

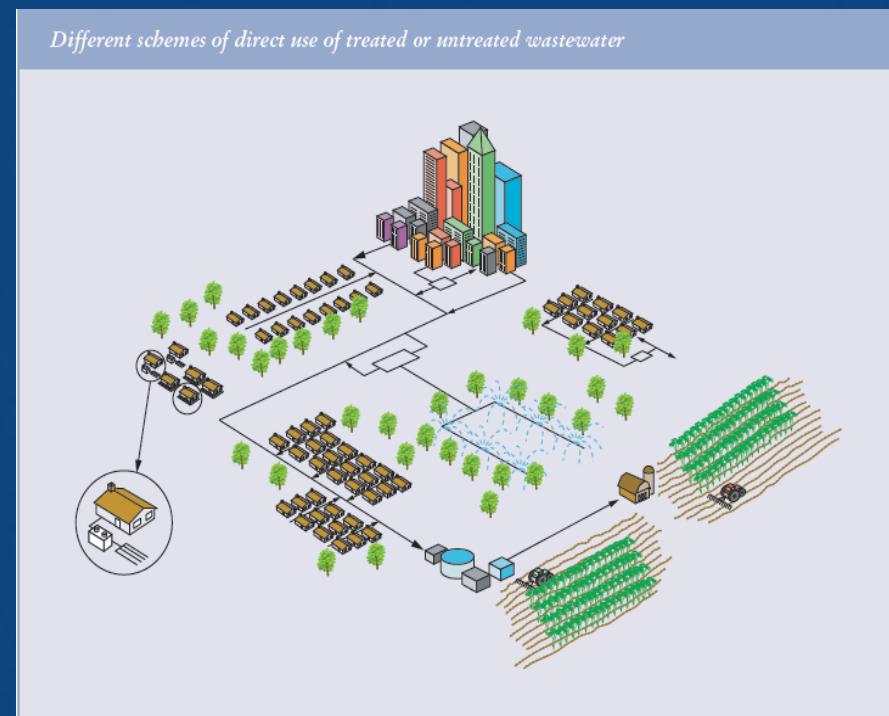


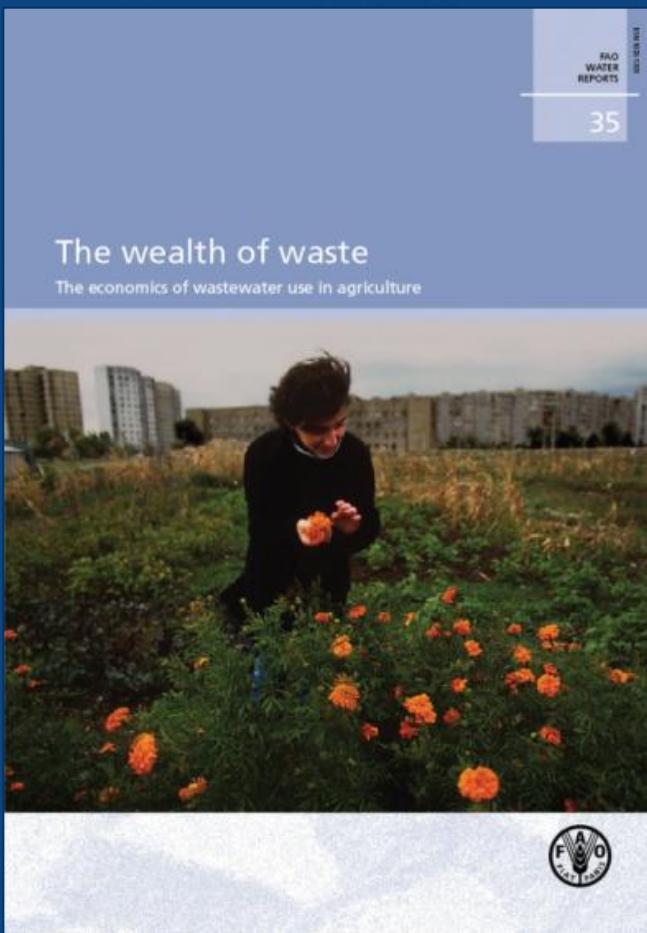
# Safe wastewater use in agriculture

## Selected FAO materials

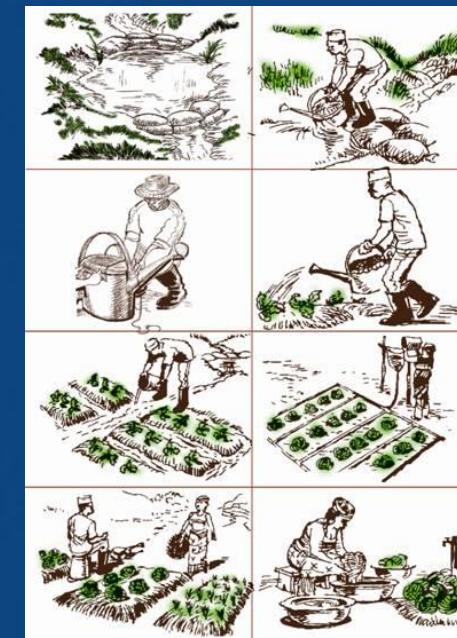
Javier Mateo-Sagasta Dávila  
([javier.mateosagasta@fao.org](mailto:javier.mateosagasta@fao.org))

FAO Land and Water Division





## Selected knowledge products

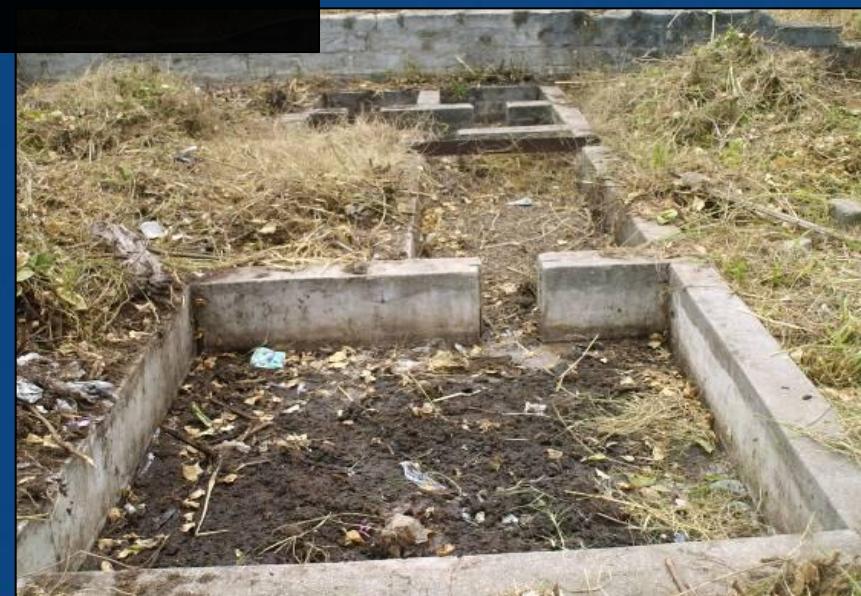


## The wealth of waste

The economics of wastewater use in agriculture



- methodology for the economic appraisal of WW reuse projects
- applies this methodology in real cases in Mexico and Spain.



## Failure Stories



Not economic  
appraisal!

## Steps in an economic appraisal

- Economic justification

Are Total Benefits higher than Total Costs?

Cost-benefit analysis

Is reuse the most cost-effective approach?

Are there better alternatives?

