

## **Geographical Distribution of Drylands in Asia with Regard to Its Water Resources**

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About one-third of the world's land mass is hyper-arid, arid or semiarid, and, excluding the Arabian Peninsula, about one-quarter of Asia.

The purpose of this article is:

- To note the extent and nature of water in arid and semi-arid regions of the world with special reference to Asia.
- To draw attention to the scientific and other values of waters in arid and semi-arid regions.

A convenient way to refer to hyper-arid, arid and semi-arid regions of the world, and one now often used, is to use the term drylands. Dryland in a general sense are those regions with receive an average less than 500 mm of rain each year. They cover almost a third of the landmass of the earth, a note insignificant fraction of which lies within Asia as table indicates. The extent of drylands in Asia (excluding the Middle East) is shown in Table 1. Most attention from limnologists worldwide has focused upon freshwater lakes, rivers and streams in the better-watered regions of the world. But semi-arid and arid regions of the world also have numerous lakes and rivers and other sorts of water-body, and not-withstanding the lack of attention according them they are not without considerable scientific interest and other values. Large parts of Asia are semi-arid and arid and here too limnological studies have been relatively slight. Large lakes and rivers, smaller bodies of standing and flowing waters are numerous. They are several characteristic types, and indeed this variety of type is greater than that found in any other climactic region. Lentic waters include permanent and temporary, natural and man-made, saline and fresh bodies. All types are found widely distributed in semi-arid and arid drylands, but not in hyper-arid regions. The extreme aridity of hyper-arid regions (where average annual rainfall is less than 25 mm each year) precludes the occurrence of all but the most short-lived of waters. The largest lake in the world, the Caspian Sea, provides the best-known example for lakes. The Syr-and Amu dar'ya provide examples for rivers. There are many issues of current interest with regard to waters in dryland regions that are attracting attention from limnologists. One of the most important issues unique to or particularly significant in drylands is secondary salinization (saline waters are those which contain more than 3 g/l total salt; fresh waters are those with less than this salt concentration).

A number of factors give rise to salinization: excessive clearance of the natural vegetation, overuse of water in irrigation, or changes to the nature of groundwater/surface water interaction are the most important.

All types of water-body in Asia drylands, as in drylands elsewhere, offer many opportunities for the study of several issues of current ecological interest.

## **THE MIDDLE EAST**

Of all the world's arid zones, the Middle East possesses the longest history of human settlement. The Middle East is made up of a wide variety of environments, ranging from high snow-clad mountains in Turkey and Iran to some of the most arid sand deserts in the world in southern Arabia and Egypt. Climatically, there are great variations as well at least in terms of temperature, though nearly all areas are subject to marked water deficiencies at certain times of the year. Population in the Middle East is concentrated in areas which have access to water resources, whether in the form of precipitation or as water brought by rivers from areas of water surplus. Desertification as the result of socio-political factors is much more difficult to establish owing to the lack of historical records.

Throughout the Middle East one commonly hears of severe vegetation degradation and widespread soil erosion having led to a loss in biological productivity. The limitations which soils impose on agriculture activities through such factors as erosion, soil thickness, angle of slope and salinity, can be studied on a broad scale or at the micro-level. If one looks at the soil potentiality of Iran (see Figure 1), one is struck by the fact that the areas possessing few or no soil limitations are very small indeed. In total, soils in this category cover an area of slightly above 14 million ha, of which between 70 to 80% area under cultivation.

During the twentieth century the Middle East has been faced with a rapid increase in pressure on its resources base. To date, rates of population increase have remained remarkably similar from one country to another (see Figure 2).

There are three factors which are possibly worthy of more detailed study when looking at the effects of desertification. These are: the speed of desertification, the scale of desertification and the permanency of desertification.

## **REFERENCES**

- The Threatened Drylands, Regional and systematic studies of desertification. Edited by J.A. Mabbutt and S.M. Berkowicz, 1980.
- W.D. Williams. 2000. Waters in arid and semi-arid regions, with special reference to Asia. Water Resources, Vol. 27, No. 5.

