

CHAPTER 10

RANGELANDS OF PAKISTAN - I

— Punjab —

2.5 million ha approx

There are four extensive range areas which are as follows:

- A. Pothwar = 2.5 million ha. approx. ✓
- B. Thal = 2.5 " " "
- C. Cholistan = 3.5 " " "
- D. D.G. Khan = 1.2 " " "

In addition, some riverain area is also available. Pothwar and Riverain belt constitute high potential area for Range Management or feed lot development. Cholistan appears to have least productive potential. The above four areas will now be briefly described one by one.

A. Pothwar plateau range area

It comprises of the entire districts of Attock, Islamabad, Rawalpindi, Chakwal, Jehlum and hilly areas of Gujrat (Pabbi), Mianwali and Khushab (salt range). The tract lies between Jehlum and Indus rivers. Altitude varies from 300 m to 1300 m. Ecologically, it is located in the sub-tropical semi-arid/sub-humid zone. Geomorphologically, the plateau can be classified into mountains, hills, rock plains, weathered rock plains, piedmont plains, loess plains and river plains. The soils of the area have developed from wind and water-transported materials consisting of loess, old alluvial deposits, mountain outwash and recent stream valley deposits; some are derived from shales and sandstones. The climate is temperate in the northeast corner to sub-tropical semi-arid in the southwest.

Temperature extremes are 45°C in June and often drop below freezing during January. The average annual precipitation in this area varies from 400 to 870 mm. (see footnote). The climatic conditions are, therefore, suitable for range forage production. Dryland farming is dominated and restricted to flat areas or valleys and depends on occurrence of rains. Cropping intensity is rather low. Fertility level is low mostly due to rampant erosion. Wheat, maize, sorghum, millets, groundnut, gram (chick pea), mustard, sunflower and soybean are major cultivated crops. Livestock rearing is an important component of rural economy.

It is the home of the famous 'Dhanni' cattle breed. Forests are open and scrubby and cover a very small fraction of the area. The rest (most) of the area is exclusively used as grazing land. It is certainly one of the most productive plateau range of this country. Studies with respect to carrying capacity indicate that good areas when protected for 2 or more years produce upto 4350 kg/ha of air dry forage per annum which is equivalent to about 2 ha per animal unit per annum. Similar estimates for moderate and depleted sites are 7 and 56 ha/animal unit/annum respectively.

Limits for various climatic zones

- (1) Arid - less than 200 mm.
- (2) Semi arid (very dry) - 200 to 300 mm.
(true semi-arid) 300 to 500 mm.
- (3) Sub-humid - more than 500 mm.

The following palatable grasses are commonly found in this tract:

<i>Aristida depressa</i> (Lumb)	Common, grass of fair palatability grazed by sheep.
<i>Bothriocoloa pertusa</i> (Palawan)	Common, palatable grass, grazed by cattle, sheep, goats.
<i>Cenchrus ciliaris</i> (Dhaman)	Common, very palatable grass, grazed by all.
<i>Chrysopogon aucheri</i> (Khar)	Common, palatable grass, grazed by cattle, sheep, goats.
<i>Cynodon dactylon</i> (Khabbal)	Common, palatable grass, grazed by sheep and cattle.
<i>Eleusine flagellifera</i> (Chhimber)	Common, grass of poor quality, grazed by sheep.
<i>Digitaria bicornis</i> (Pharion)	Common, palatable grass, grazed by cattle, sheep, goats.

/ Following browse species are also common.

<i>Acaçia modesta</i> (Phulai)	Very common, provides firewood; browsed by goats and camels. Easy to regenerate with dry afforestation technique.
• <i>Adhatoda vasica</i>	Common, browsed by species.
• <i>Butea frondosa</i> (Dhak)	Common, leaves are used as fodder.
• <i>Carrisa spinarum</i> (Garanda)	Common, browse species.
• <i>Gymnosporia reyaliana</i> (Patakhi)	Common, browsed by goats and camels.
X <i>Olea cuspidata</i> (Kao)	Common in cooler localities and better soil, provides small timber for implements. Leaves are used as fodder.
• <i>Tecoma undulata</i> (Lahura)	Common, leaves and green pods are used as fodder.
<i>Zizyphus nummularia</i> (Mallah)	Common, browse species, provides edible fruit.