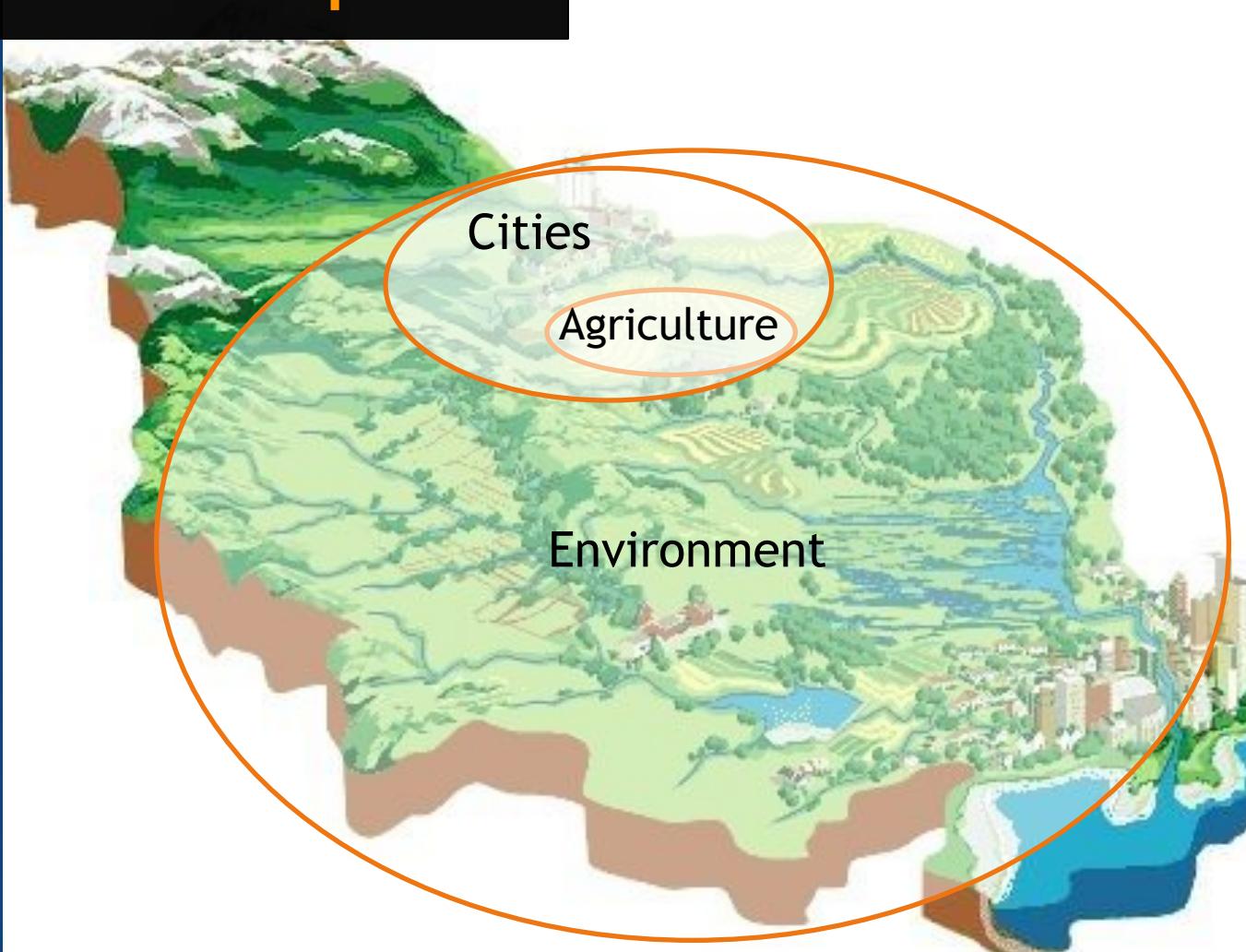
Cost-effectiveness analysis

- Financial feasibility

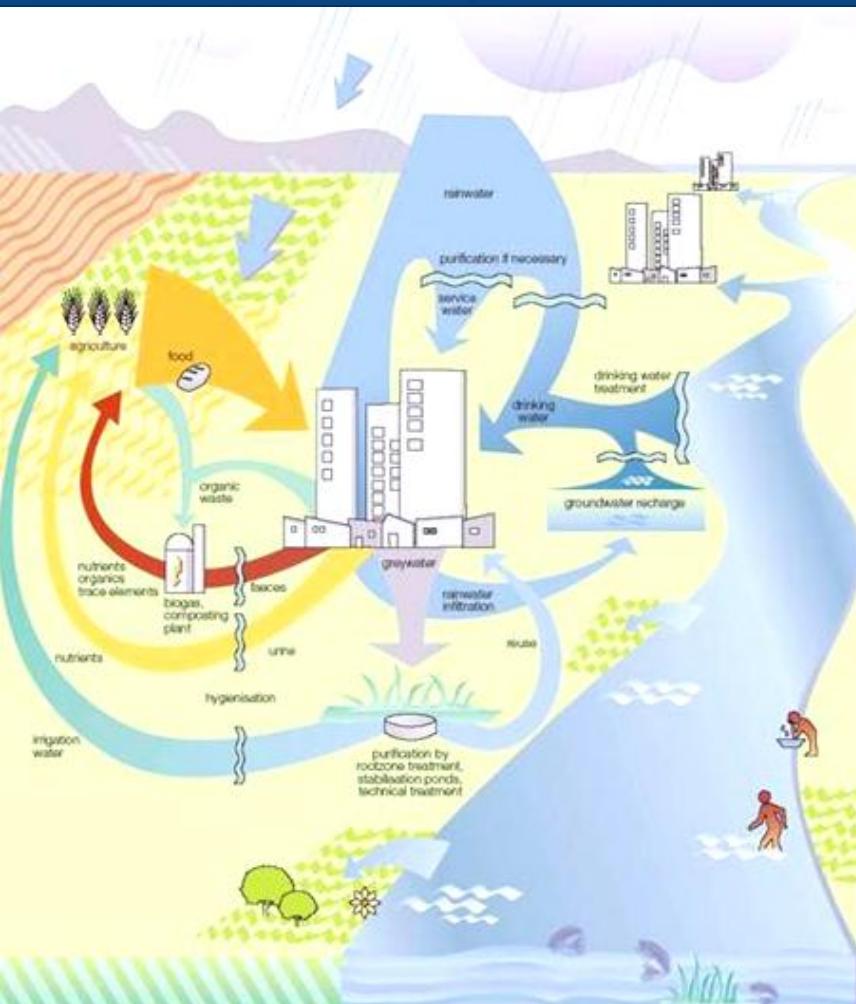
Who pays? And how?

# Economic justification

## Boundaries and parties



## Cost-Benefit analysis



## Benefits

### Farmers

- Water all year round
- Nutrients and organic matter
- Avoided costs of pumping

### Cities

- Food Security
- Low-cost treatment

### Environment

- Reduced pollution
- Reduced freshwater abstraction
- Lower C foot print

