

## POTENTIAL FOR REHABILITATION OF DEGRADED RANGELANDS OF BALOCHISTAN

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Balochistan, being the largest province of Pakistan area wise, constitutes 44% of total land mass of the country. It is characterised with fickle and unreliable rainfall, skeletal soil which induces high rate of albedo, and desiccating winds which all in combination, adversely affect the plant built-up. Adding to the woes, whatever meager plant cover is available that is also depleting rapidly. The depletion is being caused mainly by an absolute lack of grazing management by the flock owners and by the extraction of shrubs and bushes for fuel. Valuable grasses like Washta/Hadden (*Stipa pennata*), and Granang/Rangai (*Enneapogon persicum*) have almost vanished. These were the important palatable perennial grasses representing the climax of range ecosystem in highland Balochistan. Now, these have been replaced by Saba/Kaj (*Chrysopogon aucheri*), a sub-climax stage in deterioration of the original cover (Johnston and Hussain, 1963). However, for practical purposes, *Chrysopogon* may be considered the best cover presently attainable. Because of low forage production, the health of livestock that makes use of this vegetation is also impaired and they are sold at low prices.

Consequently, the livestock producer does not get adequate economic return. So, the rangelands are a valuable natural resource and need to be managed properly to get sustained maximum forage and ensure plant cover to halt soil erosion and further loss of primary productivity.

Balochistan is characterized by winter precipitation, some of which is received as snow. Rainfall occurs mostly in winter except in the north-eastern part where monsoon showers are also common. The annual rainfall ranges from 50mm in southwest to 450 mm in the northeast. Dry matter (DM) production per unit area is mainly dependent upon rainfall.

Table 1 shows the distribution of the various classes of rangelands and their dry matter production. It indicates that the existing maximum dry matter (DM) production of rangelands of Balochistan is ca. 3458 mil. kg or 100 kg/ha which, under proper (50%) utilization, is further reduced to 1729 mil. kg or 50 kg/ha.



**Table 1. Annual dry matter production of rangelands of Balochistan**

*Range class	Current Annual **DM Prod. (m.kg)	Area (m.ha)	% of Total area	Areawise DM Production (m.kg)	D.M Production under Proper Utilization (m.kg)
1.E-VG	250280	1.1	3.2	275-308	137-154
2.VG-G	200-240	3.3	9.5	660-792	330-396
3.G-F	170-190	2.8	8.1	476-532	238-266
4.F-P	60-160	5.9	17.0	354-944	177-472
5.Poor	30-50	11.7	33.7	351-585	175-292
6.Non-grazable	< 30	9.9	28.5	c. 297	100-148
	Total:	34.7	100.0	2316-3458	1158-1729

Source: Developed from FAO Report, 1983.

- \* E-Excellent,  
VG-Very Good,  
G-Good,  
F-Fair and  
P-Poor

\*\* DM Prod. - Dry Matter Production

According to 1981 census, 80% of human population in Balochistan resides in the rural areas in small villages or scattered in solitary dwellings. Livestock husbandry, particularly sheep and goats rearing is the major profession of rural people of the province. As indicated by the livestock census of 1986, Government of Pakistan (GOP), sheep

and goats alone constitute more than 90% of total livestock population in Balochistan. Based on the 1986 census, the feed requirement of different kinds of livestock fed on rangelands are shown in Table 2.



Table 2. Annual feed requirement of range livestock of Balochistan.

Kind of livestock	Population (m)	*LSU Equivalent	LSU (m)	Annual feed requirement (m.kg)	%Feed share contributed by rangelands	Feed requirement obtained from rangelands (m.kg)
1. Sheep	11.1	0.07	0.7	2100.0	90	1890.0
2. Goat	7.3	0.06	0.4	1200.0	95	1140.0
3. Camel	0.3	0.80	0.2	600.0	95	570.0
4. Donkey	0.4	0.40	0.2	600.0	95	570.0
5. Cattle	1.1	0.90	1.0	3000.0	40	1200.0
6. Horse	0.03	0.90	0.03	90.0	10	9.0
		Total:	2.53	7590.0	-	5379.0

Source: Developed from livestock census 1986, GOP and FAO Report, 1983.