Major Recommended Operations

1. Grazing at suitable stocking rate.
2. Soil and water Conservation Operations on selected favourable sites.
3. Controlled or planned grazing (deferred or deferred rotational). Elimination of grazing on erodible areas and its replacement with grass-cutting.
4. Artificial Reseeding; *Cenchrus ciliaris* and *Chrysopogon aucherii* be seeded on selected favourable sites.
5. Establishment of rainfed or irrigated perennial pastures (to overcome problem of range seasonality). *Phalaris toberose* *Lolium multiflorum*, *L. perenne*, *Sorghum almum*, *Panicum antidotale*, *P. maximum*, *Medicago sativa* and *Vicia villosa* may be tried.
6. Encouragement of farmers to grow fodder/grain crops (shaftal, sorghums, millets etc.).
7. Planting of fodder shrubs and trees (to overcome range seasonality). *Acacia modesta*, *Olea cuspidata*, *Butea frondosa*, *Zizyphus spp.*, *Morus alba*, *Robinia pseudoacacia* and *Debregeasia hypoleuca* etc. be planted and encouraged on selected favourable sites.
8. Development of water points.
9. Keeping cattle, sheep and goat together as mixed herd or separate herds.
10. Livestock Management comprising of breeding, selection, management and timely offtake.
11. Organization of marketing for livestock and their products.

B. Thal (desert) Range Area (Sindh Sagar Doab)

Thal literally means sea of sand. It comprizes of larger parts of districts of Mianwali, Bhakkar, Layyah, Muzafargarh and some parts of the districts of Khushab,*Sargodha and Jhang. This area is roughly triangular in shape and has the following land uses:

Cultivated with canal irrigation	=	26.5 per cent
Cultivated with rain water or with underground water	=	32.4 per cent
Area under river beds	=	8.7 per cent
Grazing land	=	32.4 per cent

The mean maximum and minimum temperatures recorded in the tract are about 44°C and less than 0°C respectively. The average annual precipitation varies from 385 mm in the north-east to 170 mm in the south. Approximately three-fourth of annual rainfall is received during monsoon (July-August). The area is exposed to hot and dry winds from the south and south-east. The sandy soil is subject to severe wind erosion. April to July (start of monsoon) are the windiest months.

The soils are alluvial with sandy textured sand dunes covering 50 to 60 percent of the area.

Continued heavy grazing and ruthless cutting of trees and shrubs have resulted in the complete disappearance of several desirable species. The top soil has been eroded by wind erosion and sand dunes have become unstable. The vegetative cover and forage production have declined substantially. The environment is, therefore, not very conducive to plant growth. Livestock grazing is the main occupation of the people. With the construction of Thal irrigation canal, about 1 m.ha sand dunes have been converted into highly productive cultivated areas. However, about 1.6 m.ha are still used as grazing lands. In a year of normal rainfall, sand

dunes are cultivated. Gram (chick pea), water melons, guar and millets are grown on large scale. Persian wheel wells and electric/diesel powered tube-wells are quite common in the area.

The carrying capacity of properly managed (protected) and artificially reseeded areas is considered to be about 7 ha per animal unit per annum.

The following palatable grasses are successful/commonly found in this tract.

<i>Aristida depressa</i> (Lumb)	Common, grazed by sheep and goats. A grass of fair forage value.
<i>Cenchrus ciliaris</i> (Dhaman)	Common, excellent, palatable and gives high forage production, grazed by all.
<i>Cymbopogon jwarancusa</i> (Khawai)	Common grass of poor forage value, grazed by sheep.
<i>Dicanthium annulatum</i> (Murgha)	Not very common, grass of good palatability, grazed by all.
<i>Eleusine flagellifera</i> (Chhimber)	Abundant, although palatable but gives very low forage production.
<i>Elionurus hirsutus</i> (Karera, Gorkha grass)	Common, palatable grazed by sheep, cattle, goats and camels.
<i>Panicum antidotale</i> (Malai)	Common, grazed by goat, sheep and other animals.
<i>Saccharum munja</i> (Sarkanda, Kana)	Common, poor quality grass, grazed buffaloes.

Following browse species are also common:

<i>Acacia jacquemontii</i> (Kikri)	Common, palatable browsed by goat, sheep and camel.
<i>Calligonum polygonoides</i> (Phog)	Common, palatable, grazed/browsed by goat, sheep and camel.
<i>Capparis aphylla</i> (Karir)	Common, palatable, browsed by goats and camels.
<i>Haloxylon sp.</i> (Lani)	Common, browsed by camels only.

<i>Haloxylon recurvum</i> (Khar)	Rare, palatability very poor rarely grazed by camel.
<i>Prosopis cineraria</i> (Jand)	Common, browsed by camel and goats.
<i>Prosopis juliflora</i> (Mesquite)	Common, browsed by goat and camel.
<i>Salvadora oleoides</i> (Van)	Common, palatable, browsed by goat and camel.
<i>Sueda fruticosa</i> (Lana)	Common, palatable, greatly liked by sheep and camels.
<i>Tamarix aphylla</i> (Frash)	Common, browsed by camels only.