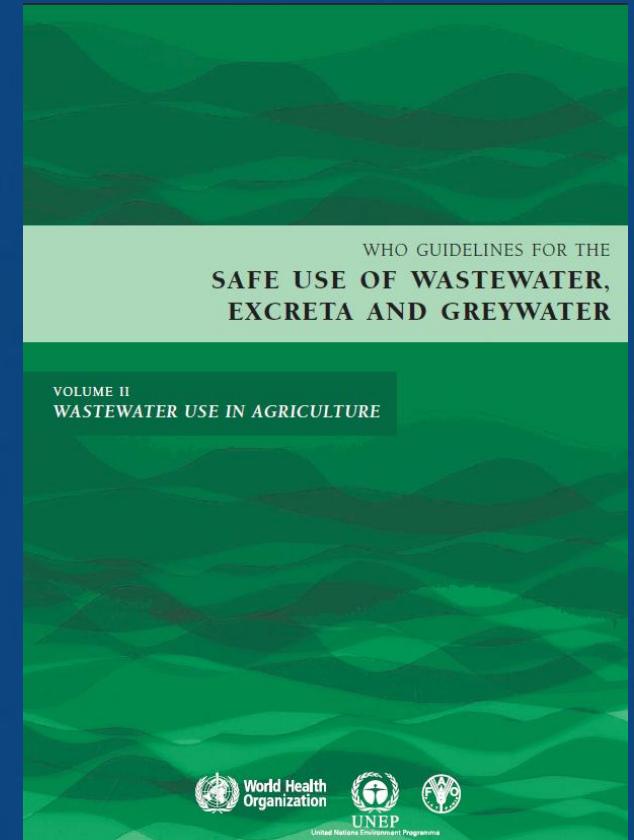
## Cost-Benefit analysis

### Risks



### Minimizing risks = Cost

- Treatment options
- Non treatment options



## Cost-Benefit analysis

### Other costs

- New infrastructure

Water pumping and conveyance

- Environmental costs

Environmental impacts (e.g. Salinization)

- Health costs

Illness due to infectious and chemical agents

## Cost-Effectiveness

If Total Benefits > Total Costs

Is the chosen reuse approach the most cost-effective approach?

