Dryland Farming in Iran and Its Impact on Rangelands and Nomadic Life

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Iran occupies an area of 1,650,000 km². The total land area under irrigation is approximately 3 million hectares with another 12 million hectares in dryland agriculture. About one third to one quarter of this area is farmed each year. The rest is left under fallow for one to three years. Nearly half of the dryland area is located in parts of the country which have less than 350 mm rainfall, 10 percent in areas with more than 500 mm, 15 percent in areas with 400-500 mm and 30 percent in areas with 300-400 mm.

Dryland farming has a long history in Iran. In the native language it is called “Dyme,” which refers to a steady rainfall but in its specific meaning it is rainfed farming. In almost all parts of the country, dryland farming is practised and anybody may grow one to two hectares of rainfed cereals. The main crop under dryland farming is cereal, particularly wheat with a total annual production of approximately 2.5 million tons. This is nearly one third of the nation’s total wheat requirement.

Dryland farming is mostly practised on lands which are not suitable for irrigation and in hilly and mountainous areas. The farming practices involved differ from place to place as far as tillage and sowing (amount of seed used and time of sowing) is concerned. Since rainfall occurs mainly during the winter months in most areas, autumn sowing is practised; but in places where there is spring rainfall, spring varieties of wheat are available and seeding is done at the end of winter. The amount of seed used varies from 30 to 100 kg/ha depending on the amount of rainfall and moisture available at the time of sowing. No fertilizer is used and weed control is not practised. In this type of dryland farming, after ploughing the land sowing is carried out and the seed is covered by discing or a light ploughing. There is not much else done until harvesting, which may be carried out with hand scythes or with combines. This type of traditional dryland farming is not profitable as the average yield of wheat is only around 600 kg/ha, which does not even cover the cost of land preparation and sowing.

Rangeland is defined as land on which the native vegetation is predominantly grasses, grasslike plants, forbs, and shrubs that are suitable for grazing or browsing and includes lands revegetated by native or introduced species to provide a cover that is managed like native vegetation. It is often referred to as residual land areas left after cultivation has reached the frontiers where inadequate water, difficult topography, and soil instability make cultivation economically unfeasible.

The area under dryland farming varies from year to year according to the amount of rainfall. In years with good rainfall there is a tendency to grow as much rainfed crops as possible and many of the rangelands are ploughed up. In years with low rainfall this trend is reversed and a large area remains under range. Rangelands and drylands are, therefore, interchangeable and there are no distinct boundaries for them. The area under fallow between seeding serves as grazing land, with the straw and stubble left after harvesting being grazed. On a regional basis, the amount of precipitation usually determines rangeland-cropland boundaries. Within dry-farming regions, permanent rangeland occupies those areas that are (a) un tillable because of topography, rocks, or water content; (b) unstable because of water or wind erosion; (c) unproductive because of inherent low fertility, high salinity, alkalinity, or inadequate soil depth.

Forage production on the native range is affected not only by the prevailing climate but also by such local site factors as topography and soil texture, depth, and fertility. Production levels vary considerably, averaging between 100 and 700 kg/ha of grazable forage annually.

Three groups of range users can be distinguished: (1) nomads, (2) seminomads, and (3) villagers. Nomads and seminomads are the main range users. They have a migratory life and travel throughout the year searching for forage to feed their livestock. They move their animals to mountainous areas during the summer and to the plains during the winter. This movement is called “yilagh” and “gheshlagh” respectively. These people are financially dependent on their animals, and not very many years ago most of the animal production in the country was provided by the nomads. Nomads have some knowledge of range use, and by experience they know how to graze the land without much harm to the vegetation and they even know the key species. Some steps in range improvement are also taken by the nomads; this includes collecting the seeds of most palatable species and broadcasting them while they are passing over the lands. Seminomads are those people who normally settle during part of the year and migrate for the rest of the year. They may have some occupation other than animal husbandry. Villagers are the greatest cause of deterioration of the rangelands and have no knowledge of land use. These people are mainly farmers who keep some animals for their daily needs of animal products and leave their animals unattended in the range around the villages through the year.

As pointed out earlier, the forage provided by rangelands is low, sufficient to feed only one quarter of the total animal population of the country.

Cultivation of rangelands in recent years is another cause of range deterioration. This has two main social reasons. Firstly, some of this land is being ploughed up to provide a

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right of ownership of the land. Because of improper management soil erosion is a problem. The second reason is related to economics. Most of the fertile, tillable rangelands where water can be provided have been brought under the intensive cultivation of crops such as vegetable, melon, and watermelon. In recent years the government has tried to encourage the farmers to grow the strategic crops such as cereals, sugar beet, cotton, etc. This has not been successful because the profit from one hectare of melon is equivalent to that of more than 10 hectares of wheat.

Crop residue, mainly cereals, straw, and sugar beet pulp are another source of animal feed. Crop residue affects soil-water storage, soil fertility, and weed control-all important factors in dryland farming. Residues are an important source of soil nutrients and organic matter and provide water-conserving mulches. Such mulches are also important for wind erosion control.

Forage crops are another source of feed for livestock but in spite of the fact that the most important forage crop, lucerne, originates from Iran, little has been done about this crop and not much is grown in proportion to other crops. In general all these sources cannot provide feed for more than half of the 80 million animal units available in Iran (one animal unit is equivalent to one adult sheep).

As has been pointed out before, in years with good rainfall much of the good rangelands are brought under rainfed crops. When rain is not adequate these lands are used as grazing areas. This practice has brought about, apart from erosion, a major social problem related to the nomad's life. Many of these people have left their tribes and started a new life around the big cities. The minimum rainfall for producing a crop in the dryland region is estimated at 250–350 mm in winter rainfall areas and 500 mm in summer rainfall areas. Notwithstanding the major influence of rainfall on yield, yields are not always directly proportional to the amount of precipitation. Generally yield levels are determined by the amount of precipitation above the basic minimum required to enable the crop to achieve maturity. It, for instance, under given circumstances 250 mm is the necessary minimum precipitation for a grain crop, 225 mm or a reduction of only 25 mm may result in complete crop failure. Conversely, 50 mm above the minimum requirements may double the yield. Moisture preservation can be carried out by leaving the land unsown for one or two years. This requires proper tillage and also weed control during the fallow year. In the following autumn the land is sown and moisture left over from the previous year will help the seed to germinate quickly before the rain starts. Experience has shown that even with proper equipment and management not more than 20% of moisture can be transferred from one year to another, but in many years this will suffice for a reasonable yield.

Summary

Rangeland-cropland boundaries in Iran are not permanently fixed and they shift in either direction in response to environmental and economic conditions. Range deterioration caused by dryland farming or other economic reasons has brought about different social problems including immigration of nomads and farmers to big cities. In the present situation dryland farming in most parts of the country is not only unprofitable but also harmful, resulting in soil erosion of productive land.

There seems to be a need to make a clear definition of rangeland area, together with a restriction of dryland farming in some areas and the introduction of modern dryland farming in areas which are suitable for this purpose. An integrated system of cereal and forage production in dryland farming has many advantages and this type of rotation should be practised in dryland areas of Iran.

Literature Cited


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