\*LSU: It is a mature Balochistan range bovine with a live-weight of about 300 kg consuming 3000 kg dry matter per year. The LSU equivalents have been estimated in the FAO Report, 1983 on the basis of following average live body weight of different animals:

1. Sheep	:	22	kg
2. Goat	:	18	"
3. Camel	:	335	"
4. Donkey	:	120	"
5. Cattle	:	290	"
6. Horse	:	280	"

It is important to note that while calculating an animal equivalent, not only live body weight of the animal is considered but also its age and dry matter intake are taken into account.

By comparing tables 1 and 2, it becomes evident that the estimated annual feed requirement of range livestock is 5379 mil. kg whereas ranges are producing upto the maximum of 3458 mil.kg.

per annum. It means the rangeland are overstocked which impairs not only forage production but also livestock production in Balochistan. Due to low feed supply, animals are small both in size and body weight. They are weak and emaciated, and are prone to diseases. They do not fetch good price in the market and as a result livestock producers can earn only a meager amount not sufficient to make their both hands meet. Therefore, livestock number has to be adjusted according to available forage, to producer sound and healthy range livestock in Balochistan.

The rangelands in Balochistan can be rated as severely overgrazed. Baig (1977) found that forage production of the Maslakh range near Quetta increased from 140 kg/ha to 690 kg/ha after 13 years complete protection from grazing. Production of ranges that are open to grazing in the Quetta district is probably not more than 20-25 kg/ha. Increase in potential production as a result of protection can be possible to more than 100%



in Cymbopogon-Chrysopogon range after several years of protection (Baig, 1977). It means there is a tremendous potential to improve grazing capacity of rangelands which will ultimately help raise living standard of the stockmen of Balochistan.

## **RANGELAND DEVELOPMENT PROBLEMS**

### **1) Nomadic grazing**

Nomads are common in Balochistan. They start moving from Afghanistan at the onset of winter towards hot plains of Balochistan like Sibi and Kachhi districts. This is the most crucial period as all the native flora become dry and whatever is left that too is overgrazed by nomadic livestock which further worsen range condition and add to feed deficiency to already starving stock.

When the spring begins, the nomads start moving back to Afghanistan. Since temperature and moisture both are favourable for plant growth at that time, plants start their growth and consume reserve carbohydrates in making early growth. If the plants are grazed at this stage, their development is impaired and they become stunted and mutilated. The premature departure of nomads from the hot plains results in an early defoliation and overgrazing of the early spring growth. If the nomad flock is kept for another month in the cropping area like Kachhi and Nasirabad districts, the range will have stronger grass cover which will not only help abate plant depletion but will also provide better and more forage to the livestock being fed on the ranges. More seed production would result after completion of life cycle and seed setting stage.

### **2) Lack of technical skill**

Ranges in the province are in a severely deteriorated condition as a result of centuries of over-use. No grazing system is

followed and vegetation is consumed by the livestock as soon as it appears. In some areas like Musa Khail, Zhob and Loralai districts where the local tribes set aside a part of the grazing area as protected from grazing for the growing season, a better vegetation can be seen in comparison to area open to grazing. This system is locally called "Pargour" in Pashto language. It means there is a potential for improving ranges through adopting some scientific measures.

### **3) Uprooting of range plants for fuel/household needs**

Because of burgeoning population, the demand for fuelwood is also resin. The rural population mainly depends upon range plants for their domestic fuelwood needs and for room-heating during winter. The uprooting of plants has become more prominent since the inception of Afghan refugees in Balochistan. They are further aggravating the range condition through overgrazing and uprooting of plants for their household needs.