Alternatives.



- Water Conservation
- Desalination
- Water transfer
- Others

# Financial feasibility

## Financial impact on stakeholders

### Stakeholders:

- Farmers
- City authorities
- Regional or national government



Who benefits and who loses ?



## Financial instruments

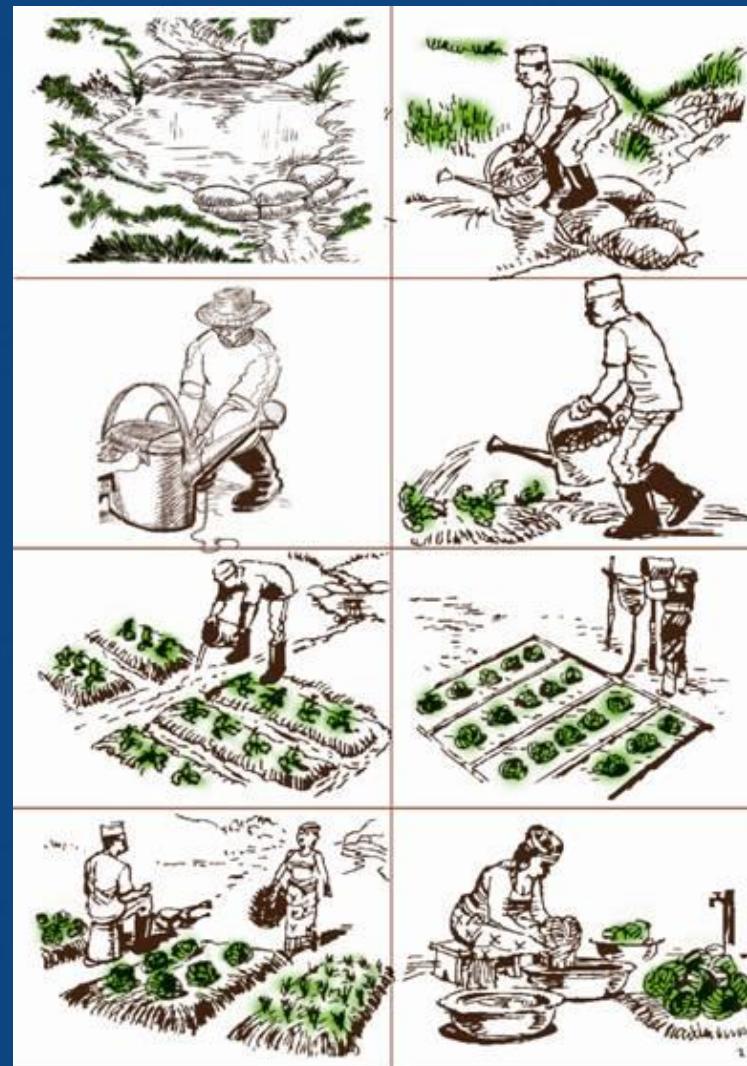
- Subsidies
- Others
  - Soft loans
  - Payment for environmental services
  - Water charges
  - Pollution taxes
  - ...

## Final remarks

Economic appraisal of projects (including reuse projects) is an **essential tool for water planning** and allocation strategies within IWRM.

The FAO report provides a **sound methodology** for the economic appraisal of reuse projects.

