

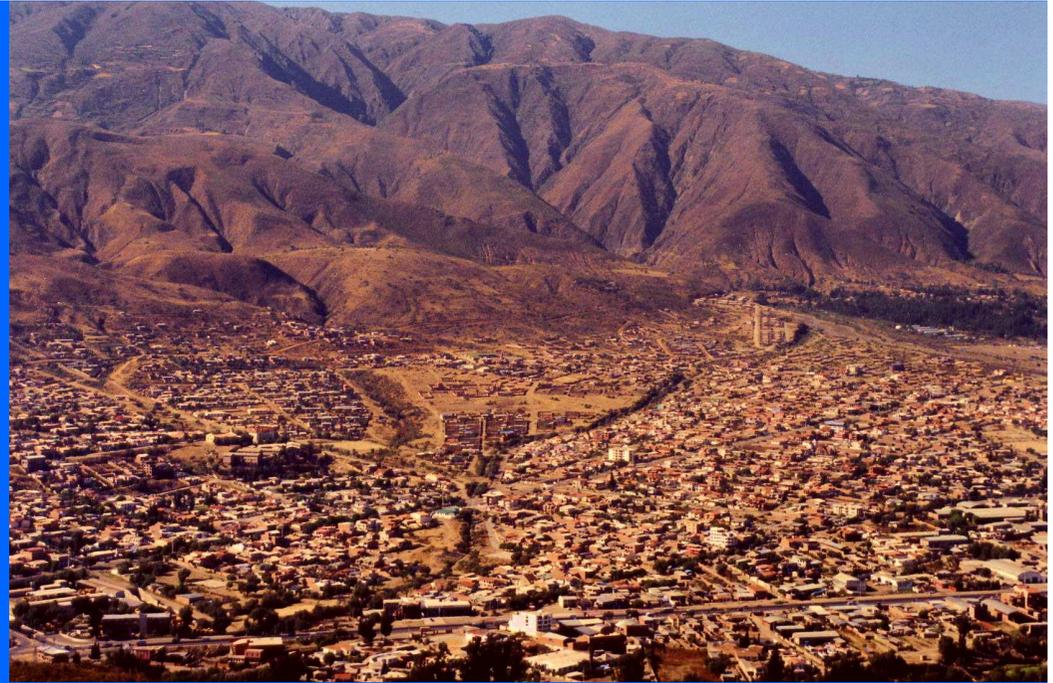
THIRST



A Short History of Drinking Water

Jim Salzman

May 22, 2008



Cochabamba, Bolivia



Cochabamba water supply

- Population ~800,000
- Over 40% have no access to piped water
- Most water purchased from water vendors
- Much more expensive than piped supply

Contract with Aguas del Tunari

- Privatization push from IMF and Bank
 - Greater capital, efficiency, improved service
- 40 year concession for water and waste
- Prohibition of non-licensed water collection and provision
- Investments followed by price increase
 - Up to 20% of consumer's income



Cochabamba Declaration

Water is a fundamental human right and a public trust to be guarded by all levels of government, therefore, it should not be commodified, privatized or traded for commercial purposes.

Dublin Declaration

...water has an economic value in all its competing uses and should be recognized as an economic good.



The natures of drinking water

- Drinking water as a physical resource
- Drinking water as a natural habitat
- Drinking water as a cultural symbol
- Drinking water as social marker
- Drinking water as a political statement
- Drinking water as a priced good

*How do different societies
think about drinking water?*

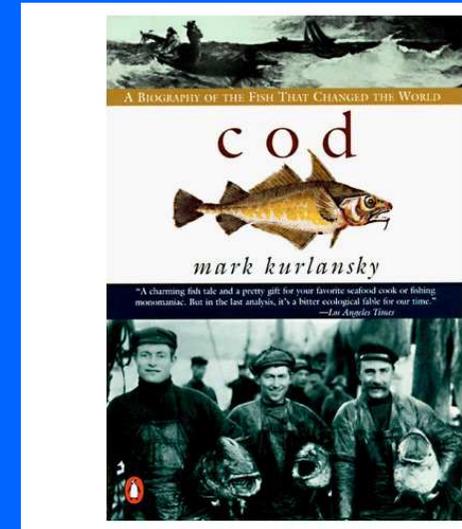
*How do different societies
manage their drinking water?*

How have these changed over time?

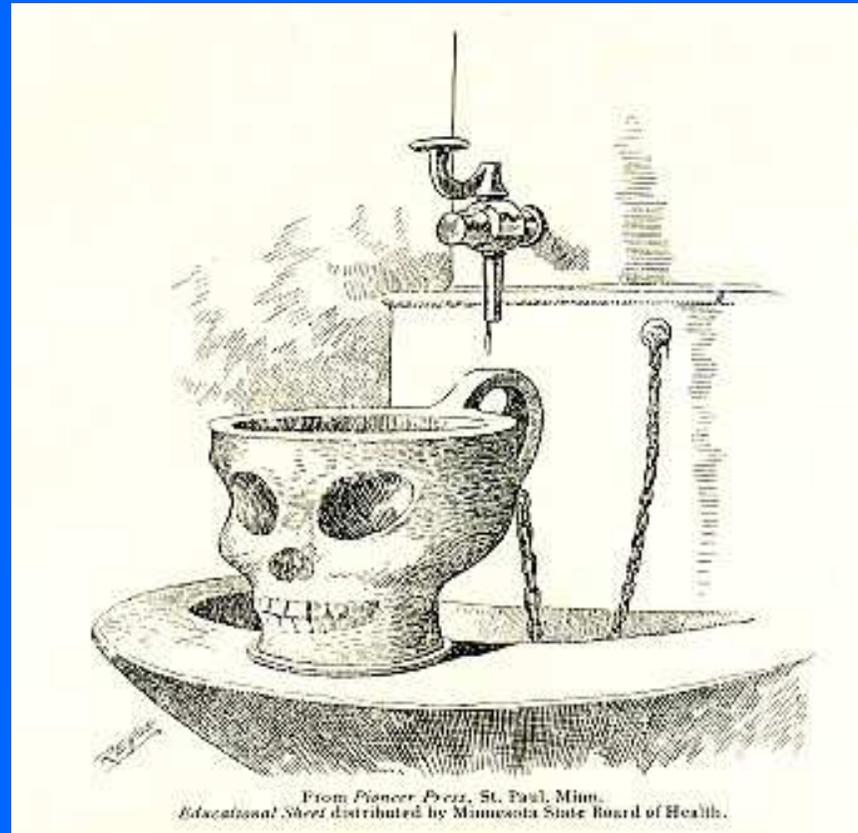
*What do these collective experiences teach us about
the challenges of drinking water management today,
both in the developed and developing world?*

Book Structure

- Drinking water and myth
- Drinking water governance
- Is it safe to drink the water?
- The rise, fall, and rise of bottled water
- Terrorist threats to drinking water
- Drinking water for the developing world
- Water provision strategies, technologies and solutions



Drinking Water Norms



Is it safe to drink the water?

