

Box 2.26 The Quantity and Quality of Freshwater

Freshwater systems provide the single most essential good: water—for drinking, cooking, washing, rinsing, mixing, growing, processing, and countless other human uses. Increases in population, industrial production, and agricultural demand have caused the global rate of water consumption to grow twice as fast as the population rate (WMO 1997:9).

The quantity and quality of water available from freshwater systems is greatly influenced by land use within the watershed from which the water is drawn. The mix of cities, roads, agroecosystems, and natural areas affects transpiration, drainage, and runoff and often dictates the amount of pollution carried in the water. Natural waters have low concentrations of nitrates and phosphorous, but these levels increase in rivers fed by runoff from agroecosystems (especially in Europe and North America, where synthetic fertiliz-

ers are widely used) and urban areas. The excess nutrients stimulate plant growth, which can choke out local freshwater species, clog distribution systems, and endanger human health.

Just as clean water is often a victim of development, development, too, can be a victim of the lack of clean water. Many experts predict that the lack of clean water is likely to be one of the key factors limiting economic growth in the 21st century. As of 1995, more than 40 percent of the world's population lived in conditions of water stress (less than 1,700 m³ of water available/person/year) or water scarcity (less than 1,000 m³ of water available/person/year). This percentage will increase to almost half the world's population by 2025. River basins with more than 10 million people by 2025 that will move into situations of water stress are the Volta, Farah, Nile, Tigris and Euphrates, Narmada, and Colorado (Brunner et al. 2000).

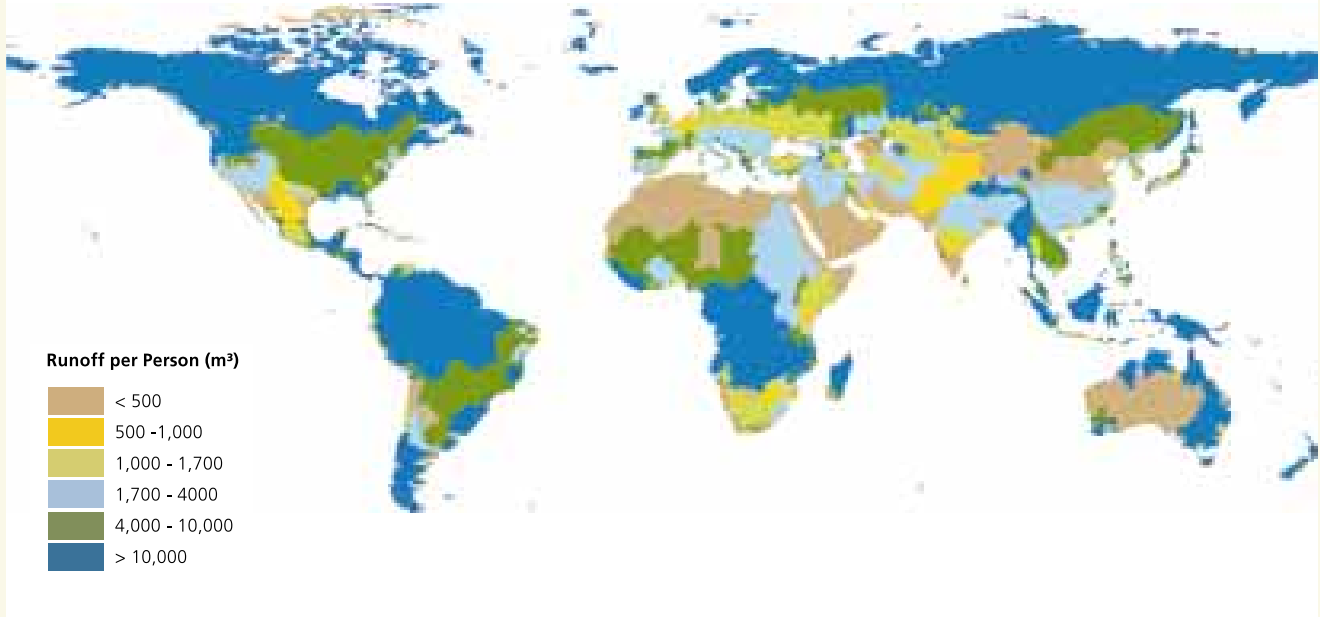
Nutrient Pollution in Selected Rivers, 1994