Table 1. Extent of Dryland in Asia (excluding the Middle East). After Various Sources

Region	Mean annual rainfall, mm	Asia		World	
		area 10 <sup>6</sup> km <sup>2</sup>	percent of Asia	area 10 <sup>6</sup> km <sup>2</sup>	percent of World
Hyper arid	<25	0.4	1.0	7.8	5.7
Arid	25-200	4.0	10.5	19.1	14.1
Semiarid	200-500	5.3	13.9	17.9	13.2
Σ		9.7	25.4	62.5	33.0

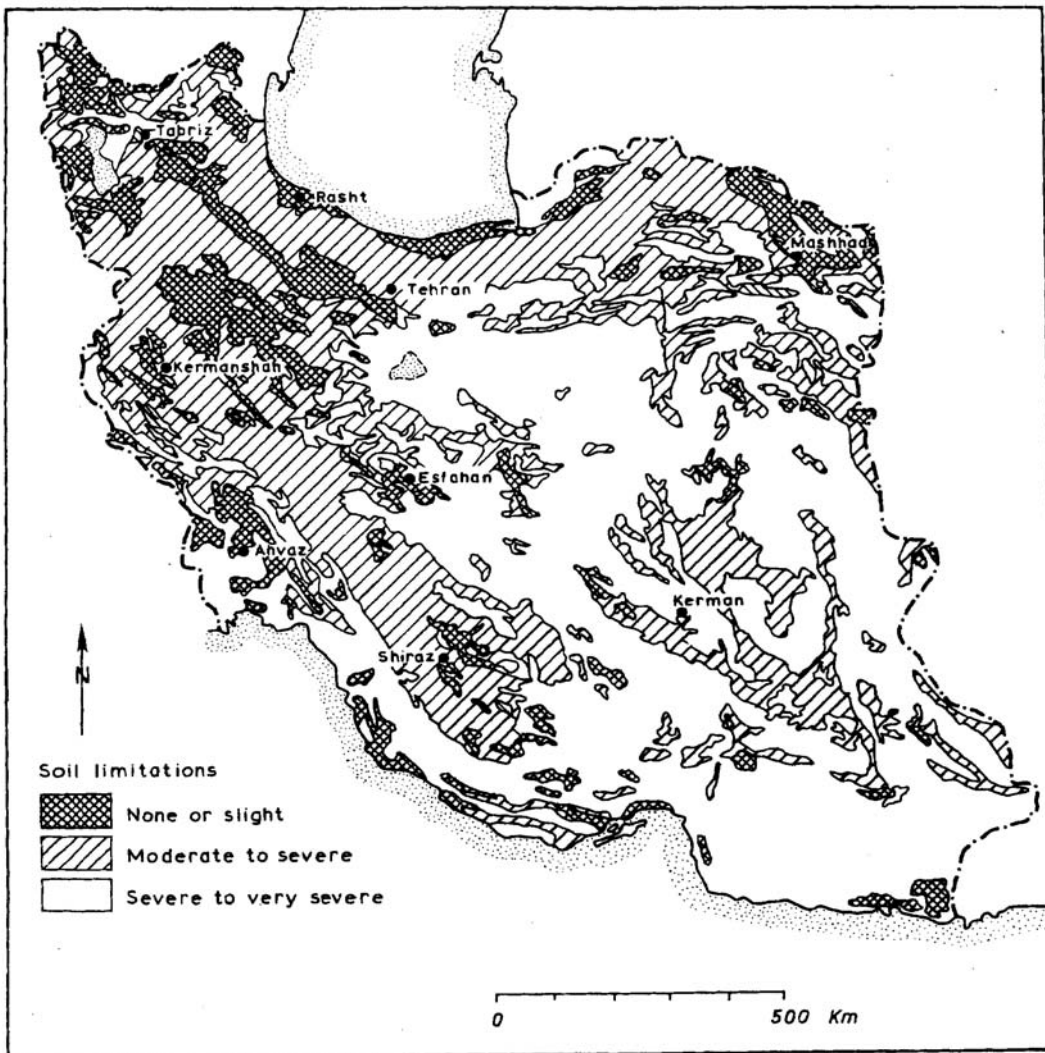


Figure 1. Soil Limitations upon Agricultural Activities in Iran (Modified from Dewan and Famouri (1964))

