

10. Eradication of poisonous plants and controlling other undesirable woody plants.
11. Prohibition of cutting trees and shrubs and encourage people to use natural gas for fuel.
12. Drill more wells to provide water for the animals on a year-round basis.

### Summary

The problems in improving range management in Saudi Arabia can be summarized as follows:

1. The low rainfall of about 100 mm per year is not enough to grow many plants, except in the oases and the high mountains in the west and the southwest where the average rainfall is more than 400 mm. Most of the grassland is found in the higher rainfall area.
2. There is no organization to conserve the grasslands and to direct the people on how to use their grasslands, and keep a balance between the animals and the available forage.
3. There is no law controlling hunting. As a result, many game species are or are almost extinct.

These are the most important factors which have caused the severe range management problems in Saudi Arabia.

Organizations should be created with specialists in range management to show the people how important it is to keep their grasslands productive and how they should use their grasslands. Also, there should be more effort to drill more wells and distribute more water over larger areas.

Perhaps there should also be a program to use desalinated sea water to irrigate and cultivate large areas. Although the Ministry of Agriculture and Water has started building three desalination stations for this purpose, the program should be expanded.

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# Some Characteristics of Iranian Rangelands

## A. Koocheki

Iran covers approximately 1,650,000 square kilometers, making it almost 7 times larger than the state of Idaho. The country lies between 25° and 39° 45' north latitude, and 44° and 63° east longitude. Iran is bounded on the north by the Soviet Union and the Caspian Sea, on the east by Afghanistan and Pakistan, to the south by the Persian Gulf and Oman Gulf, and to the west by Iraq and Turkey.

There are four primary physiographic provinces distinguished in Iran: the Alborz and Zagros mountain ranges, the Caspian sea coast, the southern coastal plain and the Khuzistan, and the central plain.

The Alborz and Zagros mountains form the two major mountain systems of Iran. These two ranges meet in the northwest corner of the country near Turkey, Russia (Caucasus), and Iraq.

The Caspian Sea coast province includes the most productive lands found in Iran, but it covers only a relatively small area. Many crops, such as alfalfa, requiring neutral to basic soils are difficult to grow in this region because of soil acidity which generally increases from east to west. However, forage crops such as Bermuda grass, timothy, sorghums, and particularly Berseem clover grow well.

The area lying between the Alborz and Zagros mountains consists of a high V-shaped plateau which widens with decreasing elevation as it extends southward. Lesser moun-

tains and salt flats characterize the area.

The Khuzistan province includes part of the Mesopotamian plain and lowlands of both the Persian and Oman gulfs.

### Climate

Five main climatic zones are recognized for Iran:

**A-Caspian zone:** This area lying between the Caspian Sea and the Alborz mountains is the only part of Iran which clearly receives more than 500 mm of precipitation annually. To date, no meaningful drought has been reported in this zone. The mean July temperature is 26° C and mean January temperature is 8° C.

Three principal vegetation belts are found in the Caspian zone, each a forest type to geologic, precipitation, soil type, and elevational differences and interactions. The *lower* forest belt occurs at elevations from below sea level to 700 meters. Annual grasses such as *Oplismenus undulatifolius* and *Setaria* spp. are abundant. Perennial grasses include *Festuca ovina*, *Phleum boeumeri*, *Dactylis glomerata*, and *Phalaris* spp. A few legumes of the *Trifolium* and *Onobrychis* genera occur where tree overstory is not too dense and soils are not too acid.

The middle forest belt ranges from 700 - 2000 meters above sea level. The effective precipitation of this belt is higher than either the lower or higher elevational belts. In contrast to the lower belt, here perennial understory species are dominant. Commonly found heraceous plants include *Dactylis glomerata*, *Phleum boeumeri*, *Melica* spp., *Trifolium*

This article is based mainly on information provided by Mr. F. Niknam as his thesis for a Masters Degree, 1970.

The author is professor of agriculture at Ferdowsi University, Mashhad, Iran, located in Khorasan Province.

*repens*, *T. pratense*, and *Lotus corniculatus*.

The upper forest (subalpine) belt occurs at 2000 – 2500 meters, is colder and appears to have less effective precipitation than the other forest zones. Trees of this zone are relatively short, and shrubs of the Rosaceae family are more common. The herbaceous ground cover is well developed because of reduced density of tree canopy. A rich range of vegetation is found in the upper forest consisting largely of *Bromus persicus*, *Dactylis glomerata*, *Agropyron* spp., *Festuca* spp., *Onobrychis* spp., and *Astragalus* spp.

