

## Water Resources

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## World Water Statistics

- 18% of World population lacks regular access to potable water.
- 1 billion without regular water access.
- 2.4 billion require more sanitization of water.
- 40,000 men, women, and children die daily from diseases directly related to drinking polluted water.

## Agriculture

- Takes up 70% of all fresh water supply.
- Cultivated areas have grown from less than 200 million hectare to more than 270 million in just the last 30 years.
- Water extraction has gone from 2500km<sup>3</sup> to 3500km<sup>3</sup> in the same period.
- Arid & Semi-arid regions have experienced 20 % salinization with considerable decrease in yields.

## Irrigation

- Most traditional way is the gravity method, which is quite wasteful.
- Subsurface drip irrigation can increase water efficiency up to three times.
- Reduced run-off, evaporation, better water uniformity, less energy usage, less crop stress.

## Affordable Alternatives

- Many developing countries cannot afford new advanced irrigation technologies.
- Small reservoirs to store rain water over the dry season to ease water shortages.
- East Africa has traditional water harvesting to cope with the dry season.
- Methods to slow run-off and divert it to cultivations

## Waste Water Treatment

- Treatment of urban sewage can provide additional water and reduce water contamination.
- Water treatment can use natural, cheaper methods such as Calcutta, India.
  - Natural lagoons to treat sewage, which produce sanitary fish to eat.
- Technology transfer option with more refined methods.
- Large public health benefits.

## Watershed Management

- Need to integrate smaller water boards for advanced planning for upcoming crisis.
- Localities must analyze and quantify their specific vulnerabilities.
- U.S. Army Corp of Engineers notes:
  - Conservation used to maintain reservoirs decrease vulnerabilities whereas conservation to expand capacity increase vulnerability.

## Population Control

- Is necessary for long-term water management.
- In third world countries many people want to plan families, what lacks is investments in family planning programs and contraceptives.
- Focus in areas that are most affected by water scarcity.

## Technical Solutions

- Windpumps for groundwater.
- Water purification technologies.
- Shipping water.
- Rain water harvesting:
  - Groundwater
  - Rooftop Catchment

## Rooftop Catchment

- Start-up costs are high, but long-term costs are reasonable.
- Reduces run-off problems.
- Water can be used for domestic purposes.
- Decentralized water storage.

## Working Paper/Resolution

- Establish an international cooperation of Hydrologists and sufficient capital to assist nations in adapting policies and infrastructure to cope with water system changes
- Short term task force to alleviate water crisis

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