

Chapter 4 Highlights

1. Throughout human history, societies have met their water needs by adapting to—and modifying—their local water cycle. This has often involved the alteration of water's temporal distribution through storage and of its spatial distribution through water transfers.
2. The development of civilization was closely linked to an improved ability to harness water supplies for settlements and agriculture. Early civilizations developed a variety of water technologies, including *dry farming*, irrigation, *runoff farming*, *aqueducts*, wells, dams, cisterns, *cenotes*, *stepwells*, and *qanats*; the diversity of approaches reflects the range of local conditions encountered.
3. Droughts and other hydrologic changes posed challenges to early civilizations, sometimes contributing to collapse and migration.
4. The Romans developed a model of urban water supply that has had significant influence on modern water systems: the importation of water from the surrounding countryside in far-reaching aqueduct systems, coupled with the flushing of wastes from cities into waterways.
5. Water management in the modern era is characterized by an approach referred to as the hard path, which has utilized gray infrastructure in a centralized, uniform way to dominate nature and change the distribution of water to match human demand. The hard path is different from earlier water management approaches in its global reach, the massive scale of its projects, and its profligate use of energy and materials.
6. Water management in the US and elsewhere is transitioning to a softer path, with more of a focus on collaborative, decentralized, and nature-based solutions. Many LMICs continue to build massive dams and aqueducts.
7. Given the wide range of uses for water, water management responsibilities are often distributed across various agencies with different interests, so integration across agencies and scales is a central challenge. The river basin is a natural unit for integrated management, but water managers must often work simultaneously at multiple scales.
8. “Water use” is a more complex concept than it might seem, so it is important to clarify what is meant in a given context: Blue or green? Instream or offstream? Withdrawal or consumption?
9. The *water footprint* is a tool for understanding water consumption—both direct and indirect—associated with products, companies, and countries. Water footprints have blue and green components, but these components are not directly comparable.
10. Globally, agriculture—especially irrigation—accounts for the majority of blue water withdrawal and consumption. Reservoir evaporation is a consumptive use that is large and growing, but hard to quantify and easy to ignore.
11. Per-capita water use in many sectors has gone down over the last several decades due to increased *water-use efficiency*.