

Module: Public Health Disaster Planning for Districts

Organization: East Africa HEALTH Alliance, 2009-2012

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Resource Title: Drought and Water Scarcity

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Drought and Water Scarcity

Factors Contributing to Drought

- Global warming
 - By 2100 average global temperatures may rise by 1.0 – 3.5 degrees Celsius ¹
 - Documented warming of the Atlantic and Caribbean oceans
 - Resultant increase of extremes in flood/drought cycle “100 year events”

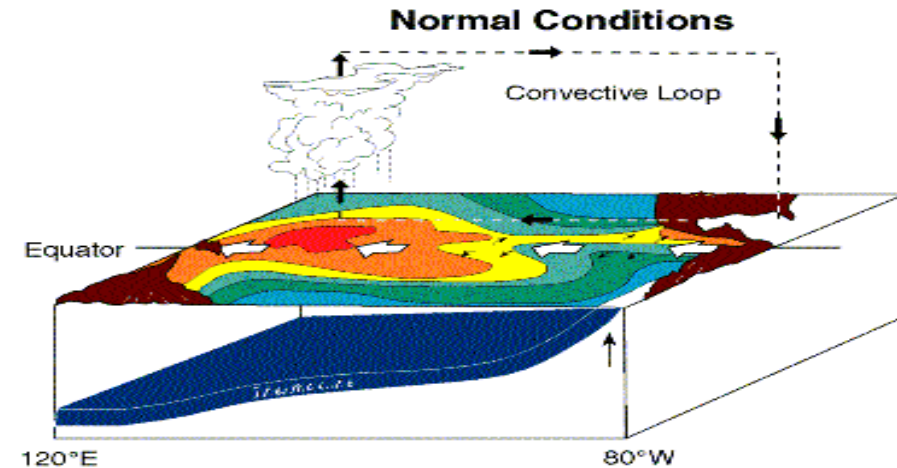
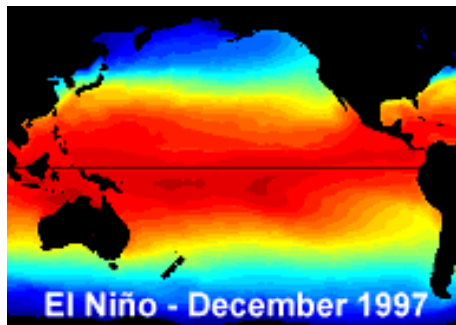
¹ Githeko, 2000

Factors Contributing to Drought

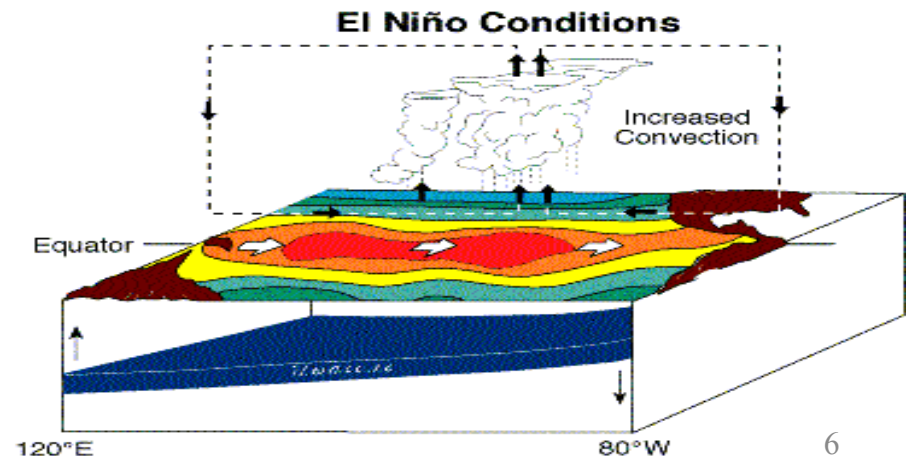
- Global warming
- El Nino Southern Oscillation
- Random meteorological variability

Factors Contributing to Drought

- El Nino Southern Oscillation (ENSO)
 - Strong relation between the ENSO cycle, sea-surface temperatures and populations affected by drought¹
- ¹ Bouma 1997



PD-INEL Source unknown



PD-INEL Source unknown

Factors contributing to water shortages

- Increased water demand
- Drying up of surface water
- Reduced yield of wells and springs
- Water pollution
- Restricted of access to water sources
- Dysfunctional water distribution
- Poor water conservation

Consequences of Drought

- **DESERTIFICATION**

- **FAMINE**

- Most frequent cause in Africa is drought ¹

- However, a recent review of 46 famines in the 20th century found one common denominator as the lack of a stable democratic government. ²

- **POLITICAL DISRUPTION** -Somalia 1991-93 ³

- Drought worsens instability

¹ Yip, 1997; ² Johnson, 1995; ³ Hansch, 1993

Possible public health hazards

- Health Hazard
 - Insufficient safe water for consumption
 - Insufficient water for hygiene purposes
- Threat to agriculture and economy
 - Lack of water for animals and crops
 - Resultant decrease in public health funding resources for intervention
 - Power loss exacerbates problem
- Malnutrition due to lack of water
- Loss of electrical power from hydroelectric generation

Possible public health hazards

- Environmental Hazards

- Wildfire
- Desertification
- Chemical exposures
 - Silo gasses
 - Improper water treatment
 - Polluted water



General aims for the public health in water emergencies

- To save life and preserve health by making at least minimum quantities of *reasonably safe* water available for household use, for institutions and community services
- To provide supplies, where possible, for livestock and irrigation purposes
- To restore or enhance existing sources, pumping and distribution systems, where possible
- To develop alternative arrangements where necessary


Water priorities for public health

- Protection of existing water sources from contamination
- Maintenance of existing water systems
- Conservation measures
 - Establishing storage tanks
 - Recycling waste water for sanitation and irrigation
 - Rationing
- Seek alternative sources

Choosing alternative water sources

- Rain and deep closed wells are usually safe
 - 1 mm rain on a 1 m² roof = 0.8 liter water
- Surface water and shallow or open wells are unlikely to be safe



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Criteria for choosing between alternative sources of water

- Speed with which it can be made operational
- Potential yields
- Reliability of supply
- Water purity
- Simplicity of technology and ease of maintenance
- Costs
- Rights and welfare of affected population

Choosing alternative water sources

- Transportation
 - Truck water only as a strictly short-term, stop-gap **emergency** measure to ensure population **survival**



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General principles for management of water emergencies

- Quantity is preferable to quality
- Involve the community
- Involve the national and local water authorities, equipment and infrastructure that are normally responsible

General principles for management of water emergencies

- Pay special attention to the needs of hospitals, health and feeding centers



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*Estimating water requirements

- Individuals
 - At least 15-30 liters per person per day
 - Absolute minimum for survival: 3-5 l/day
- Health Centers
 - 40-60 liters per patient per day
- Feeding centers
 - 20-30 liters per person per day

* Needs increase with air temperature and exertion

General principles for management of water emergencies

- Minimize work invested in “interim” solutions



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General principles for management of water emergencies

- Provide safe water as close as possible to homes
 - (not further away than polluted sources)



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General principles for management of water emergencies

- Minimize risk of water contamination in:
 - Distribution points
 - Delivery
 - Households



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General principles for management of water emergencies

- Provide safe storage at community and household levels



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General principles for management of water emergencies

- Mobilize appropriate technical expertise:
 - Water engineers to exploit available resources
 - Sanitarians to test and organize water treatment
 - Hydrogeologists to assess ground water potential
 - Hydrologists to assess surface water potential

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