

## **SOME SUITABLE AND SUSTAINABLE STRATEGIES FOR IMPROVING RANGELAND PRODUCTIVITY IN PAKISTAN**

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### **Abstract**

Rangelands are the largest natural resource, occupying about 62 percent of total area of Pakistan. These rangelands produce and support more than 91.091 million livestock heads. Most importantly, there is a need to improve the production potential of the grasslands of the country by converting them into the sown pastures. Several strategies for improving rangelands and realizing sustainable forage yields, have been discussed in the article.

### **Introduction**

Rangelands in Pakistan are the most important source of fodder and forages for our livestock. The Forest area in Pakistan is 4.224 million ha (Ashfaq *et al.* 2000) forming only 4.8% of the total land area of 87.98 million ha. and area under crop is 20.7 million ha. Forming 23.6% indicating their importance in the country. Forages are considered to be rich source of feed for livestock, facing many constraints in forage production, limiting livestock management. Because of rapid expansion in human population, the competition between livestock and human beings for consumption of edible grains has increased enormously. As a result, the animals which are already underfed and under-nourished will have to depend on less grains and more forages (Mohammad *et al.* 1991).

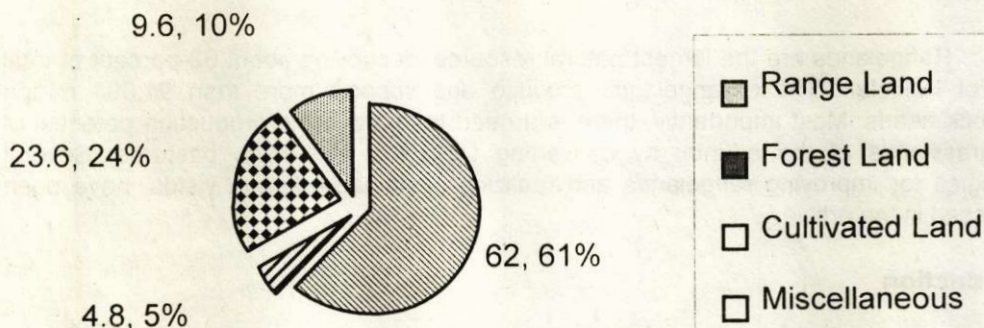
Factors like misuse, mis-management and overgrazing have resulted in lowering the production potential and in cases severe depletion of rangelands has also occurred. Therefore, capacity of most of the rangelands has declined, to 16 hectares per animal unit. Out of total 23.6% percent contribution of agriculture sector in gross national income, livestock contribute about 7.3 percent (National Commission of Agriculture, NCA, 1998). Most of the livestock of the country are supported either partially or wholly by these poorly-managed ranges which barely meet requirements of the present livestock population. That is why, the animals are usually underfed and undernourished. Therefore, per head meat and milk consumption in Pakistan is 15-20 percent low as compared to the developed

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countries (Mohammad et al., 1991). This sort of discouraging situation and scenario prevailing in the country warrants immediate management steps to improve natural grasslands and increase forage production in Pakistan. The suggestions made by Mohammad, 1989; Mohammad et al., 1991; Quraishi et al., 1995 for the improvement of rangelands are given as under:



**Range wise distribution of range lands is as follow:**

Range	Total area (m.h)	Range area (m.h)	Percentage
Punjab	20.63	8.20	40
Sindh	14.09	7.80	55
NWFP	10.17	6.10	60
Baluchistan	34.72	27.40	79
<b>Sub-total</b>	<b>79.61</b>	<b>49.50</b>	<b>62.20</b>
Northern areas	7.04	2.10	30
Azad Jamu & Kashmir	1.33	0.60	45
<b>Sub-total</b>	<b>8.37</b>	<b>2.70</b>	<b>32.20</b>
<b>Total</b>	<b>87.98</b>	<b>52.20</b>	<b>59.30</b>

**Strategies for enhancing and improving the carrying capacity of rangelands**

**Combating fodder shortage through sown pastures**

Rangeland production in the developed countries is based on the sown grasslands. At the moment, the natural grasslands in Pakistan are only the minimum requirements of the farming community of the country. The emphasis is still on the exploitation of natural productivity of the grasslands available with



the use of lowest level of management based on minimum use of agricultural inputs, like chemical fertilizers. Therefore, it is crucially important that the production potential of native grasslands should be improved, transforming them into sown pastures to meet the nutritional requirement of meat and milk of the country.