The recent example of settlement of Murree tribe near National Park Hazarganji in Southwest of Quetta city is one of the worst example of deterioration of plant community by human population. The National park has been developed as a result of almost two decades of protection to conserve natural fauna and flora of the area. The tribal people have been involved in indiscriminate cutting of trees and shrubs for their firewood needs. They are just spoiling the precious natural resource but no one is giving any heed to the gravity of problem. If such ruthless cutting and uprooting of plants is continued, we are afraid the whole Balochistan will soon become a bleak desert. Another example of range deterioration is Chaman area in district Pishin. The ranges have been further degraded since the arrival of Afghan refugees in the area.



#### 4) Absence of Range Management Agency

Balochistan, by virtue of its climate, is a rangeland province but there is no independent agency which is vested with full authority, responsibility and accountability for the development of rangeland resource. Range Management requires different types of specialists like plant physiologist, range livestock nutritionist, range ecologist, range improvement specialist, range economist and forage agronomist etc. Implementation of such an all embracing programme is obviously a whole time job but at present the Range Management activities in Balochistan are being supervised by the Forest Department which is already burdened with a heavy schedule and little attention is paid to the Range Management work.

#### 5) Lack of Implementation of range policy

The West Pakistan Range Management Conference resolved in 1961 that "Grazing Advisory Committee" including the representatives of public be formed at provincial, divisional and district levels to lay down outlines of range policy and programme and to look for the implementation of these decisions. Unless the range policy is framed by associating the representatives of the public, it would not be practicable in the field. No doubt, it was a good suggestion but no action has been taken on the recommendation of Range Management Conference yet. Similarly, the National Range Management Committee, 1973 had suggested for creation of independent and effective organizations at provincial as well as at central levels for the development and management of vast rangeland resources but still no step has been taken towards this direction. The committee had also recommended suitable economic incentives to enlist people's cooperation and encourage their participation in range management programmes but

implementation to this suggestion is still awaited.

### SUGGESTIONS FOR RANGELAND DEVELOPMENT

Prior to give any suggestion for rangeland improvement in Balochistan, it seems indispensable that the participation of public in any range improvement programme is a must. Unless we do not motivate the public, we cannot develop such a vast area through Government efforts alone. The inclusion of private people can be enlisted through the allocation of land to private parties with credit facilities, assistance in efficient utilization of under-ground and surface water resources, provision of technical know-how for livestock rearing and pasture development through the establishment of better marketing facilities especially through cooperative efforts and engaging their livestock in grazing trials on pilot project areas. The following suggestions will help improve range forage production and utilization management on sustained basis without further deterioration of very fragile natural vegetation resource:

#### 1) Plant Introduction Trials

Since Balochistan has an arid climate, shrubs comparatively perform better than grasses. Keeping in view of the research experience of Arid Zone Research Institute, Quetta we can suggest a shrub viz., fourwing saltbush (*Atriplex canescens*) that can be tried successfully on marginal lands of highland Balochistan. It is native to the western ranges of USA, is a cold tolerant, evergreen halophyte. Because of its evergreen nature, it can produce forage round the year and can be fed to livestock during winter when all local range plants become dried. So raising of block plantation/forage reserve of this plant on scattered fields around villages will help abate grazing pressure on ranges during lean



period of a year and may be fed as maintenance ration to livestock during winter. It is a perennial medium size shrub which can withstand heavy grazing and can survive through decades. It can be raised under rainfed conditions successfully as forage reserve on marginal lands but not to be grown on mountains and foothills as its growth has been recorded very poor on these sites.

## 2) Range Reseeding

Depleted rangelands can be improved either by natural reseeding or by artificial reseeding. Natural reseeding may be resorted to in some areas like Zhob and Loralai districts where some plants of good forage species are still surviving. Most of the ranges of Balochistan have been badly depleted and artificial reseeding could be the only hobson's choice for their rehabilitation.

