

6. Agricultural Production Systems

Notwithstanding extreme aridity and limited renewable water resources, the Arabian Peninsula has developed indigenous agricultural production systems, based on crop production under irrigation, and extensive livestock systems. Rapid economic development in the latter half of the 20th Century has resulted in significant changes in the traditional agricultural systems of the subcontinent. Increased agricultural production has contributed to economic growth, but at the price of degradation of natural resources, particularly the rangelands and the non-renewable groundwater aquifers.

Country-level data indicate that the cropland areas are very limited in the Peninsula (Table 10). With the exception of Saudi Arabia and Yemen, the

Table 10. Cropland in the Arabian Peninsula

Country	Surface ^a	Crop ^b	Irrigation ^c
<i>Bahrain</i>	680	7.0	100
<i>Kuwait</i>	17,820	0.4	71
<i>Oman</i>	212,460	0.3	98
<i>Qatar</i>	11,000	1.5	76
<i>S. Arabia</i>	2,149,690	1.8	42
<i>UAE</i>	83,600	1.0	89
<i>Yemen</i>	527,970	2.9	31

Base year for statistics: 1997

^a Country area in km²

^b Crop: % of country area that is cropland (defined as sum of arable land and permanent cropland)

^c Irrigation: irrigated land as a % of cropland area

Source: World Resources Institute, URL: http://earthtrends.wri.org/country_profiles

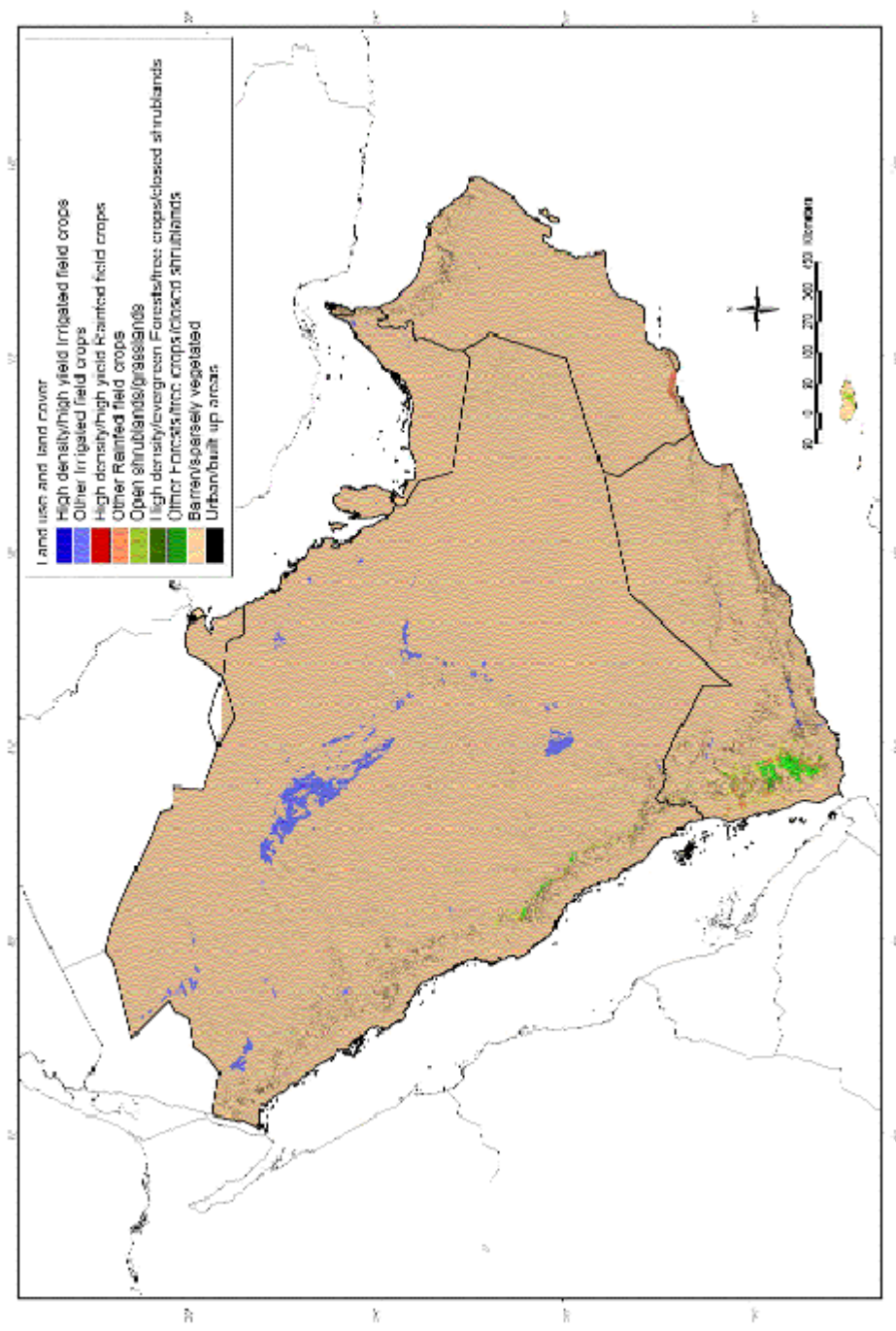


Fig. 49: Land use and land cover

majority of areas under crops are irrigated. Both statistics underscore the critical limitation of water, since soil resources for agriculture are much less limiting (see Section 'Soils').