### **Achieving stability by replacing the native species with sown pastures**

The improved pastures with a greater potential of forage yield and quality should persist in maximum productive conditions under grazing. This objective can best be achieved by replacing the native species with sown pasture of better quality and high forage yielding grasses and legumes introduced from other parts of the world. This can be implemented conditions of the introduced species. In this respect the most important point will be the selection of the most desirable and suitable species that can successfully replace the native species (Mohammad, 1989; Mohammad et al., 1991; Quraishi et al., 1995).

Productive species from the indigenous grass and legume flora (because of their ready adaptability feature) must be identified. If more nutritious and productive genotypes can be located in the existing species might be replaced with introduced material to ensure a well-balanced proportion of grasses and legumes in the grasslands. In order to achieve this objectives, several authors (Mohammad, 1989; Mohammad et al., 1991; Quraishi et al., 1995) suggest the following management plans.

### **Management of culturable wastelands and pastures**

There are waste areas in the form of culturable and nonculturable wastelands which are being used as grazing lands. These wastelands have the potential to be developed into pasture lands of maximum productivity than what they are producing at present. It has been estimated that about 70 percent of the livestock population of the country subsists on the natural grasslands in and around forests. Thus, while Pakistan has about 65 percent of its area under grasses, the country does not have a tradition of grassland farming as compared to the other developed countries (Mohammad, 1989; Mohammad et al., 1991; Quraishi et al., 1995).

### **Selection of suitable and useful native grasses**

The community of plants growing in natural grasslands is result of natural selection and competition. These plants, posses a number of valuable and



unique characters which play an important role for their adaptation to the prevailing agro-ecological conditions but they have not been necessarily selected for maximum herbage yield and quality. These genotypes should be replaced with the ones which are more suitable for animal production. This is a difficult task because the naturally occurring genotypes had been favored by natural selection for hundreds of years. On the other hand, exotic species introduced in these pasture fail to compete and the pasture, may soon revert to its original composition. Therefore, following two inter-related approaches are suggested (Mohammad et al., 1991) to achieve the objective.

- Firstly, selection of the desirable genotypes with potential of forage yield, quality, persistence, and palatability should be made from the already existing native plant populations.
- Secondly, desirable genotypes should be introduced from the countries with similar ecological environment. The introduction of exotic forage grasses legume plants into the rangelands should have special ties alongwith forage yield, forage quality, the most important being the resistance (prevailing complex of pests and diseases. Longer vegetative growth cycle, tolerant to drought, ability to with browsing and trampling, petition and aggressive with coarse, hardy, inferior unpalatable species.

### **Intercropping grasses with legumes**

After evaluation, ideal and selection of desirable strains from the introduced material, the feature of the grassland search should be replaced of the native species with introduced strains through proving management practices particularly by application fertilizers and intercropping legumes with grasses.

Most of the grasslands in the country are dominated by grass of little recognized forage value and absence of any dominant legume species which is responsible for the low crude protein and quality of these forages. Many fodder legumes species like: cluster bean, cowpea, dhancha, siratro, Lucerne, medics, clovers, etc., can by very successfully intercropped with improved grasses species. This practice will also improve the soil fertility status of degraded native grasslands. Legumes (Nitrogen-fixing species) improve the potential of grassland by many fold without the heavy investment on chemical fertilizers (Mohammad et al., 1991).