Artificial reseeding is one of the most effective and quick method of range rehabilitation but it must not be considered as panacea to all range problems. In most of the cases it may result in complete fiasco. So it is a risky affair and should be adopted only after a careful consideration of the prevailing conditions. It should be drawn on to a site where ample and good soil is available. Due consideration to land preparation should also be taken into consideration. Where topography permits, light disc ploughing with tractor would appear to be the most effective soil preparation after which the seed can be broadcast and covered lightly by dragging brush over the surface. This method provides three of the essentials for successful grass sowing, viz. light covering of seed, penetration of moisture and firm seed bed. It was applied in the early days of Maslakh project near Quetta. Seed may be sown by drilling when the terrain is not rough and the soil is free of rocks. The seed may have to be treated to remove awns and other appendages

likely to affect the efficient functioning of the drill. The depth of sowing should be adjusted according to the requirement of each species. The drills may be spaced 30 to 60 cm apart depending upon the soil and the soil moisture expected to be available (Champion et al. 1965). It is advisable to prefer native plants to exotics for reseeding. The following species are recommended for reseeding of ranges of highland Balochistan:

### Species for Highland Balochistan

#### Grass Species

*Chrysopogon aucheri*, *Stipa pennata*, *Enneapogon persicum*, *Agropyron desertorum*, *Oryzopsis hymenoides*, *Elymus junceus* and *Eragrostis curvula*.

#### Trees and Shrubs

*Convolvulus spinosus*, *Caragana ambigua*, *Prunus eburnea*, *Fraxinus xanthoxyloides*, *Gleditchia tricanthos*, *Pistacia khinjuk*, *Pistacia mutica* and *Ulmus species* (PARC, 1983).

The following species are also recommended for hot desert plains of southern Balochistan:

### Species for Lowland Balochistan

#### Grass Species

Mixture of *Elionurus hirsutus* and *Cenchrus ciliaris* (Johnston and Hussain, 1963), *Pennisetum orientale* and *Lasiurus indicus*.

#### Trees and Shrubs

*Zizyphus mauritiana*, *Zizyphus nummularia*, *Atriplex nummularia*, *Acacia modesta* and *Opuntia* (Spineless Cactus) Species (PARC, 1983).



### 3) Grazing Management

Generally the ranges are so badly depleted that grazing trials cannot be conducted. Anyhow, in some districts like in Zhob, Loralai and Kalat districts, a few sites can be selected for grazing studies. "Deferred Rotational Grazing System" may be an appropriate technique for utilization of the available forage. Range suitability classification and proper season of use should be the two important components of grazing study as no information has been reported on these parameters so far. The grazing may be conducted through sheep and goats as they are the main livestock species of Balochistan, but camels should also be included in the grazing flock as they obtain 25% of their dry matter requirement from shrubs not browsed by other species (FAO Report, 1983) to determine proper range suitability classification for different rangeland types of Balochistan.

### 4) Hay and Silage Making

Hay and silage making is one of the most effective ways of conserving fodder for the time of low forage production i.e. winter starting from October through February, when all the range flora become dried. Good silage has a high nutritional value and the unpalatable vegetation can be mixed with good quality palatable forage. *Sorghum* and other palatable fodder with *Saccharum* species forming 20-25% of the total weight (FAO Report, 1983). Hay and silage making is very important, because it can release grazing pressure on rangelands during winter or prolonged drought period. A lot of palatable ephemerals like *Avena barbata*, *Bromus danthonae* and *Poa bulbosa* appear in abundance during spring. They can be dried and used by mixing with lucerne hay.

### 5) Marketing Facilities

The existing livestock marketing facilities are primitive in nature. All the marketing processes are in the hand of middle man. He usually hires a truck, travels through the province and buy the animals from the flock owners along the road. There is no facility like transportation, livestock handling, marketing and slaughtering etc. extended by the Government to livestock producers in Balochistan. This has resulted in low off-take rate and extra built-up of livestock in already overstocked rangelands. It was estimated in a survey that due to lack of marketing facilities, services of intermediaries (commission agent and butcher) represented 32% and 30% for sheep and goats respectively of the price paid by consumers (Mahmood and Rodriguer, 1991). It is realized that improvement in marketing facilities is most needed at producer level where no competition in buying exists. The development of marketing facilities like use of feed lots, modern slaughter houses, cold storage plants and small industries like tanneries and scouring of wool should at least be developed at provincial capital in Quetta. This will not only increase stockmen's income but also help abate grazing pressure on the depleted rangelands of Balochistan.

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