The land use and land cover of the Arabian Peninsula are shown in Figure 49. It is clear that most of the subcontinent is either bare or under very sparse vegetation. The lack of vegetation is probably as much the result of overgrazing as aridity. Between 1980 and 1996 the livestock numbers nearly doubled, from about 15 million to about 28 million sheep and goats, and from about 550,000 to 850,000 camels (FAO, 2001).

The best cover is found in the Yemen Highlands and Asir mountains. It consists of open shrubland and woodland interspersed with rainfed agriculture. (This is the only part of the Arabian Peninsula with a growing period adequate for rainfed agriculture. See Section 4.6.2.)

Between 1980 and 1996, area under irrigation more than doubled, aided by the use of modern irrigation technology, such as center-pivot and drip irrigation (Figure 50). Some large areas in the deserts of Saudi Arabia are irrigated, as are some valleys in Yemen (Figure 49). The spectacular growth in irrigated agriculture in the center of the Arabian Peninsula between 1983 and 1993 is shown in the four scenes from the 8-km resolution AVHRR (Advanced Very High Resolution Radiometer) satellite (Figures 51a-51d). The areas with high biomass productivity are shown in red or brownish colors. The rainfed areas of the Yemen Highlands show up clearly, as do some coastal flats with halophyte vegetation. All other inland areas in red or brown are irrigated. In 1983 (Figure 51a) there were barely any irrigated areas. Ten years later they reached their maximum extent (Figure 51d).

The changes in biomass productivity as a result of irrigation in the desert (and some crop area increase in the rainfed areas of Yemen and the Asir) are shown in Figure 52. It should be noted that the small spots scattered across the image are probably artifacts due to errors in processing the satellite signal.

Since most of the irrigated agriculture is fed by fossil aquifers, which are barely recharged, this type of agriculture is obviously not sustainable.

