Overview

- Water, poverty and prosperity
- Water: a health concern?
- Who and where are the disadvantaged?
- Perspectives / trends
- Why invest in water and sanitation?
- How to respond?
Water, poverty and prosperity
WSH = disease and poverty

- Inadequate water supply
- Unsafe water resources
- Inequitable access

- Time, financial cost
- Disease burden
- Health care costs

POVERTY
WSH = a motor for development

- Improved water supply
- Safe water resources
- Universal access

- Time, financial savings
- Averted disease costs
- Healthy populations

Development
Costs and benefits of addressing or not addressing WSH

**COSTS:**

- **12 billion in Africa**
  - annual GDP loss from malaria
- **13.4 billion in China**
  - Costs incurred in late 1990s from poor water quality on health alone
- **100 million days in India**
  - working days missed every month due to water collection

**BENEFITS:**

- **3.7% average annual growth**
  - Growth enjoyed by poor countries with improved W&S (as opposed to 0.1% for those without)
Water: A health concern?
Leading Causes of Deaths from Infectious Diseases

2004 World Health Report

- Respiratory Infections: 3963
- Diarrhoeal Diseases: 2777
- Tuberculosis: 1798
- Malaria: 1566
- Measles: 1271
- Deaths (000s)
Percentage of disease that could be prevented by modifying the environment (top 10 environmental contributors to total disease burden)

- Diarrhoea
- Lower resp. inf.
- Malaria
- Road accidents
- COPD
- Perinatal cond.
- Mental retard. (lead)
- IHD
- Drownings
- Malnutrition
- CVD

Environmental fraction

COPD: Chronic obstructive pulmonary disease
IHD: Ischaemic heart disease
CVD: Cerebrovascular disease
• Diarrhoea:
  1.8 million people, mostly children, die of diarrhoea every year

• Malaria:
  1 million people, mostly children, die of malaria every year
  Better management of water resources reduces transmission

• Schistosomiasis:
  200 million are infected, 20 million suffer severe consequences
  Basic sanitation reduces the diseases by up to 77%

• Trachoma
  6 million visually impaired, 146 million threatened by blindness
  Improved sanitary conditions and hygiene practices prevents trachoma
Fluoride and Arsenic in Drinking Water

Fluorosis
2004 or latest available data
- cases of dental or skeletal fluorosis reported
- no data

Arsenicosis
2004 or latest available data
- elevated levels of arsenic (over 50 μg/l) reported in water
- ill-health has been reported due to arsenic-contaminated water
The more we know, the more environment matters

Water, sanitation and hygiene

- In addition (2010?)
- Water hardness and heart disease, hepatitis A and E, fluorosis, arsenicosis, typhoid fever etc.

- 2002
  - WSH caused diarrhoea and parasitic diseases

- 2005
  - Also WSH-caused malnutrition

- Total disease
  - 5%
  - 4%
  - 3%
Who and where are the disadvantaged?
Improved Drinking Water: Status in 2002

Coverage of improved drinking water sources, 2002

Percentage of population using improved drinking water sources:
- Less than 50%
- 50 - 75%
- 76 - 90%
- 91 - 100%
- Missing data

Meeting the MDG Drinking Water and Sanitation Target: Mid-term Assessment of Progress
WHO and UNICEF, 2004
To Fetch a Pail of Water

A heavy burden

Percentage of people who must travel more than half an hour to fetch water and return home 2001 or latest available data

- over 50%
- 26% – 50%
- 25% and under
- no data

Time ticking away

Average number of hours per household spent each week on essential water activities 2001 or latest available data

- Pakistan
- India
- Nepal
- Philippines
- Indonesia

Time spent on water collection represents time lost to household and national economies. Every month, the Indian economy misses out on over 100 million working days in this way. Within its huge population, Asia loses more time than any other continent.
WHO/OMS

Percentage of population using improved sanitation

- Less than 50%
- 50 - 75%
- 76 - 90%
- 91 - 100%
- missing data

Sanitation coverage, 2002

Meeting the MDG Drinking Water and Sanitation Target: Mid-term Assessment of Progress

WHO and UNICEF, 2004
Improved Sanitation:
Unserved population by region, 2002 (millions)

Meeting the MDG
Drinking Water and Sanitation Target:
Mid-term Assessment of Progress
WHO and UNICEF, 2004
Disparities Masked by National Averages: Rural versus urban sanitation (2002)

Meeting the MDG Drinking Water and Sanitation Target: Mid-term Assessment of Progress WHO and UNICEF, 2004
Most drinking-water outbreaks in USA (1999 – 2000) associated with private/non-community wells

14 – 15 million households in USA rely on private wells

1 in 10 Europeans (50 of 500 million people) secure drinking water from small or very small systems
Perspectives / trends
Reaching the MD Goals from 2002: What does it mean for Goal 7 Target 10?

