




Louis Berger

Integrated Water Resources Planning

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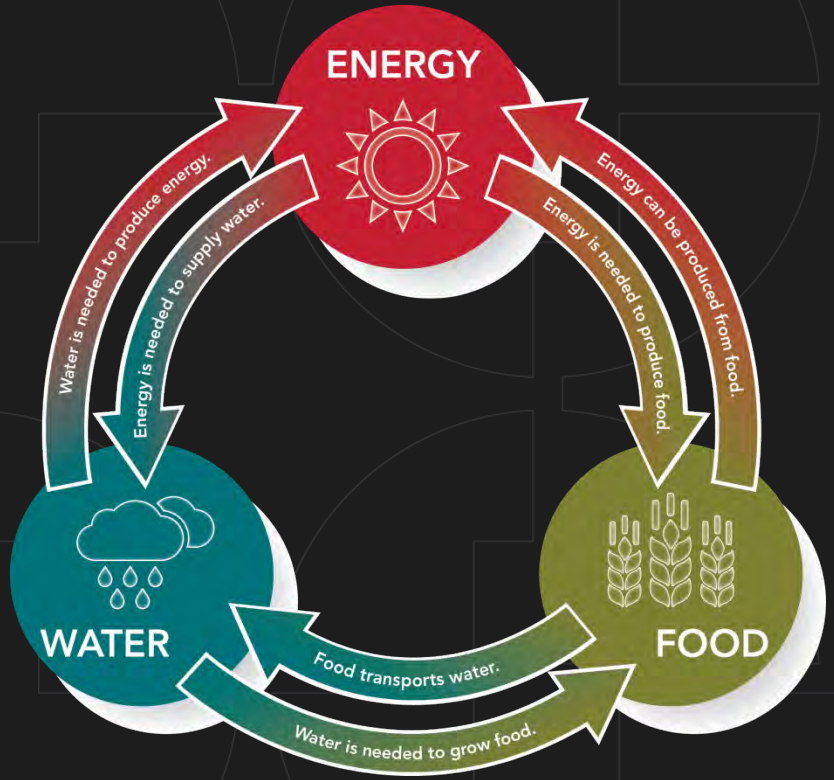
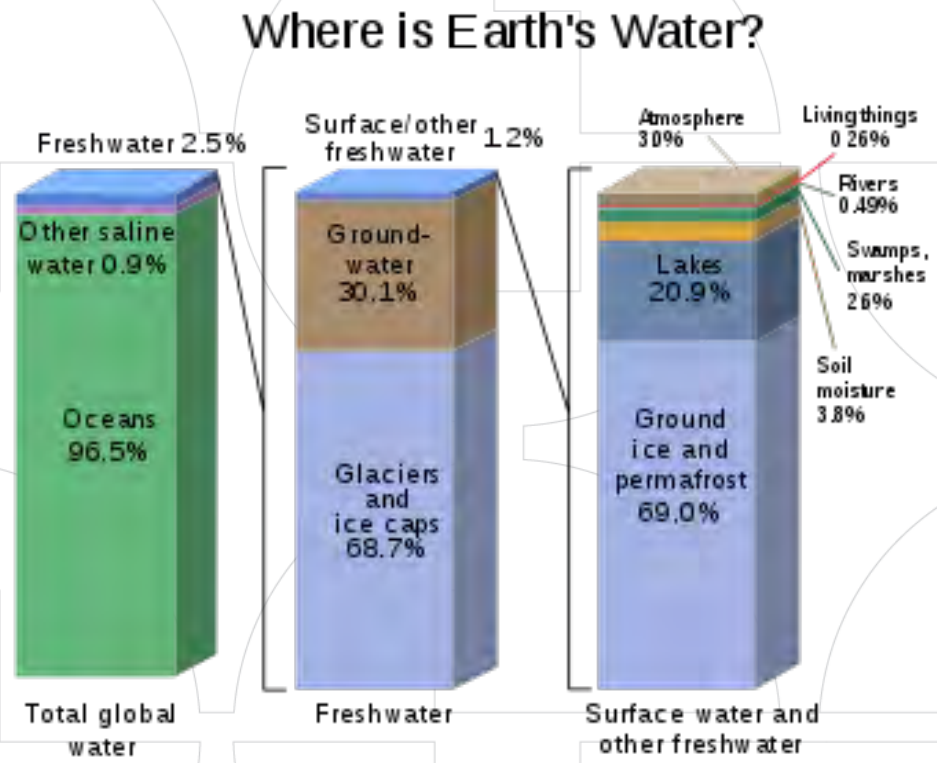
Water, food and energy are fundamental to the functioning of society, closely interlinked and associated with deep security concerns