Major Recommended Operations

1. Grazing according to carrying capacity.
2. Planned Grazing: Deferred/rotational; close use with long rest period, grazing interval not less than half month, two years protection to re-seeded areas.
3. Providing limited irrigation on selected favourable sites wherever possible.
4. Reseeding in favourable sites (northern and north-eastern parts of the tracts with *Cenchrus ciliaris* and *Elionurus hirsutus*: two years protection to reseeded areas.
5. Hay-making on reseeded areas and on irrigated areas.
6. Planting of fodder trees such as *Zizyphus*, *Prosopis*, *Tamarix* and *Salvadora*, etc on selected favourable sites.
7. Stock water Development. Sinking of hand-pumps, digging of shallow wells.
8. Livestock Kinds: Grazing by mixed livestock desirable, such as cattle, sheep, goat and camel.
9. Livestock Management: Comprizing of breeding, selection, management, and timely off-take.
10. Livestock Marketing.

C. Cholistan Desert Range Area

It comprises of two-third area of Bahawalpur Division (districts of Bahawalnagar, Bahawalpur and Rahim Yar Khan). The remaining one-third area to the north is in the form of a belt and is under irrigated farming. (Average annual precipitation varies from 100 to 180 mm., which is highly erratic. Long spells of drought extending over a period of 2 to 3 years are not uncommon which seriously affect fauna and flora. Extremely hot dry south-westerly winds blow during summer. The sandy soil is subject to severe wind erosion. Ecologically, it is sub-tropical arid sandy desert. The area is subject to wind erosion. Mean minimum and maximum temperatures are 20°C and 40°C, respectively.) The soil survey of Cholistan was conducted by the Soil Survey of Pakistan in 1974. The soils of the tract are saline, alkaline and gypsiferous. The area consists of shifting sand dunes. The dunes reach heights of about 100m in greater Cholistan.

Livestock production is the major occupation. Wildlife are hunted during the winter. Shortage of drinking water is a serious problem as underground water is saline. Aridity precludes dryland farming. The environment is very hostile to plant growth during summer.

The average carrying capacity of properly managed and artificially reseeded areas is considered to be 40 ha per animal unit per annum.

Vegetation

The following palatable grasses are successful/commonly found in Cholistan:

- | | |
|---|--|
| <i>Aristida depressa</i>
(Lumb) | Common, grass of fair forage value, grazed by sheep and goats. |
| <i>Cenchrus ciliaris</i>
(Dhaman) | Rare, very palatable grass, grazed by all. |
| <i>Cymbopogon jwarancusa</i>
(Khawi) | Common, grass of poor forage value, grazed by sheep. |
| <i>Dicanthium annulatum</i>
(Murgha) | Not very common, grass of good palatability, grazed by all. |
| <i>Eleusine compressa</i>
(Chhimber) | Common, fairly palatable grass, eaten by all kinds of livestock especially by sheep. |
| <i>Eleonurus hirsutus</i>
(Karera, Gorkha) | Common, palatable, grazed by all kinds of livestock. |
| <i>Panicum antidotale</i>
(Garar, Malai) | Rare, palatable grass, grazed by all. |

The following browse species are also common.

- | | |
|--|--|
| <i>Calligonum polygonoides</i>
(Phog) | Common, moderately palatable browsed by camels and goats. |
| <i>Haloxylon salicornicum</i>
(Lana) | Common, forage value is poor, contains a lot of salts, browsed by camels only. |
| <i>Prosopis cineraria</i>
(Jand) | Common, very high forage value browsed by camels and goats. Also provides timber and firewood. |
| <i>Salsola foetida</i>
(Lani) | Common, palatability, grazed by camels. |

<i>Salvadora oleoides</i> (Van)	Common, moderately palatable, grazed by sheep, camels and goats.
<i>Suaeda fruticosa</i> (Lana)	Common, palatable, greatly liked by sheep and camels.
<i>Zizyphus nummularia</i> (Mallah)	Common, highly palatable, browsed by all.

Major Recommended Operations

1. Grazing according to carrying capacity or at least freezing the present number of animals.
2. Mixing sand in clayey flats by their deep ploughing across summer winds.
3. Planned Grazing: Planned but simple grazing programme developed in due consideration of prevailing semi-nomadic and nomadic patterns such as Best Block Grazing System.
4. Providing limited irrigation on selected favourable sites wherever possible.
5. Irrigated fodder: Allotting irrigated land on western fringe of the desert to Cholistanis who would bring at least 70 per cent of their land under fodder crops; allotments to progressive farmers who could develop underground water resources for fodder production.
6. Opening up of Forest plantations especially during periods of emergencies.
7. Planting of Fodder shrubs and trees. Fodder use of existing shrubs and trees be regulated and new ones planted on selected favourable sites. Reseeding, on selected relatively high potential areas.
8. Stock water Development: such as shallow-wells, pond, ponds with adjacent shallow-wells, wind mills; extending the watershed areas of ponds (tobas) etc. It is the most important of all operations.
9. Livestock kinds: Mixed livestock herd is desirable.
10. Livestock Management and preventive medicine.
11. Livestock Marketing.