Is it safe to drink the water?





Drinking Water in the USA

- *Cryptosporidium* in Milwaukee
 - Over 100 dead, +25% of population ill
- 434,000 reported water drinking illnesses from 1991-2002
- Estimated \$325 billion to upgrade infrastructure

Source Identification

- How to find reliable sources of drinking water?
 - Engineering

Drinking Water Provision

- From earliest times
 - Human settlements at drinking water sources
- Municipal water management a driving force in urban development
- Sophisticated storage basins, canals, fountains



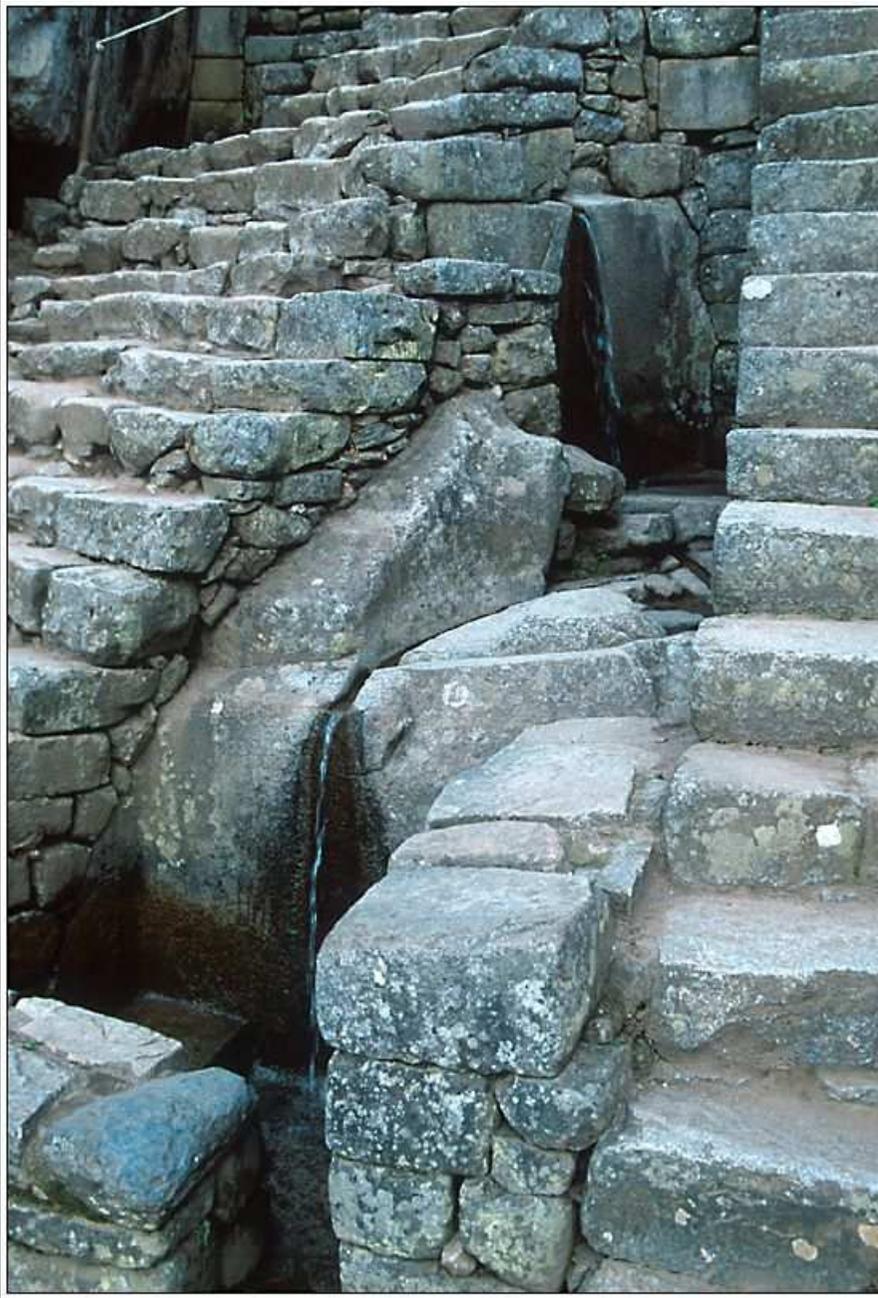
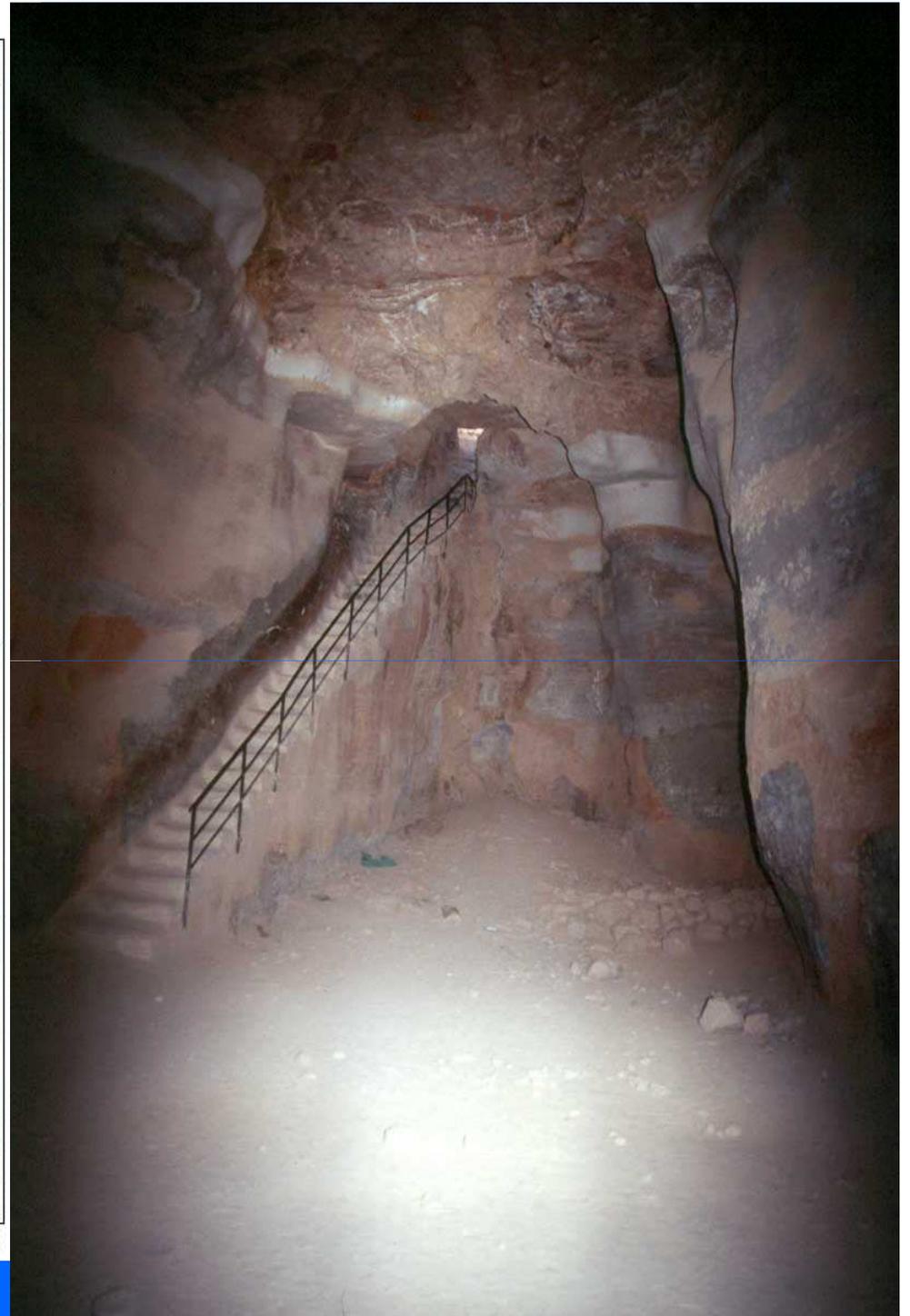


