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 drought \(^1\)  
\(^1\) Bouma 1997
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

- **DESERIFICATION**
- **FAMINE**
  - Most frequent cause in Africa is drought
  - However, a recent review of 46 famines in the 20th century found one common denominator as the lack of a stable democratic government.
- **POLITICAL DISRUPTION** - Somalia 1991-93
  - Drought worsens instability

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
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
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
*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
General principles for management of water emergencies

• Provide safe water as close as possible to homes
  — (not further away than polluted sources)
General principles for management of water emergencies

- Minimize risk of water contamination in:
  - Distribution points
  - Delivery
  - Households
General principles for management of water emergencies

• Provide safe storage at community and household levels
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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