To halve, between 1990 and 2015, the proportion of the population without improved drinking water and sanitation now means:

- Enabling an additional 260 000 people a day up to 2015 to use improved drinking water sources
- Enabling an additional 370 000 people a day up to 2015 to use improved sanitation

Ensuring continuation of services to an unprecedented population and maintenance and renewal of infrastructure
Reaching the MD Goals from 2002: Focusing G7 T10 on the wider goals

- Reaching the target would:
  - Reduce disease and death
  - Improve nutrition and food security
  - Reduce poverty (avert health care costs, time savings)

- Unserved, children and women likely to benefit most (health and education)

- Studies show WS&S to be cost effective

- 1 billion urban dwellers to keep up with urban population growth – targeting slums

- 900 million rural dwellers to start to deal with the rural backlog

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Improved Drinking Water: Trends in service levels

Meeting the MDG Drinking Water and Sanitation Target: Mid-term Assessment of Progress WHO and UNICEF, 2004
Improved Sanitation: Perspectives

Population (in billions)

- If on track to reach the MDG target
- Current trend

Meeting the MDG Drinking Water and Sanitation Target: Mid-term Assessment of Progress WHO and UNICEF, 2004
Why invest in water and sanitation?
Annual cost of not dealing with water and sanitation

Lives lost
- 1.6 million annually due to diarrhoea alone

Health care costs:
- USD7 billion per year to health agencies
- USD340 million to individuals

Value of time lost
- USD 63 billion per year
Cost-benefit analysis (CBA)

The aim of the study was to estimate:

- the costs (capital and recurrent)
- the health benefits (diarrhoea cases and deaths)
- the additional benefits (costs averted, time saved)

Results presented as US$ per year, per capita, per intervention.
5 interventions were modelled:

- Halving population w/o improved WS by 2015 (through low-tech services).
- Halving population w/o improved WS&S by 2015 (through low-tech services) (MDG 7).
- Increasing access to improved WS&S services (low-tech) for all by 2015.
- Increasing access to improved WS&S services (low-tech) plus disinfection at point of use, for all by 2015.
- Increasing access to in-house piped water and sewer connection for all by 2015.
Cost-effectiveness ratios (US$ per DALY averted)

- Disinfection
- Halve pop w/o access to WS
- Halve pop w/o access to WS&S
- Improved water supply and basic sanitation
- Piped water supply and sewer connection
Costs of interventions vs. healthy life years gained

- AfroD
- AfroE

1 - halve pop w/o WS
2 - halve pop w/o WS + S
3 - disinfection
4 - improved WS + S
5 - piped WS + S
How to respond?
WHO Responses on Drinking-water quality

17%: no access
32% 'improved sources'
51% piped water
3 Prong Response to Drinking-water Quality

International network on safe household water

- 17%: no access
- 32% 'improved sources'
- 51% piped water

Network on community water supply and safety

Guidelines for Drinking-water Quality
3 Prong Response to Drinking-water Quality

'Organised supplies' – Guidelines for Drinking-water Quality
WHO Guidelines on Drinking-water Quality

- Protection of human health (safe and acceptable)
- Advisory to national standard setting – flexible to account local social, cultural, economic & environmental context
- Risk-benefit - adaptation to local priorities for health gain
- Best available evidence - science and practice
- Scientific consensus
- Use global information and experience
Framework for Drinking-water Safety

Health Based Targets

Water Safety Plans
1 System Assessment
2 Monitoring of control measures
3 Management Plans

Independent Surveillance
3 Prong Response to Drinking-water Quality

Network on community water supply and safety
Why focus small communities'?

- 6 of 7 people without access to an improved water source live in rural areas.
- Small system management is problematic in both developing and developed countries.
- Most detected outbreaks of water-borne disease are associated with small community and single household supplies.
WHO Small Community Pilot Projects
1980s - Peru, Indonesia, Zambia

Key lessons learned

- Catchments to consumer
- Risk assessment + water quality analysis
- Community participation in process
- Regulatory 'enforcement' of little value
- Local outreach
- Prioritising where to act
- Correcting recurrent errors
- Need a responsible public health authority
- System specific
Accelerating action – improving systems

- Proposed *Network on Small Community Water Supply*
- Conceived at a meeting in Iceland, January 2005:
  - Models of best practice, info sharing
  - Case studies, country databases
  - Network development
- Second meet Australia July 2005
  - Sharing 'tools' (NHMRC leadership)
  - Approaches review (Bangladesh and others)
3 Prong Response to Drinking-water Quality

International network on safe household water
Ensuring safety - household interventions

Can make an immediate difference:

- **Effective**: Can reduce risk of diarrhoea by 39%
- **Cheap**: US$ 60 in benefits for US$ 1 invested
- **Variety of technologies** - no "silver bullet"

Photo source: WHO Household Water Network Participants: A Buller, G Allgood, T Clasen, SANDEC, CDC, PSI
Accelerating action –

- **WHO Network on Safe Household Water**
- More than 90 members
- 4 working groups: research, communication, advocacy and implementation
- Member projects in more than 60 countries
Household interventions - Achieving health gains

- **Technical effectiveness**
  - ability to remove or inactivate pathogens (field and lab)

- **Consumer acceptance**
  - availability of product
  - costs
  - taste, clarity, safety of treated water

- **Scalability**
  - Achieving widespread sustained use

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Significant health impacts
Water and Health in Developing Countries and Disadvantaged Populations

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