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Traditional Jewish Water Law



*“Let all who thirst,
come to the water!”*

Isaiah 55:1

Traditional Jewish Water Law

- Water from natural sources provided by God
 - Sale is sacrilegious
- Water from wells can be exclusive
 - But subject to Right of Thirst

Right of Thirst

- Priority to those in need of water
- Drinking takes priority over irrigation and grazing
- For each category, community's needs satisfied before outsiders'

Islamic Water Law



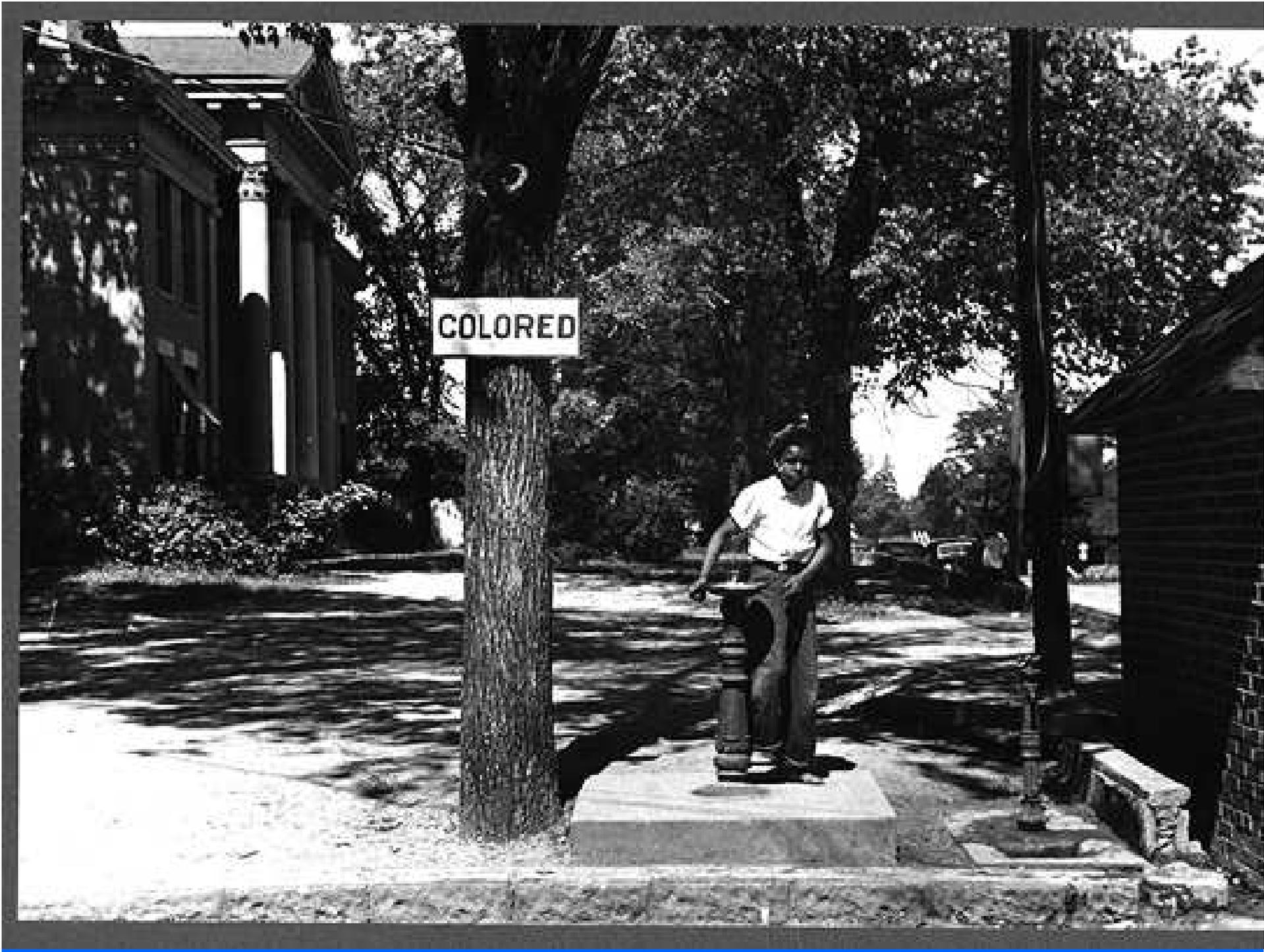
- *Sharia = Way to Water*
- *Sharing water a holy duty*

