

CHAPTER 22

INTER-BASIN WATER TRANSFER

22.1. INTRODUCTION

India has 16% of the world's population, 4% of the world's freshwater resources and 2% of world's land area. In India, precipitation distribution is highly variable – both temporally and spatially. The rainfall over the country is primarily associated with tropical depressions originating in the Arabian Sea and the Bay of Bengal. Nearly 80% of the annual precipitation is received during 4 months of summer monsoon season. Spatially, precipitation varies from less than 100 mm in Western Rajasthan to more than 10,000 mm in parts of Meghalaya. Large parts of the country are not only in deficit in rainfall but also subject to large variations, resulting in frequent droughts and causing immense hardship to the population and enormous loss to the nation. The uncertainty of occurrence of rainfall coupled with prolonged dry spells and large fluctuations in seasonal and annual rainfall is a serious problem in the country. The water availability even for drinking purposes becomes critical, particularly in the summer months as the rivers dry up and the ground water recedes.

Regional variations in precipitation lead to situations when some parts of the country do not have enough water even for raising a single crop while intense rainfall in some other parts creates havoc due to floods. Floods are a recurring feature, particularly in Brahmaputra and Ganga Rivers, which carry close to 60% of the river flows of the country. Table 1 shows the water resources potential and per capita water availability in the river basins of India. Due to topographical and other constraints, only 690 BCM of surface water out of 1,869 BCM and 432 BCM of ground water can be put to beneficial use. The reasons behind lesser quantities of utilizable flows are the skewed spatial distribution of these flows and that potentially good storage sites are not available in basins with plenty of water resources.

As can be seen from Table 1, nearly 60% of the potential is available in the Ganga-Brahmaputra-Barak River system in the north. About 11% is available in the high rainfall region of the Western Ghats which flows down through many small west flowing rivers. Hardly 16% of the potential is available in all the rivers – including mighty rivers like Mahanadi, Godavari, Krishna and Cauvery – of the peninsular India flowing towards east.

To illustrate disparities in the water availability, the per capita water availability for the year 2000 and projected data for the year 2025 for major basins

Table 1. Water Resources Potential of River Basins of India

S. N.	Name of the River Basin	Average annual potential as per NCIWRDP	Estimated utilizable surface water (km ³)	Per capita water availability (m ³)	Ground water potential (km ³)
1.	Indus (Area in Indian Territory)	73.31	46.00	1,757	26.5
2.	a) Ganga b) Brahmaputra, Barak, and others	525.02 677.41	250.00 24.00	1,260 14,616	171.57 35.07
3.	Godavari	110.54	76.30	2,026	40.65
4.	Krishna	69.81	58.00	1,058.0	26.41
5.	Cauvery	21.36	19.00	750.0	12.3
6.	Pennar	6.32	6.86	648.0	4.93
7.	East flowing rivers from Mahanadi to Godavari and Krishna to Pennar	22.52	13.11		18.8
8.	East flowing rivers between Pennar and Kanyakumari	16.6	16.73		18.2
9.	Mahanadi	66.88	49.99	2,546	16.46
10.	Brahmani & Baitarani	28.48	18.30	2,696	4.05
11.	Subarnarekha	12.37	6.81	1,392	1.82
12.	Sabarmati	3.81	1.93	182	3.2
13.	Mahi	11.02	3.10	1,057	4.0
14.	West flowing rivers of Kutch & Saurashtra including Luni	15.10	14.98	631	11.23
15.	Narmada	45.64	34.50	2,855	10.83
16.	Tapi	14.88	14.50	1,091	8.27
17.	West flowing rivers from Tapi to Tadri	87.41	11.94		
18.	West flowing rivers from Tadri to Kanyakumari	113.53	24.27	3,366	17.69
19.	Area of inland drainage in Rajasthan desert	Negligible		Negligible	—
20.	Minor rivers draining to Myanmar (Burma) & Bangladesh	31.00		14,616	—
	Total	1,952.87	690.00		431.98

in India is shown in Figure 1. It can be seen here that per capita utilizable water in Sabarmati basin is 182 m³/year (1991 census), 2,050 m³/year in Mahanadi, 2,900 m³/year in Narmada basin and more than 14,000 m³/year in the Brahmaputra basin. The utilizable water per ha of culturable area varies from 1,244 m³/ha in the Sabarmati basin to 8,320 m³/ha in the Mahanadi. Table 2 further illustrates the