## Forage quality, quantity and palatability

It is needed to evaluate, identify and select best quality forage species that have the potential to grow around the year to keep animals in good condition. Natural pastures of Pakistan are high in seasonal drymatter production. The native species are relatively deficient in protein and rich in fiber contents. Therefore, the quality of these pastures is not sufficient even to provide the maintenance requirements of that animals and the possibility of producing milk and meat on a large scale by using these pastures does not exist at all. The most important feature of natural pastures in Pakistan is that these mostly consist of summer perennial grasses which have rapid growth; due the short rainy season, As a result, during longer part of the year, the animals depend on dry and mature fodder of so poor nutritive quality that animals lose weight and some of them even die (Mohammad et al., 1991).

It is imperative to increase forage yield per unit area. Annual dry matter yield of majority of native pastures range from 1 to 2 tonnes per hectare. This low yield, irrespective of the management practices used, becomes a limiting factor for animal production. Therefore, improved species of grasses having a potential to produce more nutritive forage should be introduced in the pasture (Mohammad et al., 1991).

A large quantity of unpalatable forage of low nutritive value remains uneaten and unconsumed. Palatable and better quality of unpalatable forage species help in more efficient conversion of milk and meat, both by grazing and forage conservation (Mohammad et al., 1991).

## Fodder conservation during dry seasons

In Pakistan, the farmers usually raise fodder crops on a small piece of land to meet the needs of their livestock. These cultivated fodders are cut and directly fed to the animals. A very little quantity of this fodder is conserved by few farmers in the form of silage or hay. Usually, the straw and stubbles of different cereal crops like sorghum, maize, millet, wheat, barley and rice is used as a source of roughage. The farmer should conserve their surplus fodder in the form of hay or silage to ensure year-round supply of nutritive forage. This practice will also help to alleviate the adverse effects of fodder scarcity periods occurring during May-June and November-December in Pakistan (Mohammad et al., 1991).



## **Fertilizer application enhances production**

Application of chemical fertilizers and agronomic practices for successful cultivation and maximum productivity are management practices and are equally important but are not frequently practiced to bring the desired change (Mohammad et al. 1991).

## **Some additional steps towards improvement endeavors**

### *Date Collection and Evaluation of Range and Forage Material*

Date on various agronomic clipping and rate of fertilizers application should be collected. Also data on the impact and influence of various management and establishment practices on various traits, productivity, seasonal variation in growth: patterns, persistence to prevailing agroecological conditions insect, pest, and disease resistance, forage and drymatter yield, response to simulated grazing and finally quality traits would enable researchers and facilitate selection of a forage species.

### **Animal Preference**

Since selection of a desirable forage species is intended for animals consumption, therefore, it should be evaluated on the basis of animal's liking and preference. For cultivar selection, quality traits like palatability, intake and digestibility should be estimated at the earliest stage of selection.

### **Selected Cultivar**

Yield potential, growth rate and seasonal availability of forage in response to various management techniques like daily animal gains, quality forage consumed, and its growth and finally economic analysis of various inputs outputs must be confirmed.

## **Conclusion and Recommendations**

Rangelands occupy about 65 percent area of the country. Presently available ranges and pastures are unable to meet the feed and forage requirements of the country's livestock. There is a dire need to convert our rangelands into sown pastures. Selection of native grasses with desirable traits and application of fertilizers to them would enhance the production potential of the country's pastures. Cultivation of legumes with grasses (intercropping) would enrich the soil and enhance the fertility status of the soils, saving the heavy budget on inorganic fertilizers. The quality, quantity and palatability of



grasses and forages by cultivating and sowing nutritious and high yielding species with desirable traits, capable of growing around the year. The introduced species must be palatable and liked by the animals. Exotic species with desirable traits and ready adaptability characteristic must be included in the range improvement plan to enhance productivity. In this article, several strategies for improving natural grasslands and production potential of livestock have been outlined.

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