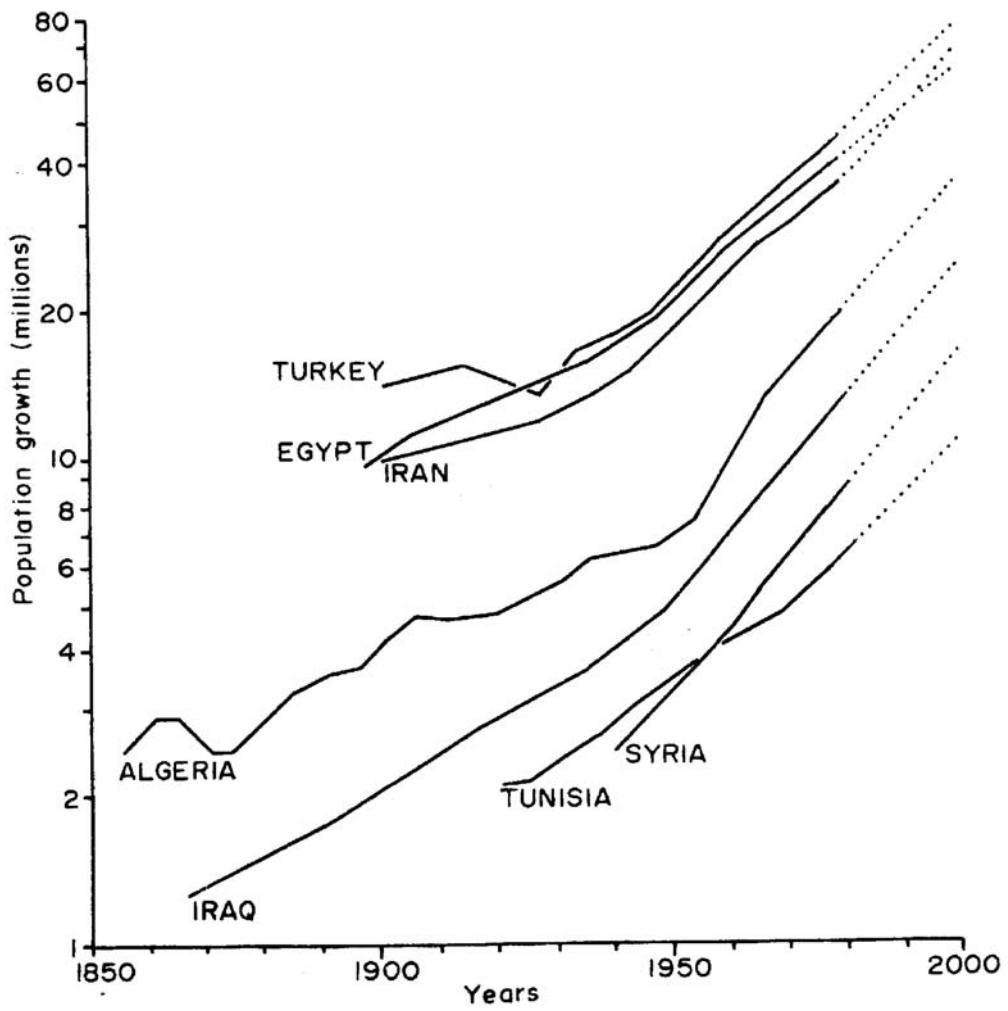


Figure 2. Past and Projected Population Growth in Middle Eastern Countries