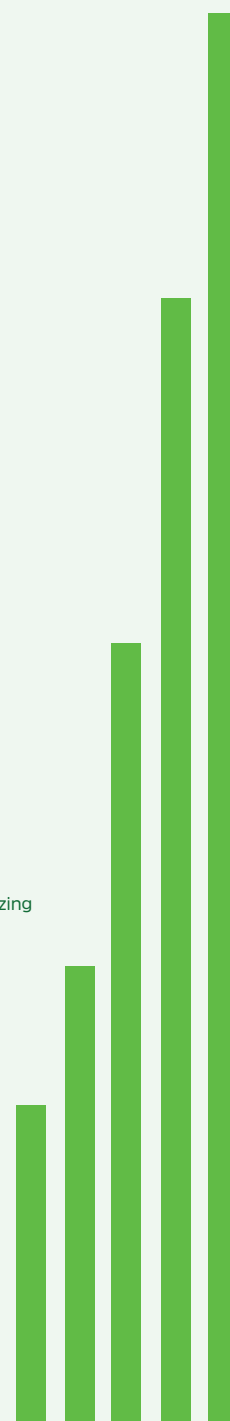
produced on farm lands and crop residues

**38%**  
**Rangelands**

**06%**  
**Cereal** by-products

**03%**  
**Post-harvest** grazing

**02%**  
**Oil** cakes



## ASSESSMENT OF RANGELAND CONTRIBUTION TO LIVESTOCK SECTOR

Out of the total land area of Pakistan of 88 million ha, about 50.88 million ha are grazing lands, which constitute about 57% of the land area of Pakistan. The extent of rangelands in different parts of the country varies. Balochistan has about 97% of its area under grazing lands, while the proportion of grazing land area out of the total land area in AJK, GB, KP, Punjab and Sindh are 64 %, 61%,35%, 24%, and 21% respectively. About 65% of the land area in the country is under the management responsibility of different provincial departments. All these lands are managed by the provincial forest departments.

**Table 2: Extent of rangeland, shrubs and bushland, and forest lands (000 ha)**

Province	Rangeland	Shrubs and Bush Land	Forest Land	Total Area used for livestock grazing	Total Area Land	Proportion of land used as grazing land (%)
KP	1,974	880	2,698	3,578	10,182	35.14
Punjab	3,759	698	534	4,992	20,548	24.29
Sindh	1,837	585	661	3,083	14,364	21.46
Balochistan	29,094	4,597	499	34,190	35,195	97.14
GB	3,096	183	974	4,252	6,981	60.91
AJK	153	80	520	752	1,179	63.79
ICT	10	3	20	33	90	37.20
<b>Total</b>	<b>37,949</b>	<b>3,065</b>	<b>5,905</b>	<b>50,880</b>	<b>88,539</b>	<b>57.47</b>

Source: Land Cover Atlas of Pakistan. Pakistan Forest Institute, Peshawar, 2012.

Feed is recognized as the most important element of cost of production of livestock, forming from 70-90 % of the cost of production of livestock. Given that 40% of the feed resources for livestock raising come from lands under the management responsibility of provincial forest departments, it is safe to assume that 40% of the feed cost of livestock raising is a value contributed by the forestry sector to the livestock sector. Hence, this contribution of the forestry sector to the livestock sector, which is currently reflected as the contribution of the livestock sector, needs to be recognized and duly accounted for when estimating the full GDP contribution of the forestry sector at the national as well as provincial levels. This is an accounting anomaly and needs correction for true reflection of the ecosystem services of rangelands to the economy.



## CHALLENGES FACING RANGELANDS IN PAKISTAN

Out of the total land area of Pakistan of 88 million ha, about 50.88 million ha are grazing lands, which constitute about 57% of the land area of Pakistan. The extent of rangelands in different parts of the country varies. Balochistan has about 97% of its area under grazing lands, while the proportion of grazing land area out of the total land area in AJK, GB, KP, Punjab and Sindh are 64 %, 61%,35%, 24%, and 21% respectively. About 65% of the land area in the country is under the management responsibility of different provincial departments. All these lands are managed by the provincial forest departments.

-  There a number of challenges in sustainable management of rangelands in the country. These include:
-  Inadequate policies and their lax implementation
-  Non-existence of legal framework for sustainable management of rangelands
-  Inadequate and incapable institutional and organization arrangements
-  Lack of and inadequate investment in rangelands
-  Overgrazing of range resources due to poor regulation of access to rangeland resources due to weak governance institutions
-  Declining range condition and productivity due to over-grazing and lack of investment in the resource
-  Inadequate research, extension and human resource capacity to support the design, development and implementation of rangelands development programs
-  Poor knowledge management systems
-  Low investment in sustainable rangeland management skills
-  Increasing droughts, floods and other extreme weather events
-  Increased climate change related negative impacts

## RECOMMENDATIONS

The following recommendations are made towards sustainable management of rangelands in Pakistan:

- ❧ Improve policy and legal framework for sustainable rangeland management by supporting processes towards requisite policy and legal environment and institutional support. support budgeting and properly equipping departments and agencies responsible for rangeland management, both at the national and provincial levels. This is proposed to be achieved through effective implementation of existing policies or formulation of new ones where they do not exist, as well as through harmonization and integration of rangeland policies with other relevant policies such as forest policies, climate change policies, desertification policies, etc.
- ❧ Strengthen organizational capacities for sustainable rangeland management through support budgeting and properly equipping departments and agencies responsible for rangeland management, both at the national and provincial levels. This should also include proper recognition and facilitation of local level institutions of rangeland management to play their roles. This will ensure that rangeland issues will receive the requisite attentions, and that there is adequate capacity to respond to challenges as they arise.
- ❧ Invest in and improve rangeland health and productivity through rangelands development, improving range management practices including grazing management through participatory rangeland management planning and sustainable land management practices. This will contribute to increased range plant cover and diversity; reduced soil erosion and vegetation degradation; improved range condition resulting in increased availability and improved quality rangelands.
- ❧ Strengthen governance of rangeland resources through recognition and mainstreaming of local level institutions. This will contribute to ensuring regulated access and responsible use of rangelands.
- ❧ Institute a proper land use planning and management mechanisms so that there is no encroachment of rangelands for various development purposes.
- ❧ Increase inter-sectoral coordination between different organizations particularly forest department, livestock department, agriculture department and other relevant departments for initiating integrated management approach to management of rangelands.
- ❧ Increase inter-provincial coordination to properly manage transboundary management of migratory and transhumant livestock from one province to another province.
- ❧ Invest in and improve research, extension and human resource capacity and knowledge management through support of research, extension and training of various cadres of departmental staff dealing with rangelands management. This will lead to increased awareness raising and deepening understanding of rangeland ecosystems and pastoral productions among experts and decision makers.
- ❧ Promote investment in rangelands management by creating various incentives. These among others include estimating and revealing total economic value of rangelands and creating opportunities for value addition of rangeland products to attract private sector investment in rangelands.

- Alongside forage production, develop rangelands for their other ecosystem services including all types of services-provisioning, regulating, cultural and supporting services.
- Strengthen drought and floods risk management and climate change adaptation and mitigation measures through appropriate climate change risk management.
- Correct the accounting anomaly to attribute and reflect the value of rangeland contribution in livestock rearing, which is currently reflected in the livestock sector, so as to properly recognize and document the role of rangelands in the national and provincial economies.

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