D. Dera Ghazi Khan Range Areas

It lies between the base of Suleiman hills and the Indus river and stretches over D.G.Khan and Rajanpur districts. It also includes bela land along the Indus river.

The general climatic regime of D.G. Khan, Rajanpur tract is typical of very arid sub-mountainous, sub-tropical areas. Ecologically, it is sub-tropical (non-sandy) plain. Climate is broadly characterised by cold winters and very hot summers. Winter temperatures occasionally reach zero especially in January and February, due to cold winds from the west. June and July are the hottest months with an average maximum temperature of 42°C.

Average annual precipitation is 140 mm which is received in summer. Most of the light rainfall storms from the high mountains (1540-3400 m) lose their moisture through evaporation before reaching range area which are at lower altitudes (150m). Flash floods are common. The flood water, however, runs off into river -Indus rapidly. Shortage of water and uncontrolled nomadic grazing are very serious problems of this area. The soil is deep, well-drained, calcareous, medium-textured and low in organic matter.

Livestock production is the major traditional land use in the region. It is the home tract of elegant Dajal breed of cattle. Raud-i-kohi irrigated farming is practiced wherever it is feasible. Millet and Sorghum

etc. are cultivated. Canal irrigation is also spreading quickly and is resulting in the production of most traditional farm crops.

Deterioration of the rangelands has been associated with irregular grazing by nomadic and local livestock and illicit cutting of shrubs for fuel and fodder. Most of the rangelands are in poor shape. Estimated dry matter yields were 3 to 4 t/ha from *Lasiurus indicus* seeded areas at Rakh Choti Dalana and only about 400-500 kg/ha from non-seeded areas. The average carrying capacity of protected, reseeded and watered area is expected to be from 5-7 ha per animal unit.

The following palatable grasses are successful/commonly found in this tract.

<i>Cynodon dactylon</i> (Khabbal).	Grazed by buffaloes, sheep.
<i>Eleusine flagellifera</i> (Chhimber).	Grazed by sheep.
<i>Elionurus hirsutus</i> (Karera, Gorkha)	Grazed by all animals.
<i>Panicum antidotale</i> (Malai).	Grazed by all animals.
<i>Saccharum spontaneum</i> (Kahi)	Grazed by buffaloes, sheep.

Following browse species are also common:

<i>Acacia nilotica</i> (Kikar)	Grazed by goats, camels.
<i>Copparis aphylla</i> (Karir)	Grazed by goats, camels.
<i>Prosopis cineraria</i> (Jand)	Grazed by goats, camels.
<i>Salvadora oleoides</i> (Van)	Grazed by goats, camels.
<i>Tamarix dioica</i> (Pilchi)	Grazed by goats, camels.
<i>Zizyphus jujuba</i> (Ber)	Grazed by goats, camels.
<i>Zizyphus nummularia</i> (Mallah)	Grazed by goats, camels.



Major Recommended Operations.

1. Grazing at suitable stocking rate.
2. Soil and water Conservation Operations on selected favourable sites.
3. Controlled or planned grazing (deferred or deferred rotational). Elimination of grazing on erodible areas and its replacement with grass-cutting.
4. Artificial Reseeding: *Cenchrus ciliaris* and *Chrysopogon ancheri* be seeded on selected favourable sites.
5. Establishment of rainfed or irrigated perennial pastures (to overcome problem of range seasonality). *Phalaris tuberosa*, *Lolium multiflorum*, *L. perenne*, *Sorghum almum*, *Panicum antidotale*, *P. maximum*, *Medicago sativa* and *Vicia vilosa* should be tried.
6. Encouragement of farmers to grow fodder/grain crops (shaftal, sorghums, millets, etc).
7. Planting of fodder trees (to overcome range seasonality). *Acacia modesta*, *Olea cuspidata*, *Butea frondoza*, *Zizyphus spp.*, *Morus alba* and *Robinia pseudocacia* etc. be planted or encouraged on selected favourable soils.
8. Development of water points.
9. Water spreading on suitable sites as done in Rakh Miran, Dera Ismail Khan.
10. Keeping cattle, sheep and goat together as mixed herd or separate herds.
11. Livestock Management comprising of breeding, selection, management and off-take.
12. Organization of marketing for livestock and their products.

TEST QUESTIONS

1. Enlist major ranglands of Punjab alongwith their areas. Indicate which ones are high potential areas.
2. Describe characteristic features of range areas of Pothowar Plateau.
3. What are the major recommendations for developing Pothowar Range Areas ?
4. How can one improve the Thal Range Areas most effectively ?
5. What are the characteristics of Cholistan Desert Area ? Enlist 5 important range improvement operations in order of their priority.
6. Write a detailed note on Range Areas of Dera Ghazi Khan.