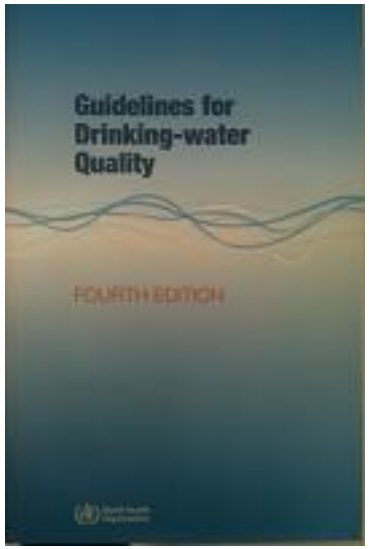
WHO Guidelines
Safe Use of Wastewater Greywater and Excreta in Agriculture and Aquaculture

World Health Organization

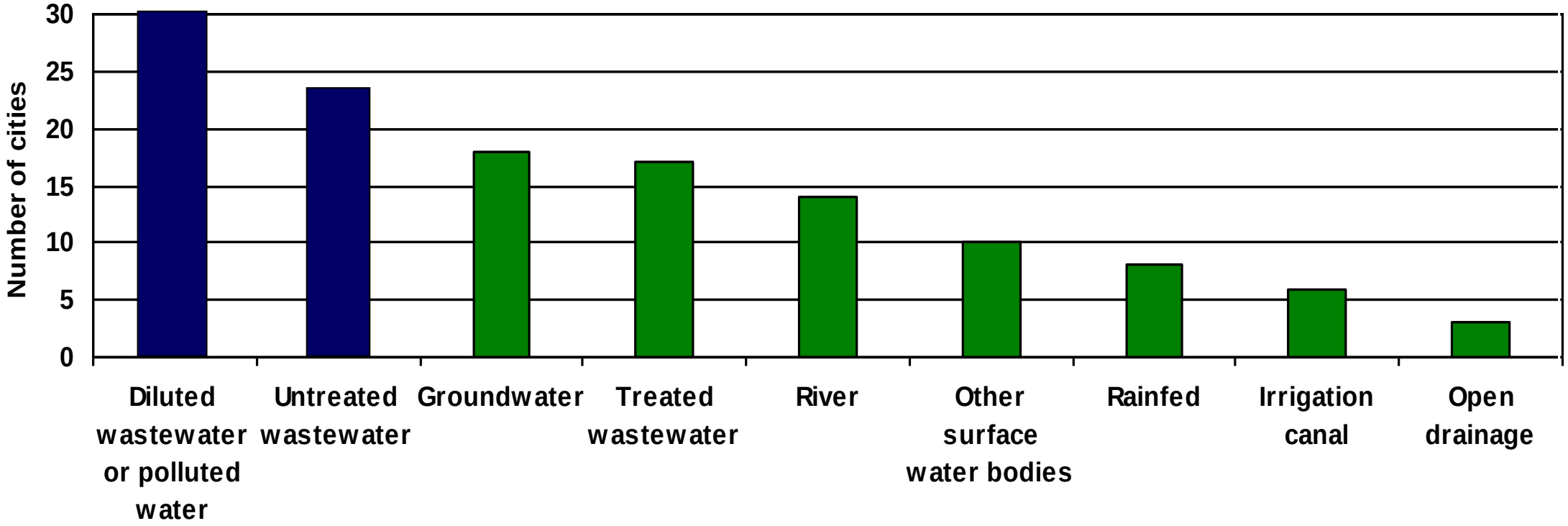
Various WHO Guidelines on Water Quality



Background

- Wastewater use is extensive worldwide, and increasing
- 10% of the world's population is thought to consume wastewater irrigated foods.
- 20 million hectares in 50 countries are irrigated with raw or partially treated wastewater.
- The use of excreta (faeces, urine) is important worldwide, but the extent has not been quantified.
- The use of greywater is growing in both developed and less-developed countries – it is culturally more acceptable in some societies
- Wastewater can be an excellent resource…. if it is managed safely.

Scenarios where untreated wastewater is being used by city farmers



Source: IWMI, 2007

Health concerns

Direct Health Effects

- Disease outbreaks (in developing and developed countries).
- Contribution to background disease (e.g, intestinal helminth infections).