## Training Manuals for Farmers



Module 1

## Health-Risk Reduction Options for Vegetable Production in Urban and Peri-urban Areas

*A training handbook for farmer field schools*



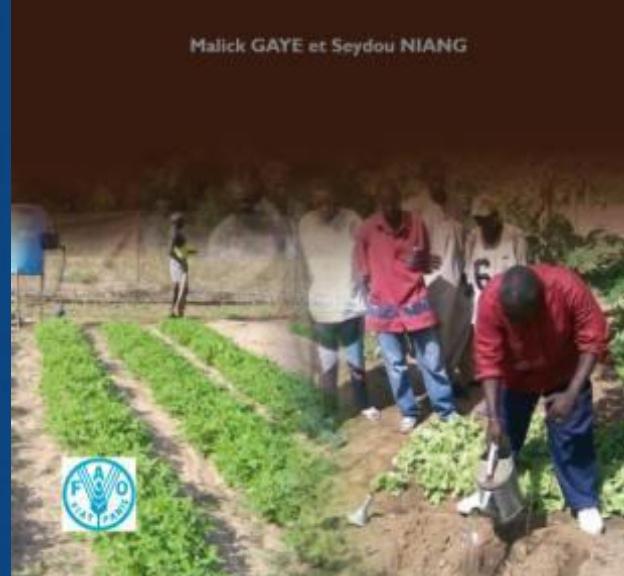
Robert Abaidoo  
Medeste Kenane  
Collins Osei  
Bernard Kerata  
James Akatse  
Anthony Youdeowei  
K. G. Ato de Graft-Johnson

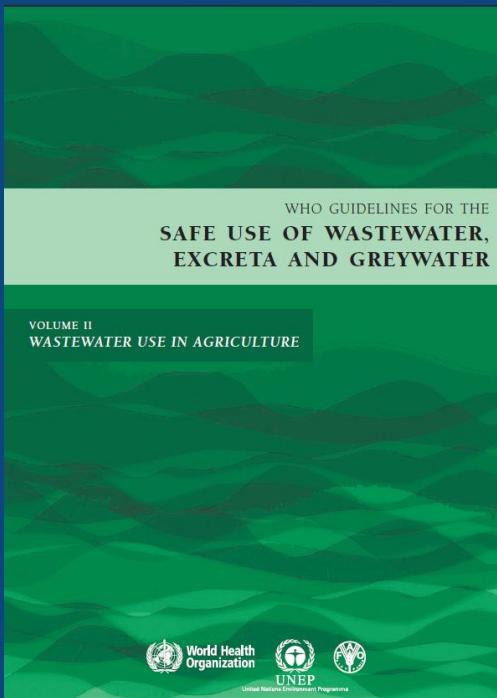


## MANUEL DES BONNES PRATIQUES DE L'UTILISATION SAINE DES EAUX USÉES DANS L'AGRICULTURE URBAINE

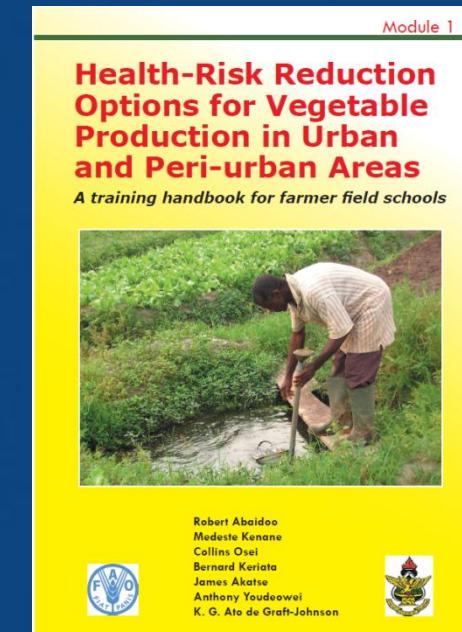
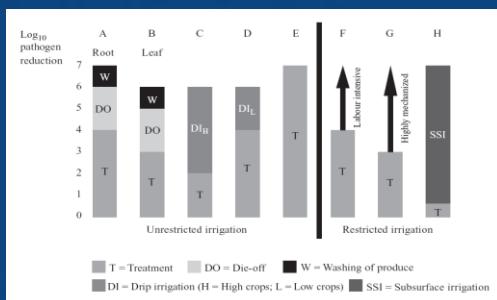