Anyone who gives water to a living creature will be rewarded...To the man who refuses his surplus water, Allah will say: 'Today I refuse thee my favor, just as thou refused the surplus of something that thou hadst not made thyself.'

Bihar Indian Water Law

- Water transmits metaphysical pollution
- Upper and lower castes maintain distinct water sources
- But those in need must be given access
 - Spiritual act of generosity
 - “saptasantantas”





A Global Right of Thirst

- Communal lands in Zimbabwe
- Hottentots in Southern Africa
- Akwa in Nigeria
- Aborigines in Australia

Common features

- 1) Drinking water not viewed as a commercial good
- 2) Free access to water in times of need regarded as a basic right
- 3) This culture can endure long periods and continues today in many parts of the world

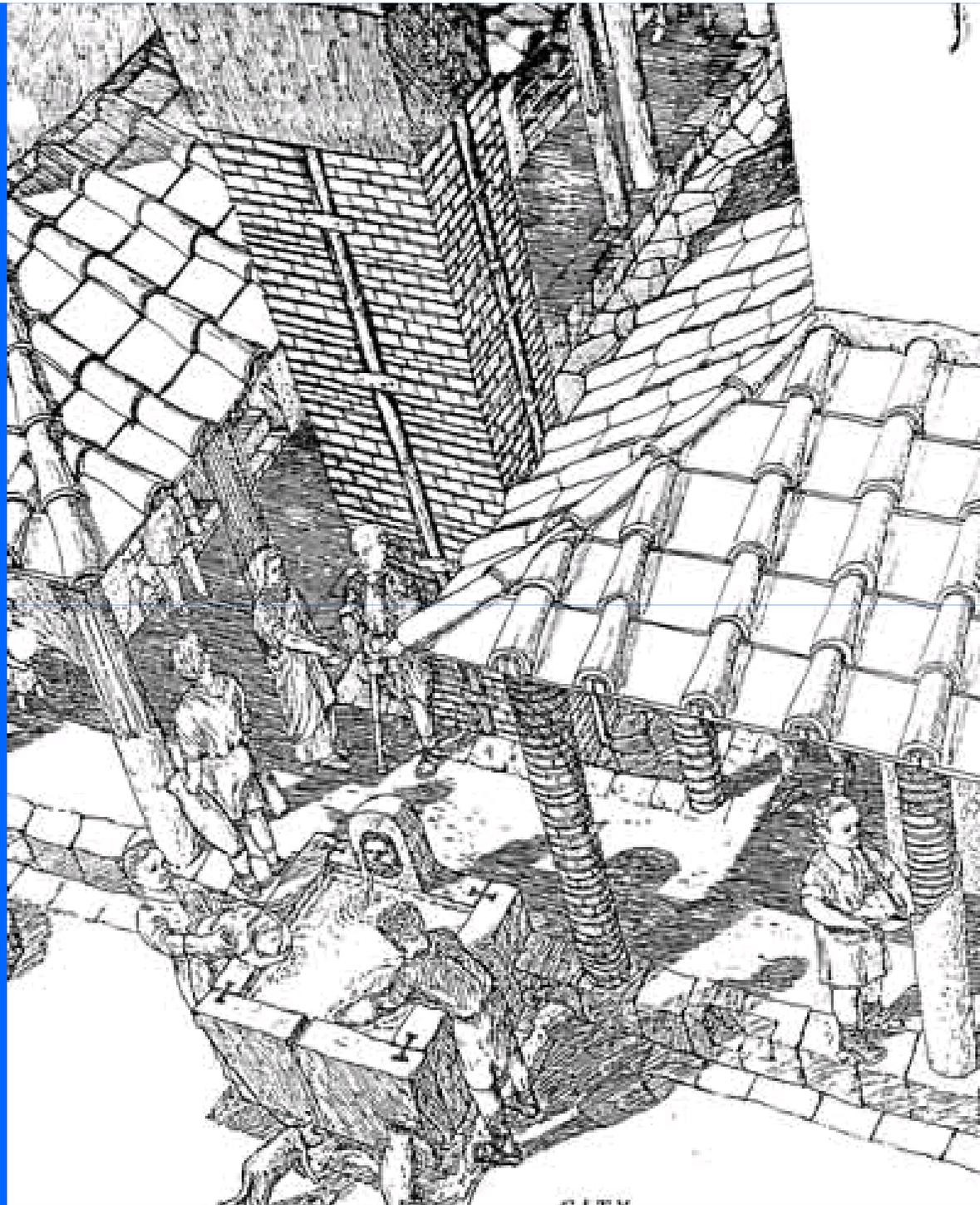


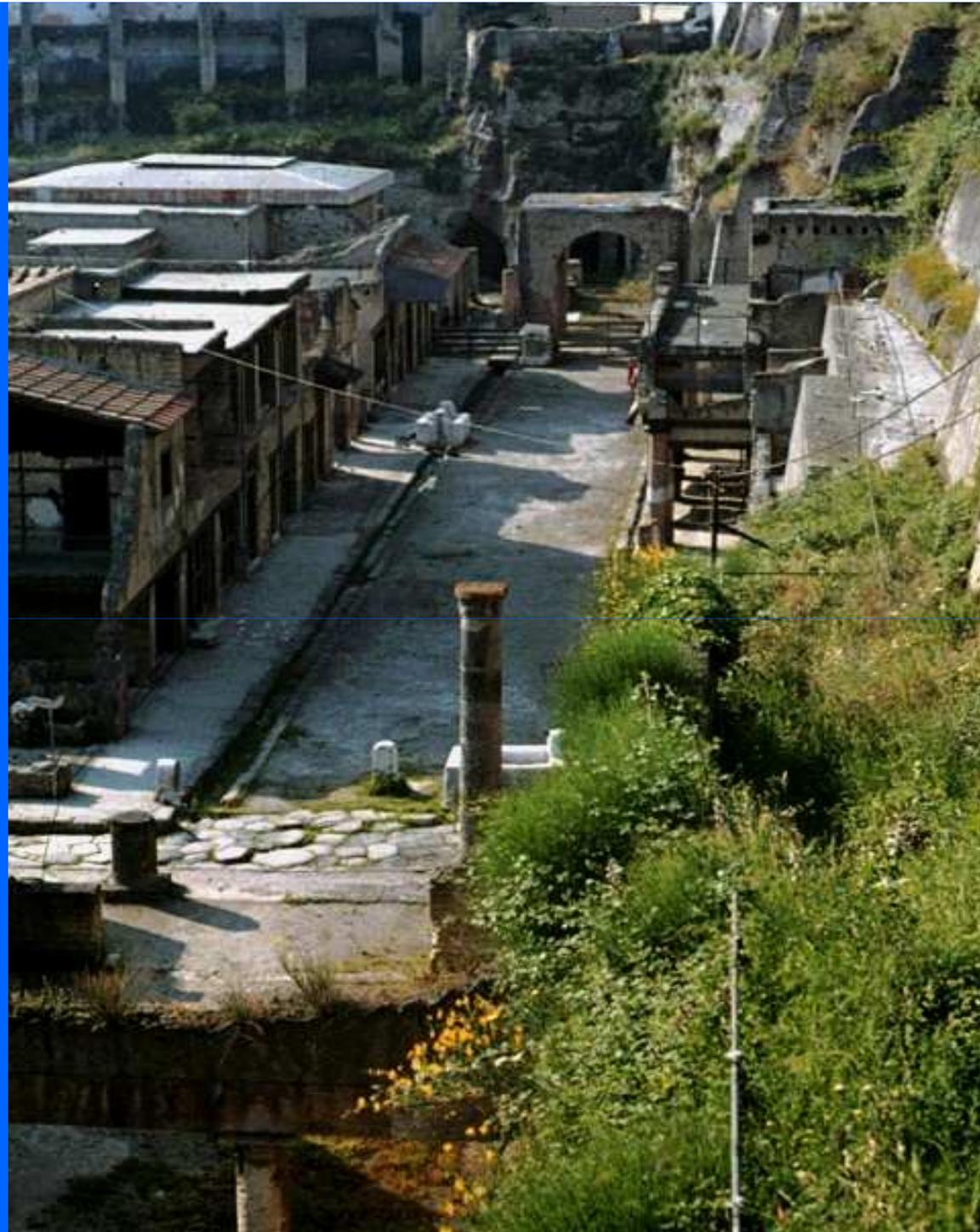


Ancient Rome's Aqueducts