Indirect Health Effects

- Adverse impacts on the safety of drinking water, food and recreational water.
- Positive impacts on household food security and nutrition.

3 GROUPS TO CONSIDER:

workers

community

consumers

Some lessons so far

- Overly strict standards borrowed from other countries often fail.
- Guidelines are not just numbers; they are made up of good practice + microbial water quality standards.
- Low-cost effective treatment technologies needed.
- Risk reduction strategies necessary (and possible) where wastes receive no or inadequate treatment.

WHO Guidelines (3rd Edition)

Objective:

Maximize the ***protection of human health*** and the ***beneficial use*** of important resources.

Target Audience:

- Policy makers
- People who develop and enforce standards and regulations
- Environmental and public health scientists
- Educators
- Researchers and engineers

What's new in the 3rd edition?

Guidelines provide an ***integrated preventive management framework*** for maximizing public health and environmental benefits of waste use.

Health components:

- Define a level of health protection as health-based targets.
- Identify health protection measures to achieve the health-based target.

Implementation components:

- Establish monitoring and system assessment procedures.
- Define institutional and oversight responsibilities.

Requires:

- System documentation; and confirmation by independent surveillance.

Scope

The Guidelines cover:

- Intentional use. But they may also be relevant to some unintentional uses
(e.g., irrigation or aquaculture with sewage contaminated surface waters);

- Municipal or domestic wastes without substantial industrial inputs;

- Faecal sludges derived from on-site sanitation facilities but not sludge produced from the treatment of wastewater;

- Detailed information only on matters related to health protection.

Four volumes to better reach different target audiences

Volume 1: Policy and regulatory aspects

Volume 2: Wastewater use in agriculture

Volume 3: Wastewater and excreta use in aquaculture

Volume 4: Excreta and greywater use in agriculture

Vol I: Policy and Regulatory Aspects

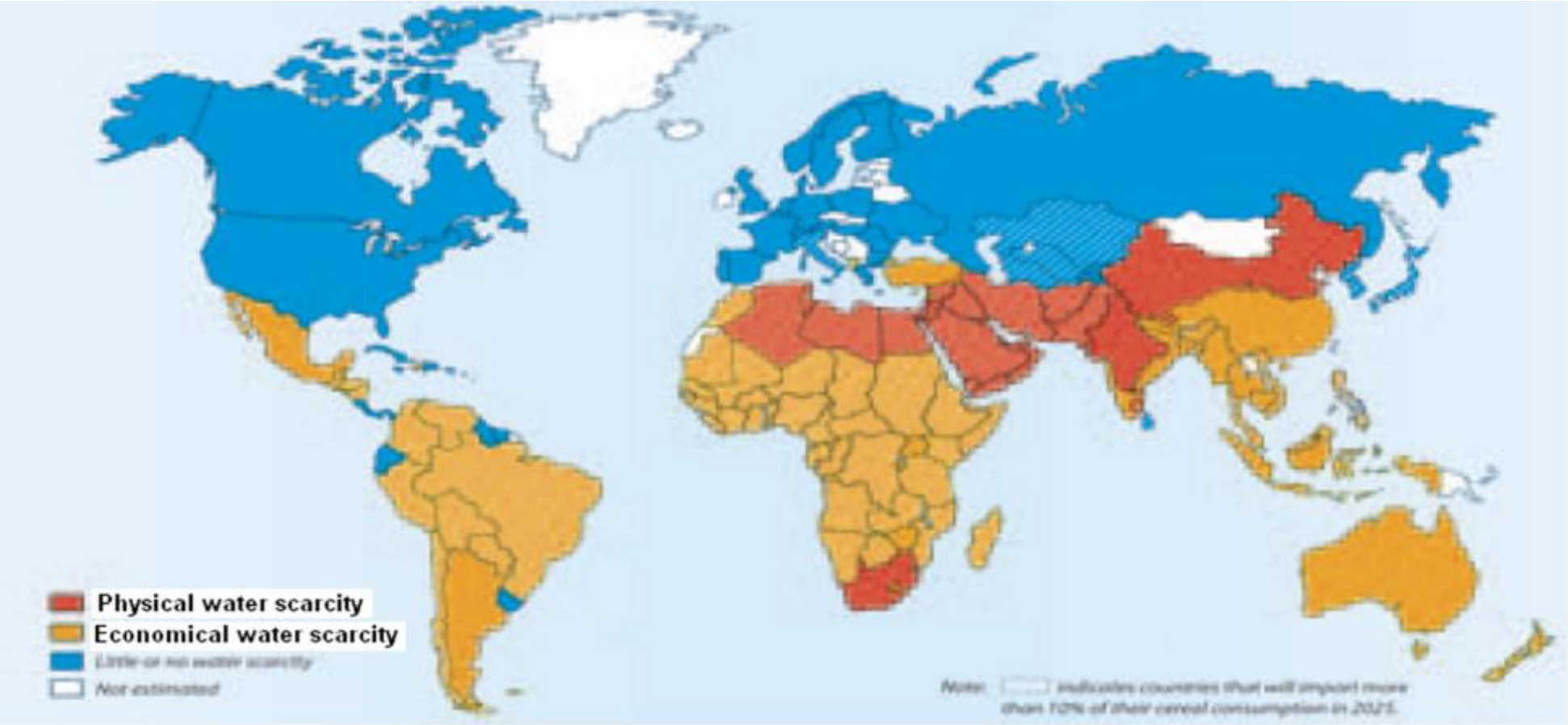
International Policy framework:

- **MDG Goal 1**
  Eradicate extreme poverty and hunger
- **MDG Goal 7**
  Ensure environmental sustainability

National Policy aspects:

- **poverty reduction**
- **food security**
- **protection of public health**
- **protection of the environment**
- **consumer protection**
- **integrated water resources management**
- **energy reliance**

Where is it most needed?



Further water resources development in is increasingly limited by rising difficulties to mobilise more water (RED) or economic difficulties (Yellow) IMWI, 2000

How to start?

Harmonization:

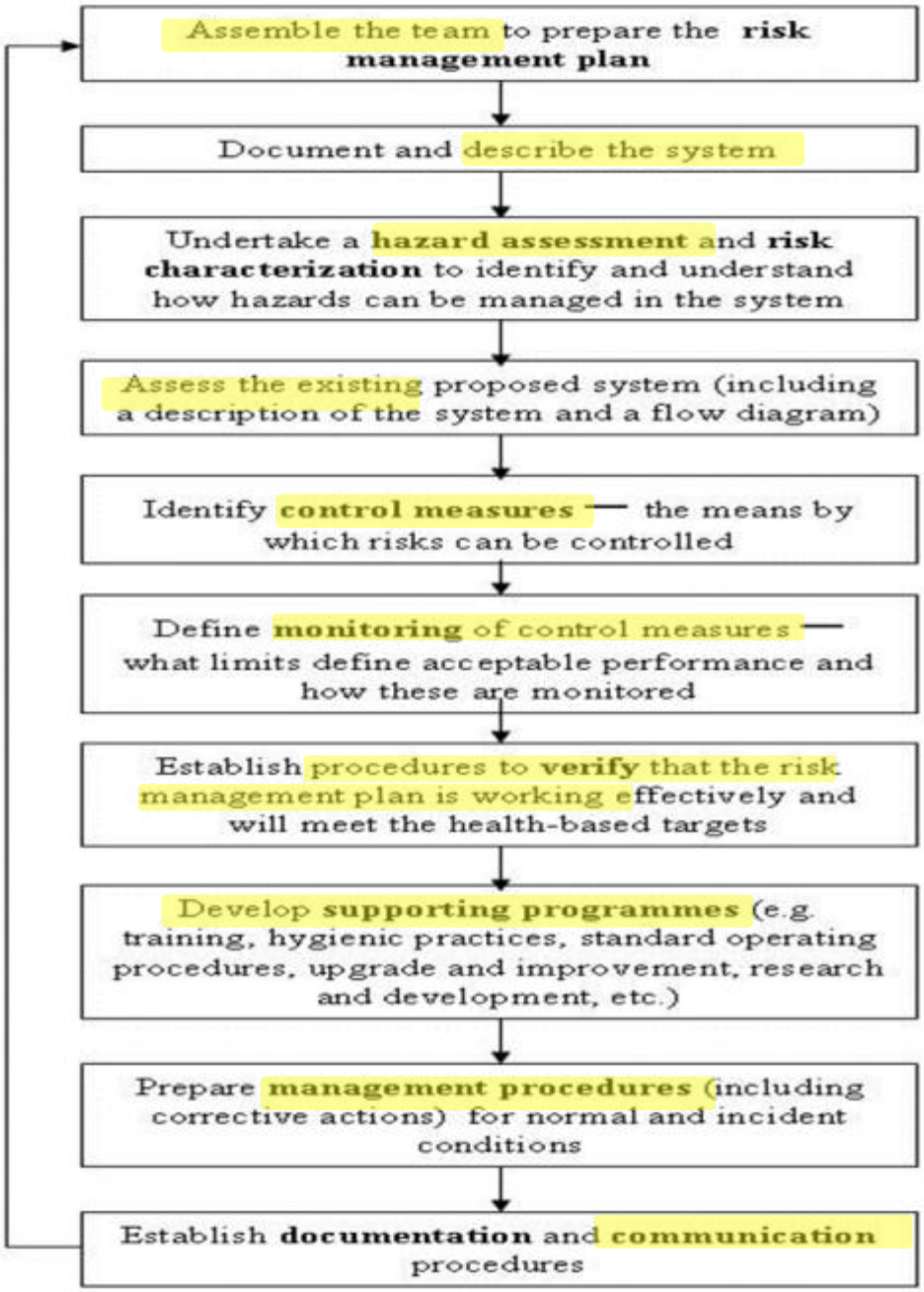
- Situation analysis and needs assessment
- Establish a mechanism for policy dialogue
- Obtain political endorsement
- Engage in an adequately resourced policy dialogue
- Ensure policy changes are legitimized through Parliament and/or decreed by the Prime Minister's Office