**B-Baluchi zone:** This zone is characterized by high relative humidity (60 – 80 percent) due to its close proximity to the Indian Ocean. It has Saharo-Sindian subtropical, arid affinities with an annual precipitation of less than 200 mm at sea level, but increasing with elevation. The total area comprises about 5.5 percent of the total area of the country. Long hot summers characterize the area with a July mean temperature of 34° C, and 15° C mean for January. The area is rich in perennial grasses such as *Panicum antidotale*, and *Pennisetum dichotomum*.

**C-Irano-Turanian zone:** This is a large zone covering more than 90% of the entire country. Dry summers and a temperate continental climate with precipitation ranges from 100 mm to 500 mm are found. The area is further subdivided into the following climatic sub zones, based on precipitation:

1. Sub-desertic zone occupies the driest part of the plateau and covers more than 20% of the entire country. Forty percent of this portion is made up of salt flats and sand dunes. The vegetation consists mainly of drought and salt tolerant members of the Chenopodiaceae family.
2. The steppic zone is a large area covering 30% of the entire country with a mean precipitation never exceeding 250 mm. Mean January temperature is 4 – 10° C and 29 – 37° C in July. This zone is easily distinguished from the sub-desertic zone by the presence of *Artemisia herba-alba*. Grasses such as *Aristida plumosa*, *Aeluropus* spp., and *Cymbopogon laniger* and legume species in the *Astragalus* and *Onobrychis* genera make up the main species found.
3. Sub-steppic zone comprises 24 percent of the country. Mean precipitation varies between 200 and 400 mm, with temperature varying significantly due to differences in latitude and elevation. Principal shrubs of this zone are *Artemisia maritima*, *A. aucheri*, *Salsola*, *Kochia*, and *Atriplex*. Representative grasses include *Andropogon ischaemum* and *Agropyron tauri*. Other important plants include the legumes of the *Onobrychis* and *Astragalus* genera. Rosaceae is represented by *Poterium* spp.

**D-Xerophilous Forest zone:** Precipitation is always greater than 400 mm with temperatures varying between –7 and 5° C in January and 18 to 30° C in July. This zone occupies more

than 11 percent of the entire country. Perennial grasses found include *Stipa* spp., *Bromus tomentellus*, and *Secale montanum*. *Onobrychis* spp. and *Astragalus* spp. are legumes common to the area.

**E-The High Mountain zone:** This zone has an alpine climate, and comprises about 5 percent of the country. Climatological data is very limited for this zone. Major species of the zone are *Agropyron* spp., *Bromus tomentellus*, *Festuca oviana*, *Trifolium* spp., and *Lotus* spp.

### The People Who Use the Range

Rural people in general are involved in range use in different ways. The main range users are as follows:

**Nomads.** Nomads are people who lead a migratory life with no fixed home or residence. Those in Iran can be specified as pastoral nomads, fully dependent upon domesticated livestock. They move from one place to another by passing along the same route every year and they have an established territory. This distance exceeds in some cases 400 km for nomads of southern Iran. When the tribe is moving to the next stop they do not leave anything behind them except the range, which is grazed properly according to their knowledge of range use. Their experienced experts have an understanding of indicator plants, which are locally selected.

**Semi-nomads.** The semi-nomads have a fixed home where they farm, and they have their family or part of them at home during the migration to summer range. They grow grains and forage crops as a help to offset the shortage of range forage. Grazing land which is used by semi-nomads of Iran is not as productive as that used by the nomads.

**Gypsies.** Gypsies are nomadic people who are a kind of wanderers, and their living conditions are decided by climate, local conditions, the hospitality of the local people, and chances for using national grazing land without a permit.

**Villagers.** Villagers have the poorest knowledge of range use and the most depleted grazing land is around villages. They send their animals out daily with herds and return them each evening. They are not economically dependent upon livestock, but want to benefit from range as much as they can and they are the cause of most grazing problems in Iran.

**Others.** Some people own more than 10,000 sheep herded by hired shepherds. Their migration includes shepherds and livestock only. These people have been in this business for a lifetime and are merchants who make a good profit, especially when the weather is favorable.

Except for the gypsies, and most of the nomads, range users supposedly hold a permit issued by the Government. Grazing has been regulated by an administrative body rather than a technical and scientific approach and it is hard to believe, however, that a single one of these range users is following regulations and is strict about the number of livestock grazed. ●