- *Aqua Appia* built in 312 B.C.
- 11 aqueducts built over 400 years
- Gravity fed into separate reservoirs
- First priority to public basins
 - *Lacus*



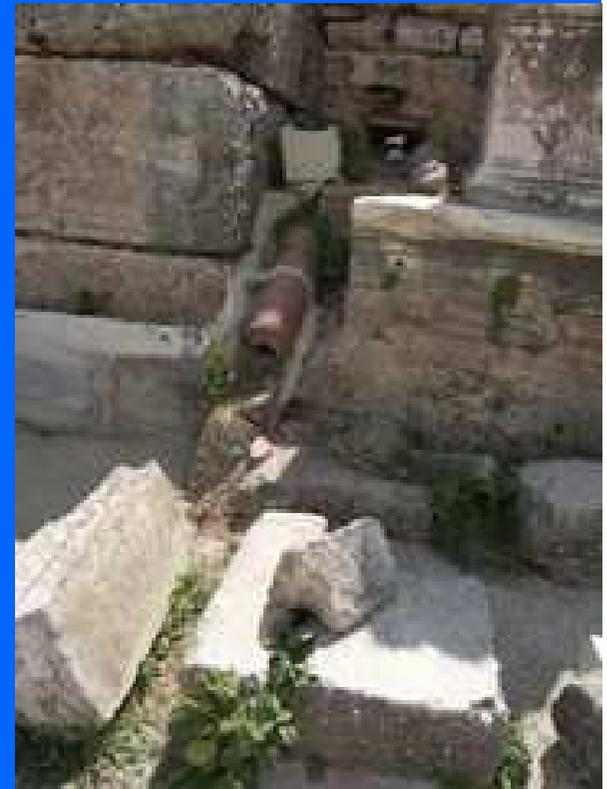






Private Water Supplies

- ~40% of *Marcia* aqueduct water
- Tax paid for right to run pipe from mains
 - *Vectigal*,
 - Determined by size of nozzle



Private Water Supplies

- Highly valued
 - Problem of “puncturing”
 - 100,000 sesterces fine



Water financing

- Imperial treasury and private donations pay for basic infrastructure
- *Vectigal* directed toward maintenance
 - Cross subsidization



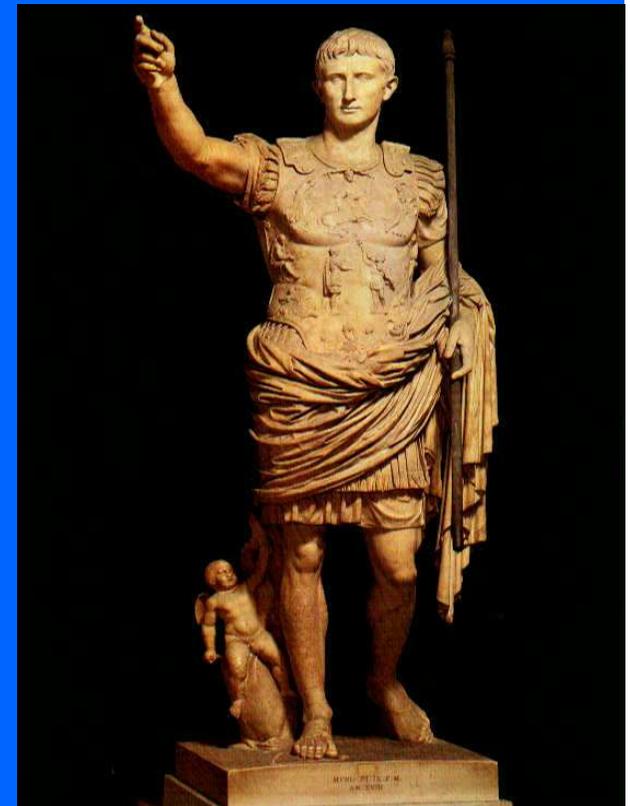
The Properties of Roman Water

- To private consumers – priced good
 - Glass of water at home no different than a cup of wine
- To most Romans – public good
 - Water as free as water from Tiber River
 - A right of being a Roman
- But also a political statement...