Adapted from: Water – A Global Innovation Outlook Report, IBM, 2009

Water-Food-Energy Security Nexus

- billions of people without access to them;
- rapidly growing global **demand** for each of them;
- each faces **resource constraints**;
- each depends upon healthy ecosystems;
- each is a global good with trade implications;
- each has different **regional availability and variations** in supply and demand; and
- each operates **in heavily regulated markets.**



A graphical distribution of the locations of water on Earth. Only 3% of the Earth's water is fresh water. Most of it is in icecaps and glaciers (69%) and groundwater (30%), while all lakes, rivers and swamps combined only account for a small fraction (0.3%) of the Earth's total freshwater reserves

Water Uses

- **Agricultural:** It is estimated that 70% of worldwide water is used for irrigation, with 15-35% of irrigation withdrawals being unsustainable
- **Industrial**, 22% of worldwide water is used in industry
- **Household**, 8% of worldwide water use is for domestic purposes. These include drinking water, bathing, cooking, toilet flushing, cleaning, laundry and gardening

- **Recreational**: is usually a very small but growing percentage of total water use. Recreational water use is mostly tied to reservoirs and typically non-consumptive.
- **Environmental Activities**, is very small but growing percentage of total water use. Environmental water may include water stored in impoundments and released for environmental purposes. It is non-consumptive but may reduce the availability of water for other users at specific times and places.

Water stress

a situations where there is not enough water for all uses…

- **Population growth.** In 2000, the world population was 6.2 billion. The UN estimates that by 2050 there will be an additional 3.5 billion people
  - **Expansion of business activity**
  - **Rapid urbanization**

Climate change: Can have significant impacts on water resources because of the **close connections between the climate and hydrological cycle**.

- Rising temperatures will increase evaporation and lead to increases in precipitation
- Both droughts and floods may become more frequent in different regions at different times,
- Higher temperatures will affect water quality. Possible impacts include increased eutrophication.
- Climate change could also mean an increase in demand for farm irrigation, garden sprinklers, and perhaps even swimming pools.

cross-cutting, overarching strategies

- **Systems Approach**
- **Performance based** - **indicators** to monitor the performance of the ***Strategic Plan***
- **Adaptive Management** –promotes flexible decision making that can be adjusted in the face of risks and uncertainties
- **Collaboration and Partnering** – Build and sustain collaboration and partnerships
- **State-of-the-Art Technology** – Embrace new and emerging technology and research
- **Innovative Financing** – Seek innovative arrangements such as public-private partnerships, revised funding prioritizations, and other appropriate funding mechanisms to develop and sustain water resources infrastructure

Strategic Plan/Frame work?

Watershed Management

is the study of the relevant characteristics of a watershed **aimed at the sustainable distribution of its resources and the process** of creating and implementing plans, programs, and projects to sustain and enhance watershed functions that affect the plant, animal, and human communities within a watershed boundary.

Features of a watershed to manage include:

- water supply,
- water quality,
- drainage, stormwater runoff,
- water rights, and
- overall planning and utilization of watersheds.

Landowners, land use agencies, stormwater management experts, environmental specialists, water use surveyors and communities all play an integral part in watershed management.

Integrated water resources management

IWRM is a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

IWRM rests upon three principles :

1. Social equity: ensuring equal access for all users to an adequate quantity and quality of water necessary to sustain human well-being.

2. Economic efficiency: bringing the greatest benefit to the greatest number of users possible with the available financial and water resources.

3. Ecological sustainability: requiring that aquatic ecosystems are acknowledged as users and that adequate allocation is made to sustain their natural functioning.

Objectives of watershed management

To protect, conserve, improve, reduce, enhance …..

Examples of watershed management program objectives :

- To check soil erosion and to reduce the effect of sediment yield on the watershed.
- To rehabilitate the deteriorating lands.
- To increase infiltration of rainwater.
- To improve and increase the production of timbers, fodder and wild life resource.
- To enhance the ground water recharge.
- To reduce the occurrence of floods and the resultant damage by adopting strategies for flood management.
- To provide standard quality of water by encouraging vegetation and waste disposal facilities.
- To protect, conserve and improve the land of watershed for more efficient and sustained production

Breakout Session

1. What water and natural resources are important to your Tribe?

2. What is the best way to protect and enhance them?