Institutional Arrangements:

- Agreed mechanisms for coordination and resource sharing between sectors
- Identification of roles and responsibilities
- Incentive: partial inputs lead to credit for 100% outcome
- through specific Memoranda of Understanding between sectors
- through existing intersectoral mechanisms
- by operating at lower levels of governance

Planning assessment and management

Prepare Risk Management Plans



Assessment of Health Risk

A health risk exists if:

- an infective dose of a pathogen reaches a crop or a pathogen that reaches a crop multiplies to an infective dose, and
- the infective dose reaches a human host (directly or indirectly through a vector).

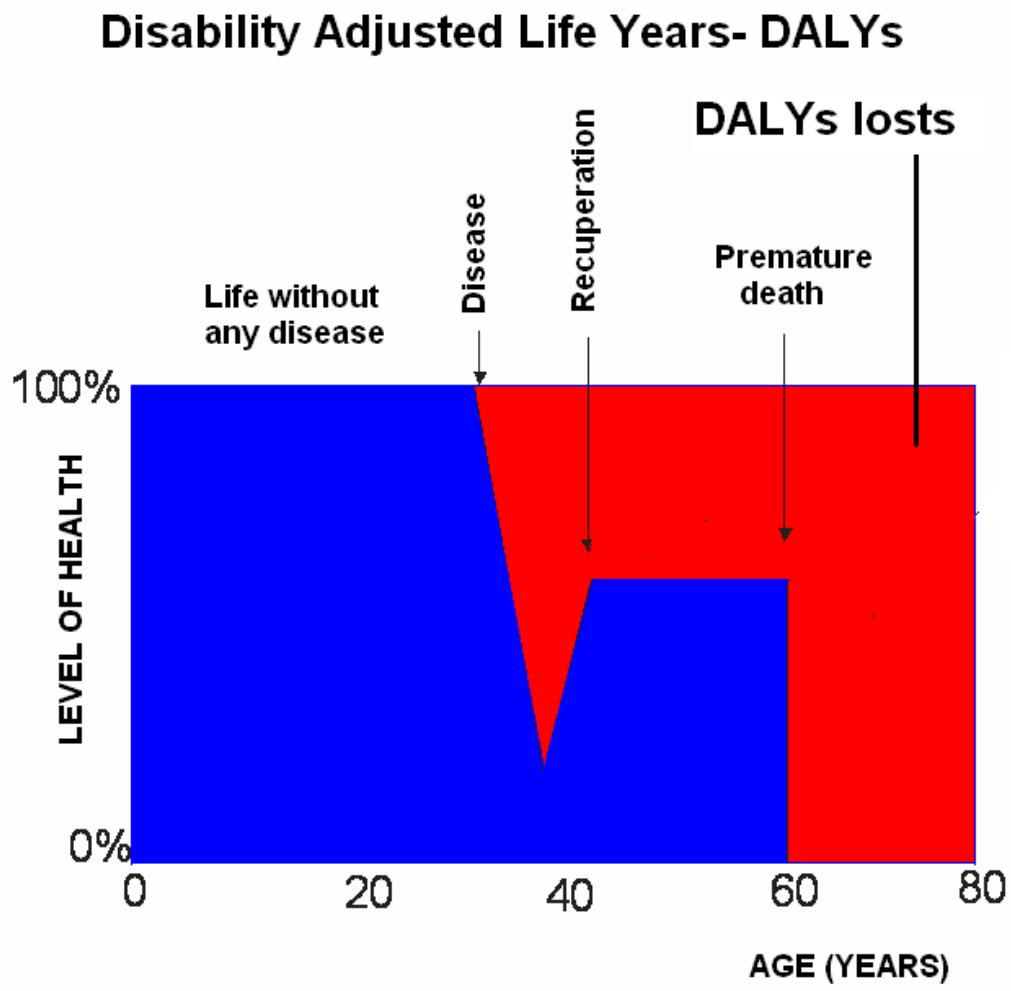
What is a tolerable health risk?

- Based on local public health conditions
- Health priorities (hazards, types of diseases and relative importance)
- Capabilities (institutional, economic, social)
- Can be expressed in DALY's

What is a DALY?

The purpose is to standardize the acceptable risk caused by different agents in different norms
(Drinking water a risk of 10^{-5} for cancer while in irrigation a risk of 10^{-3} for diarrhoeas)

One DALY = One year of healthy life lost, as a measure of community health.
The burden of disease , expressed in DALYs, represents the gap between a real community health status and an ideal situation where everyone lives into old age free of disease and disability .



WHO recommendation: ≤ 10-6 DALYs lost

- Compatible with other public health safety standards
- It is below the actual global incidence of diarrhoeal disease which is estimated at 0.7, i.e. 10^{-1}
- On a per person basis it is equal to losing 31.5 seconds of healthy life in a year.
- At the community level it signifies a collective loss of one year of healthy life per million people