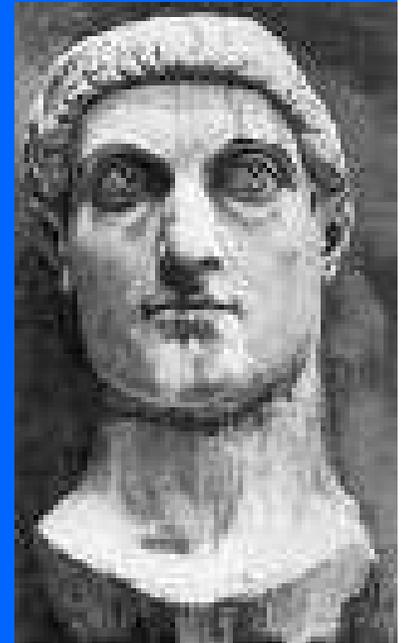
The medium is the message

- In time of Emperor Augustus
 - Number of *lacus* increased six-fold
 - From 91 to almost 600
 - Over 300 bronze and marble statues erected



Aqua Nomine Caesaris

- Remind common people they received water from imperial beneficence
- Displace symbolism that older aqueducts survived from Republic
- Romans have a right to drinking water, enhanced by their Emperor
 - Justification of regime change



HISTORY · OF CIVIC · SERVICES IN THE CITY · OF · NEW · YORK

NEW AMSTERDAM

WATER SUPPLY

No. 1



The first Public well was dug opposite the Fort

Excited by Thomas Art Project 1650 P.A.



THE PURCHASE OF MANHATTAN ISLAND.

The Dutch in New Amsterdam

- Collect rain water in cisterns
- Shallow private wells
- The “Kalch-Hook”
(later the “Collect”)
- 1660 plans for wells
 - Peter Stuyvesant denies funds



Peter Stuyvesant

The British in New Yorke

- Construction of public wells
 - Few public funds spent: Local families assessed
- Reliance on The Collect
- Problems by mid 18th Century
 - The Collect: *“A very sink and common sewer”*
 - Peter Kalm in 1746

Rise of Tea Water trade





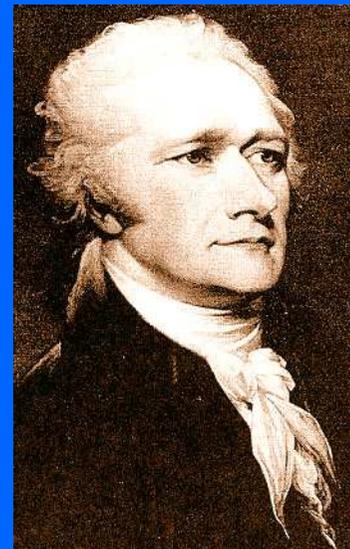
Velázquez, *The Water Seller of Seville*, 1620

City Initiatives

- 1774 approval for steam engine to pump water throughout city
- Issuance of “Water Works Money”
 - First paper money issued by American city
- Construction commences, but destroyed when British occupy city
- No municipal plans approved after war

The Manhattan Company

- Corporate mandate to provide NYC with drinking water
- Monopoly authority for water provision
- Assumed water will come from Bronx River



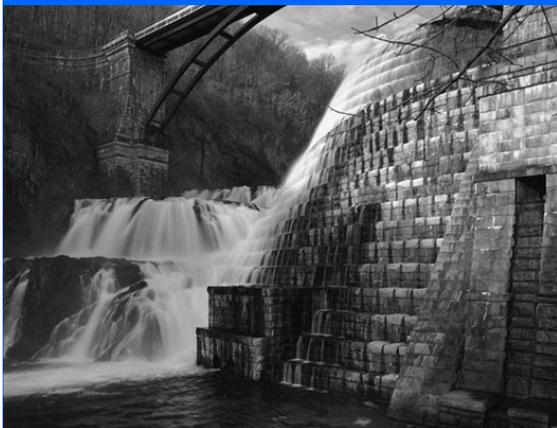
The Manhattan Company

- Cover for a bank
- Only 10% of money spent, rest invested
- Tea Water Pump driven out of business
- Continued reliance on Collect and wells
- Wealthy import soda water



Municipal Supply

- 1829 fires and 1832 cholera epidemic
- Creation of permanent Board of Water
 - Granted condemnation authority and budget
- Construction of Croton Reservoir and Croton Aqueduct



New York's Water

- In face of declining water quality, commodification and rise of private solution
- Logical conclusion in privatization of *entire* city water supply
- Only in face of obvious failure does government step in
- *Aqua Nomine Caesar*
 - “Croton Street Hydrants”