Region	River	Area (millions of km ²)	Concentration (mg/l)	
			Nitrates	Phosphates
Africa	Zaire	3.69	n.a.	n.a.
	Nile	2.96	0.80	0.03
Asia	Huang He	0.77	0.17	0.02
	Brahmaputra	0.58	0.82	0.06
Europe	Volga	1.35	0.62	0.02
	Seine	0.06	4.30	0.40
N. America	Mississippi	3.27	1.06	0.20
	St. Lawrence	1.02	0.22	0.02
Oceania	Murray Darling	1.14	0.03	0.10
	Waikato	0.01	0.30	0.10
S. America	Amazon	6.11	0.17	0.02
	Orinoco	1.10	0.08	0.01

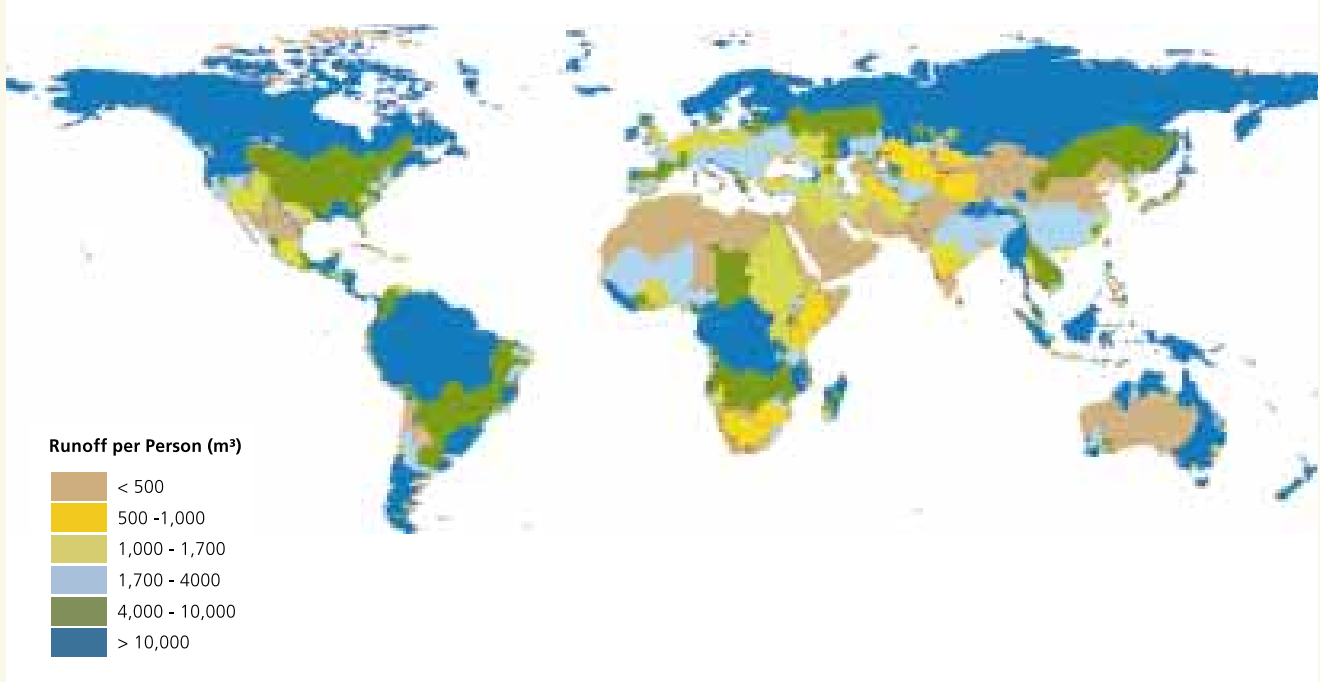
Global Water Availability, 1995 and 2025

Status	Water supply (m ³ /person)	1995		2025	
		Population (millions)	Percentage of Total	Population (millions)	Percentage of Total
Scarcity	<500	1,077	19	1,783	25
	500–1,000	587	10	624	9
Stress	1,000–1,700	669	12	1,077	15
Adequacy	>1,700	3,091	55	3,494	48
Unallocated		241	4	296	4
Total		5,665	100	7,274	100

Annual Water Availability per Person by River Basin 1995



Annual Water Availability per Person by River Basin 2025



Sources: Nutrient pollution table is based on UNEP-GEMS (1995). The water availability table and maps are from Revenga et al. [PAGE] 2000, based on Brunner et al. (2000), Fekete et al. (1999), and CIESIN (2000). Water scarcity projections are based on the UN's low-growth projection of population growth or decline; they do not take into account effects of pollution and climate change.