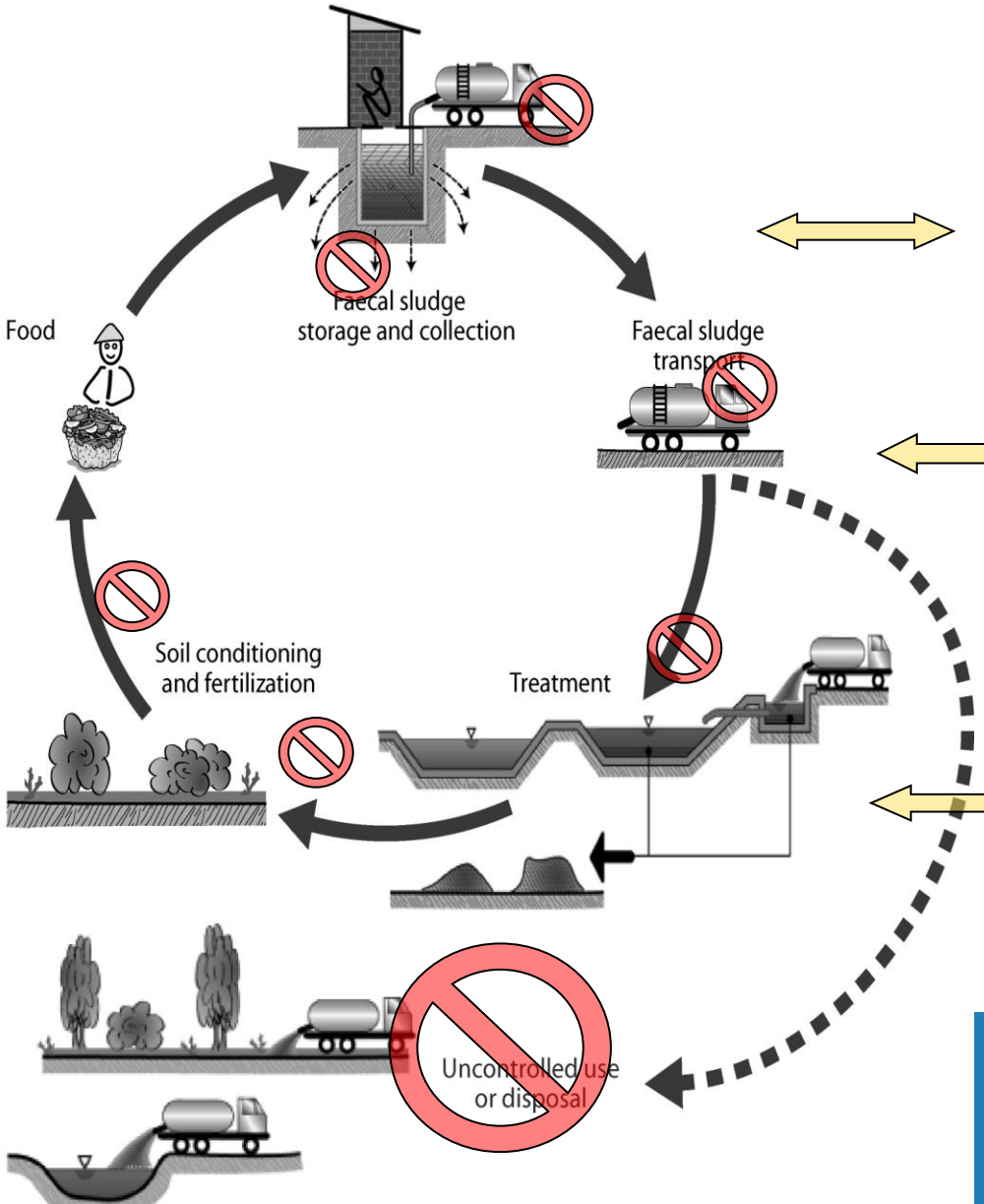
Health protection measures: the multiple barrier approach

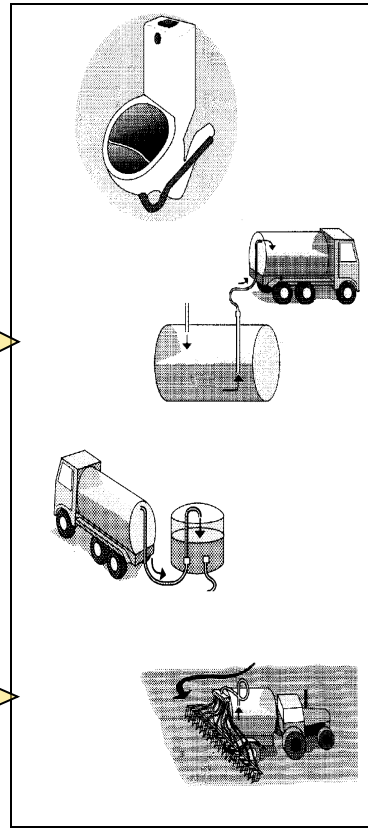
The level of protection to achieve the target can be reached through a combination of management options such as:

- Wastewater treatment
- Crop restriction
- The method of irrigation
- Food preparation
  - Washing
  - Disinfection
  - Peeling
  - Cooking
- Hygiene practices at the marketplace
- Vaccines and other health sector preventive measures