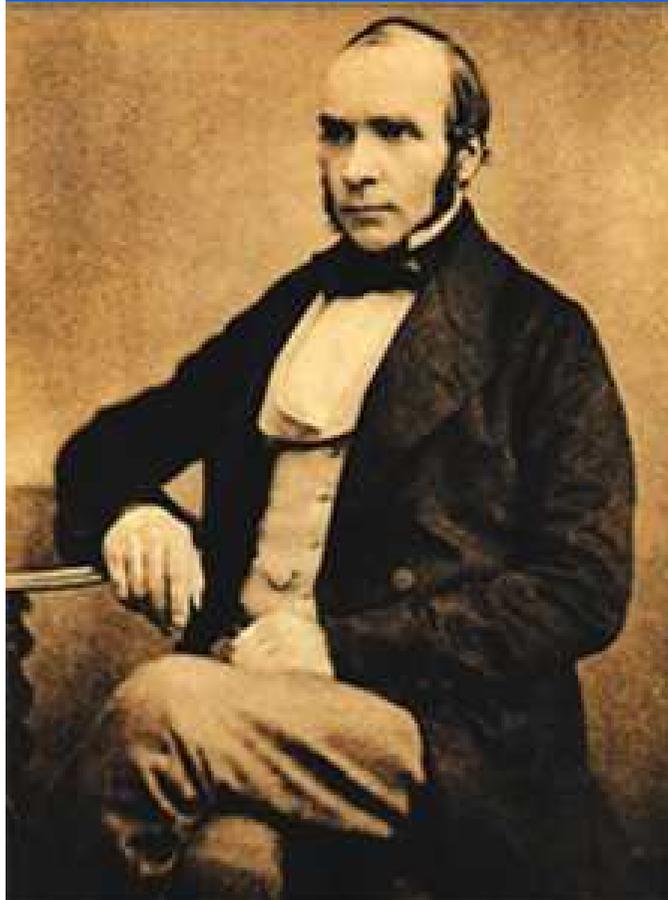
Similar Urban Histories

- Philadelphia
- London
- Boston

But Is the Water Safe to Drink?

- Depends on what you think causes disease...
 - Ancient Greece and Rome
 - Four humors
 - Medieval Europe
 - Miasmatic theory
 - Nineteenth Century Europe
 - Germ theory???
 - Getting the water in *and* getting the water out
 - → Source Protection

John Snow and the Broad Street Pump, 1854

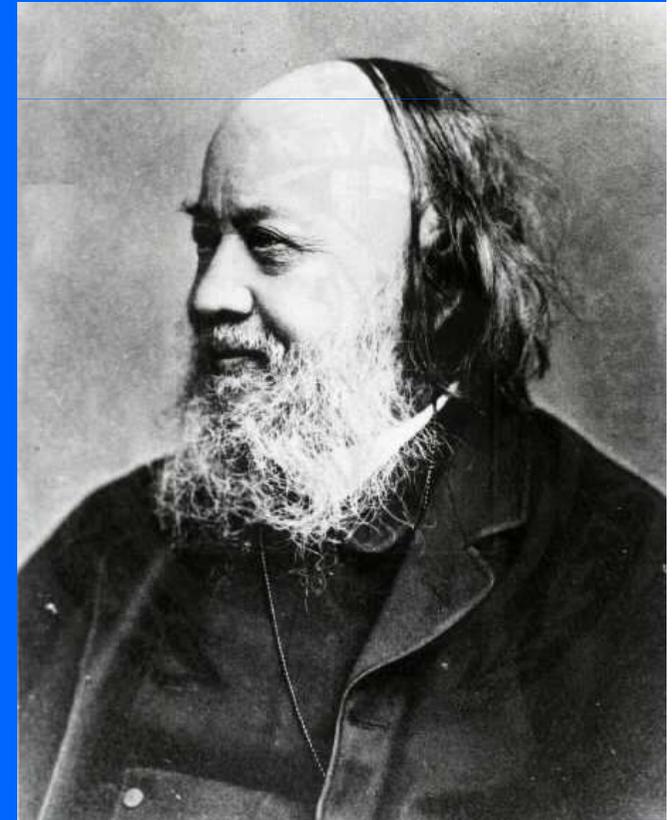


Edwin Chadwick

“all smell is disease”

These adverse circumstances tend to produce an adult population short-lived, improvident, reckless, and intemperate, and with habitual avidity for sensual gratifications....

[D]efective town cleansing fosters habits of the most abject degradation and tends to the demoralization of large numbers of human beings



Fork in the Road of Development

- “A cesspool city”
- “Most urban citizens, rich and poor, live amidst excrement and sewage.”
 - Peter Gleick, 2005, talking about Madras
 - George Goodwin, 1850, writing about London
- “*Cordon sanitaire*”

The Rise of Water Treatment

- Long history, but not at municipal level
- During *Great Sanitation Awakening*, transition to large-scale treatment
 - Slow and fast sand filtration
 - Chlorination
 - Fluoridation
- All opposed at the time and highly controversial
- And expensive – *Cordon Sanitaire*

Drinking Water in the Developing World



Scarcity and Disease

- Over one billion people lack ready access to “improved drinking water”
- Over two billion lack access to “improved sanitation”
- ~50% of developing world's population suffers from illnesses caused by contaminated water supplies

Millennium Development Goal

By 2015, reduce by half the proportion of people without sustainable access to safe drinking water



Developed vs. Developing World

- Low versus high concern over quality
- Low versus high concern over quantity
- Govt/corporate responsibility
 - Versus individual/domestic responsibility
- Low versus high labor input



Limited Access to Piped Sources



Gender Implications

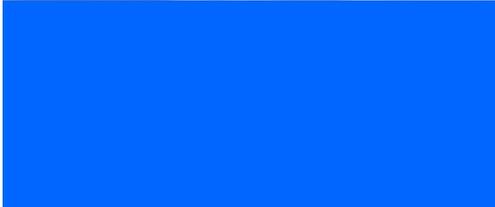
- Water historically not provided to poor and marginalized communities
- Water gathering done by women
- In East Africa, average time spent collecting water
 - ~90 minutes every day
- Enormous impacts on productivity