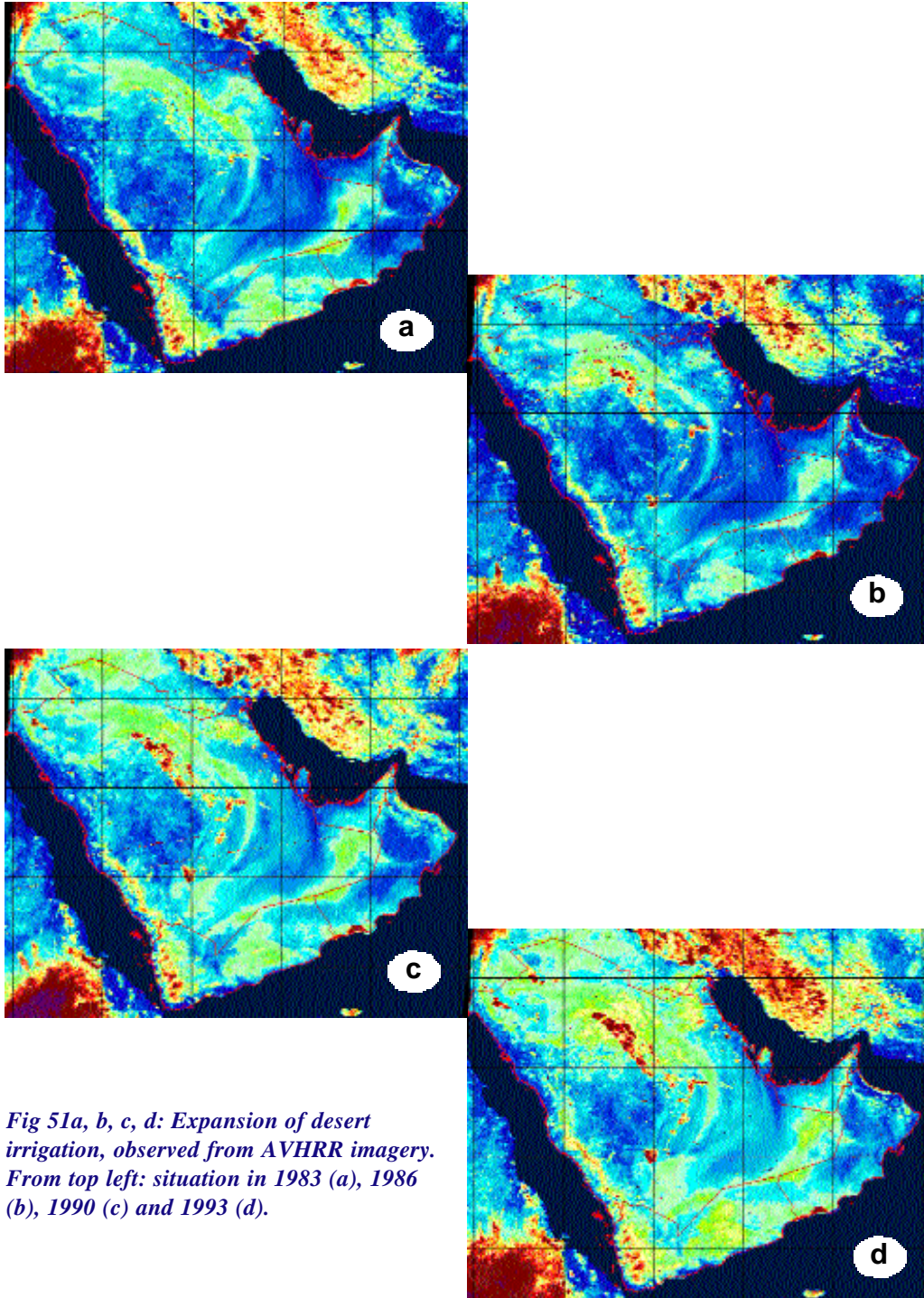


Fig 51a, b, c, d: Expansion of desert irrigation, observed from AVHRR imagery. From top left: situation in 1983 (a), 1986 (b), 1990 (c) and 1993 (d).

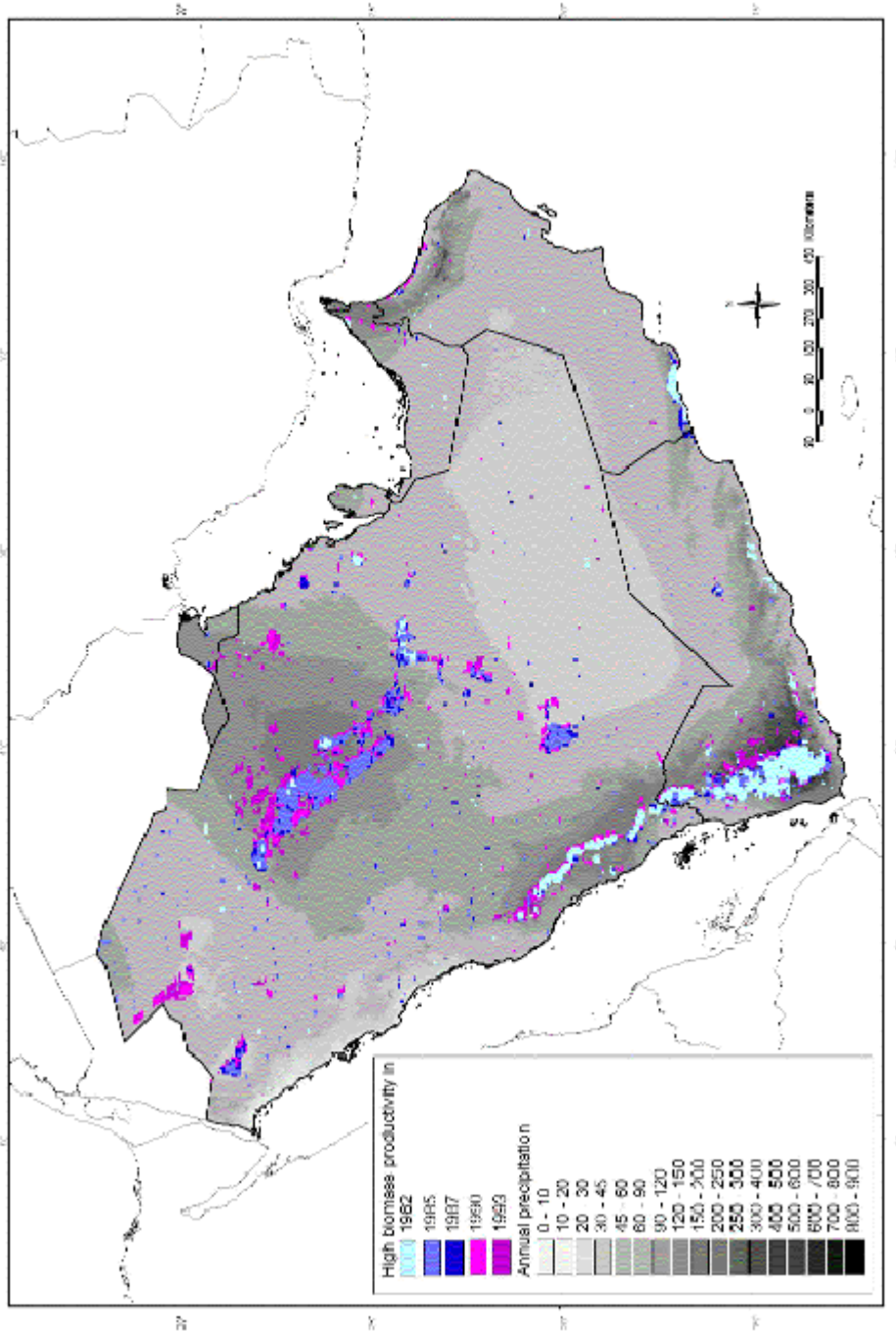


Fig. 52: Evolution of desert irrigation 1982-1993