"Control Measures" that may be identified in the Risk Management Plan

Example of excreta systems

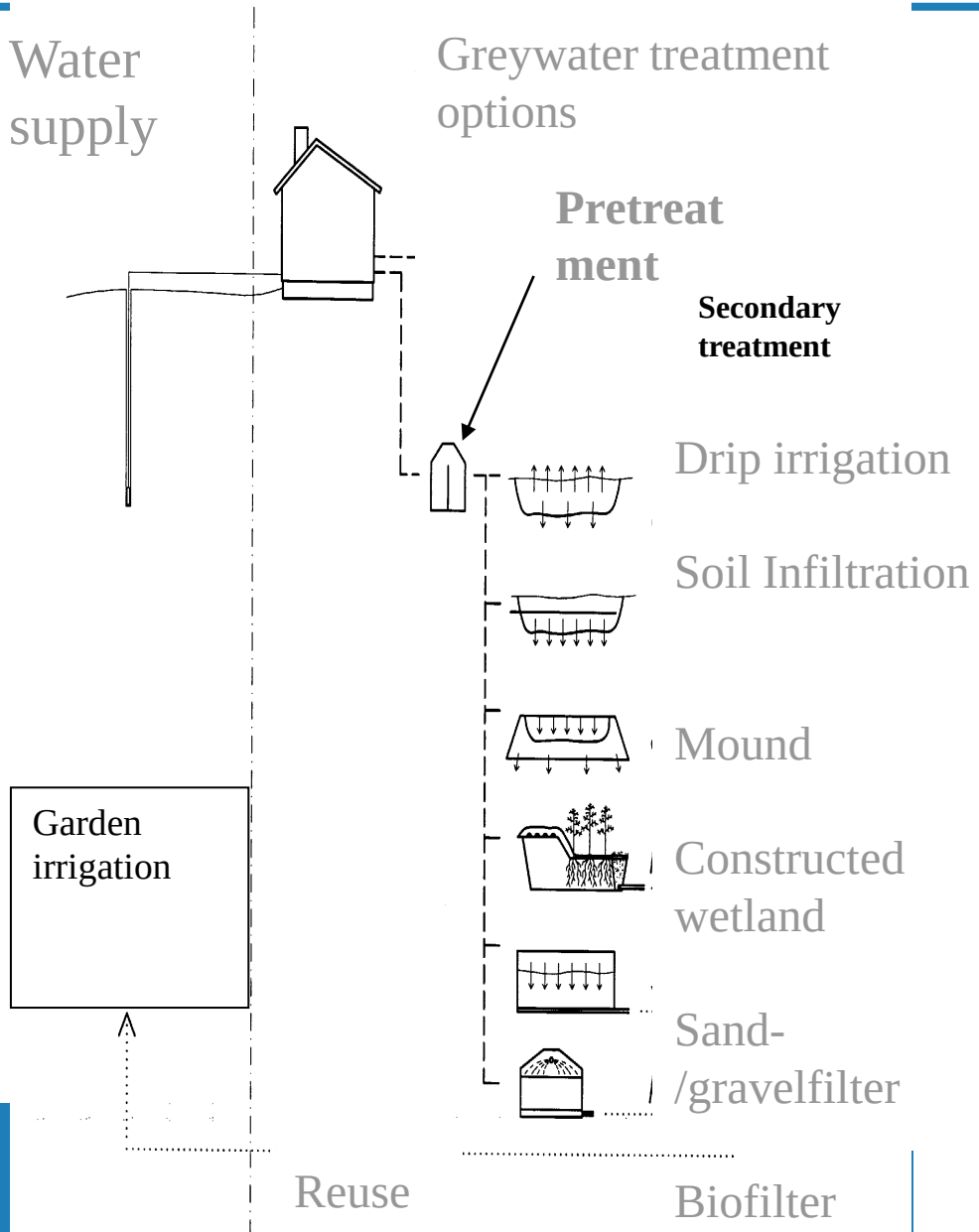




Exposure	Risk
Cleaning of blocked pipes	Ingestion of pathogens
Accidental ingestion when handling unstored urine	Ingestion of pathogens
Accidental ingestion when handling stored urine	Ingestion of pathogens
Inhalation of aerosols created when applying urine	Inhalation of pathogens
Consumption of crops fertilised with urine	Ingestion of pathogens

World Health Organization

Greywater: same principles – the faecal input is crucial to assess risks



Thank you for your kind attention.

More information:

www.who.int/water_sanitation_health