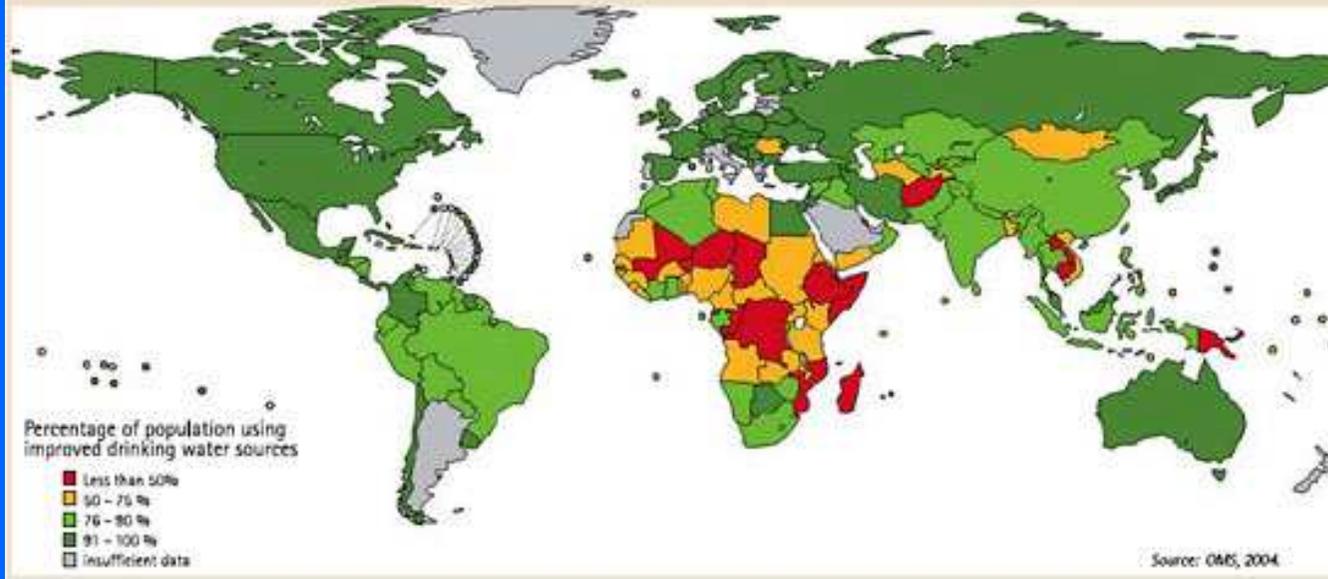
Expensive

- If water sources are too far away or polluted, must rely on private water vendors
- In East Africa, ~40% use water vendors
- 12-20 times higher than piped water prices



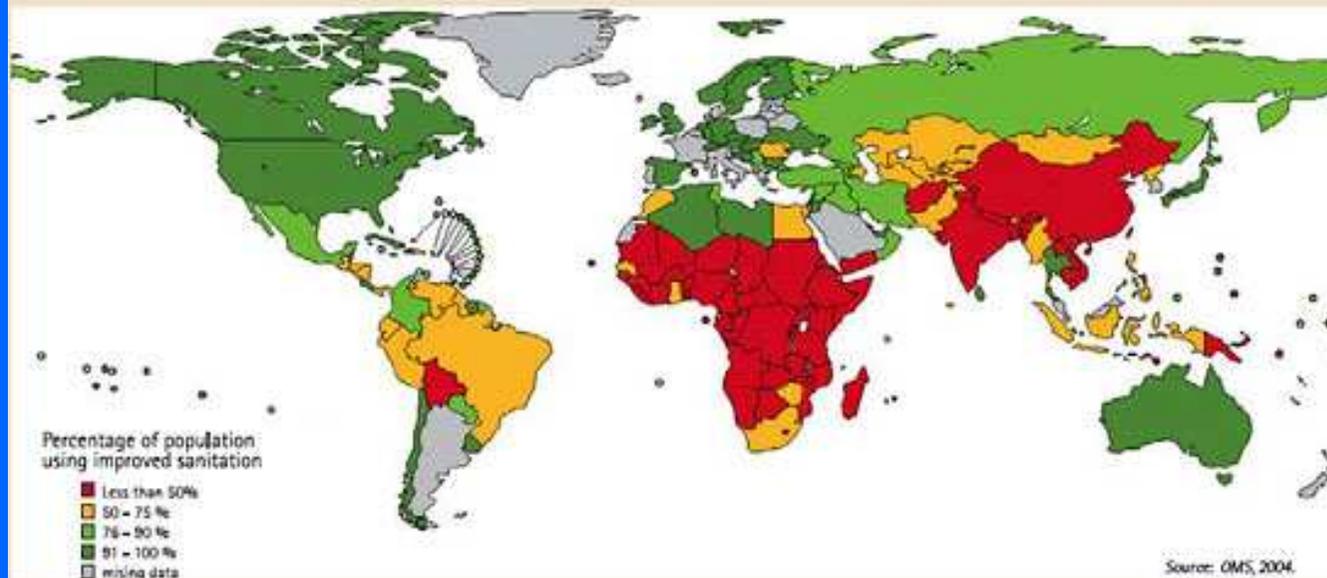


Coverage with improved drinking water sources, 2002



Red is bad, green is good; Sanitation's a bigger problem, with 2.5 billion people lacking access to 'improved sanitation'

Coverage with improved sanitation, 2002



Rise of calls for privatization

- 1980s the *the International Drinking Water Supply and Sanitation Decade*
- Private sector provision can be more efficient, effective, less prone to corruption
 - Assumption of state failure
- Induce additional private investment
- 1992 *Dublin Declaration*

Rise of water service industry

- In last 20 years, 183 water and sewer deals for over \$33 billion
 - In Argentina, Chile, Indonesia, Guatemala, Morocco, Poland, the Philippines, etc.
 - Many forms: privatization, concessions, etc,
- Supported and sometimes required by international financial institutions
 - Structural Adjustment
 - Assumption of full cost recovery



VIVENDI
UNIVERSAL

Rise of calls for Right to Water

- Cochabamba Declaration
- UN Economic and Social Council
 - General Comment 15



Rise of calls for Right to Water

- The human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses....
- Water should be treated as a social and cultural good, and not primarily as an economic good. ...
 - Availability
 - Quality
 - Accessibility (physical, economic, non-discrimination)

Globalization Fissures

- Drinking water as social/cultural good or an economic good?
- Markets vs. Rights
- Public vs. Private Provision



Historical Vantage

- Treating water access as a basic right is not a new idea
- Treating water as a priced resource is not a new idea
- Treating the conflict as rights versus markets is a false choice

Natural Resource Vantage

- Drinking water as a complex resource
 - Drinking water as a physical resource
 - Drinking water as a cultural symbol
 - Drinking water as social marker
 - Drinking water as a political statement
 - Drinking water as a priced good

Natural Resource Vantage: Rome

- Physical
 - Aqueducts and distribution system
- Social/Cultural
 - *Lacus*
- Priced
 - *Vectigal*
- Political
 - Regime change justification

Drinking deeper...

- Why do we see certain types of drinking water regimes in some societies but not others?
- Why and how do these evolve over time?