Malick GAYE et Seydou NIANG





# Training Manuals for Farmers



Module 1

## Health-Risk Reduction Options for Vegetable Production in Urban and Peri-urban Areas

A training handbook for farmer field schools



Robert Abaidoo  
Medeste Kenane  
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UNIT  
1

### Contamination of Irrigation Water and Vegetables



UNIT  
2

### Health-Risk Reduction Options of Wastewater Irrigation



# Training Manuals for Farmers

UNIT  
3

Monitoring and Evaluating the Performance

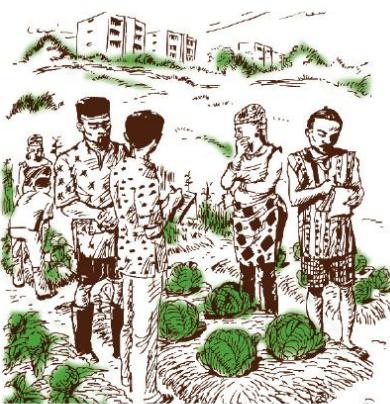
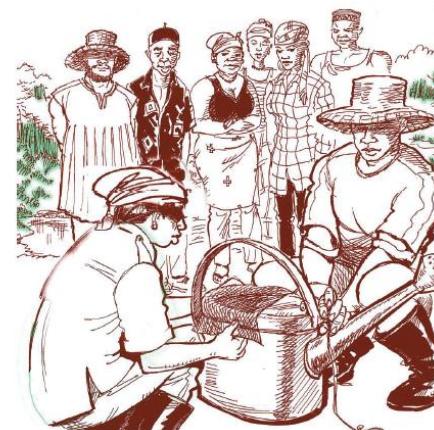


Figure 12: Farmers monitor and discuss field observations

UNIT  
4

Farmer-to-Farmer Training



UNIT  
5

Disseminate and Communicate Your Strategies for Safe Vegetable Production





FAO  
WATER

AQUASTAT- wastewater



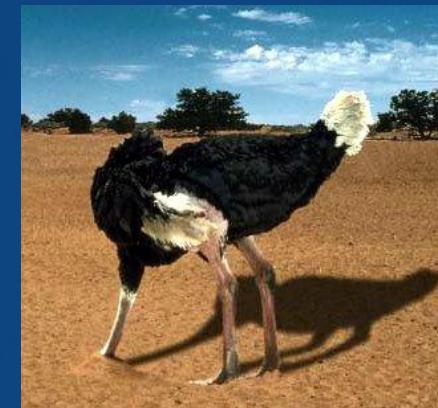
Use of untreated or partially treated WW

5-20 million hectares

50 Countries

Difficult to monitor by public authorities.

May be underreported!



ation System on Water...

 aquastat

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS  
for a world without hunger 

AQUASTAT FAOWATER FAOLAND&WATER FAONATURALRESOURCES Français Español

FAO's Information System on Water and Agriculture



■ AQUASTAT Home  
■ Databases  
■ Countries, regions, river basins  
■ Climate info tool  
■ Water resources  
■ Water use  
■ Irrigation worldwide  
■ Spatial data, maps, tables  
■ Publications  
■ Glossary

■ 

**AQUASTAT**

AQUASTAT is FAO's global information system on water and agriculture, developed by the Land and Water Division. The main mandate of the programme is to collect, analyze and disseminate information on water resources, water uses, and agricultural water management with an emphasis on countries in Africa, Asia, Latin America and the Caribbean. This allows interested users to find comprehensive and regularly updated information at global, regional, and national levels.

All AQUASTAT products can be found using the left navigation menu. Shortcuts to our most popular programme areas containing country-level information are presented below for ease of use:

Main database **Main AQUASTAT country database** 

Country profiles   

Fact sheets   

Water balance sheets   

Sub-national irrigation   

Dams database **Africa || Middle East** 

Global maps **Thematic maps** 

MDG water indicator **Millenium Development Goal Indicator 7.5** 

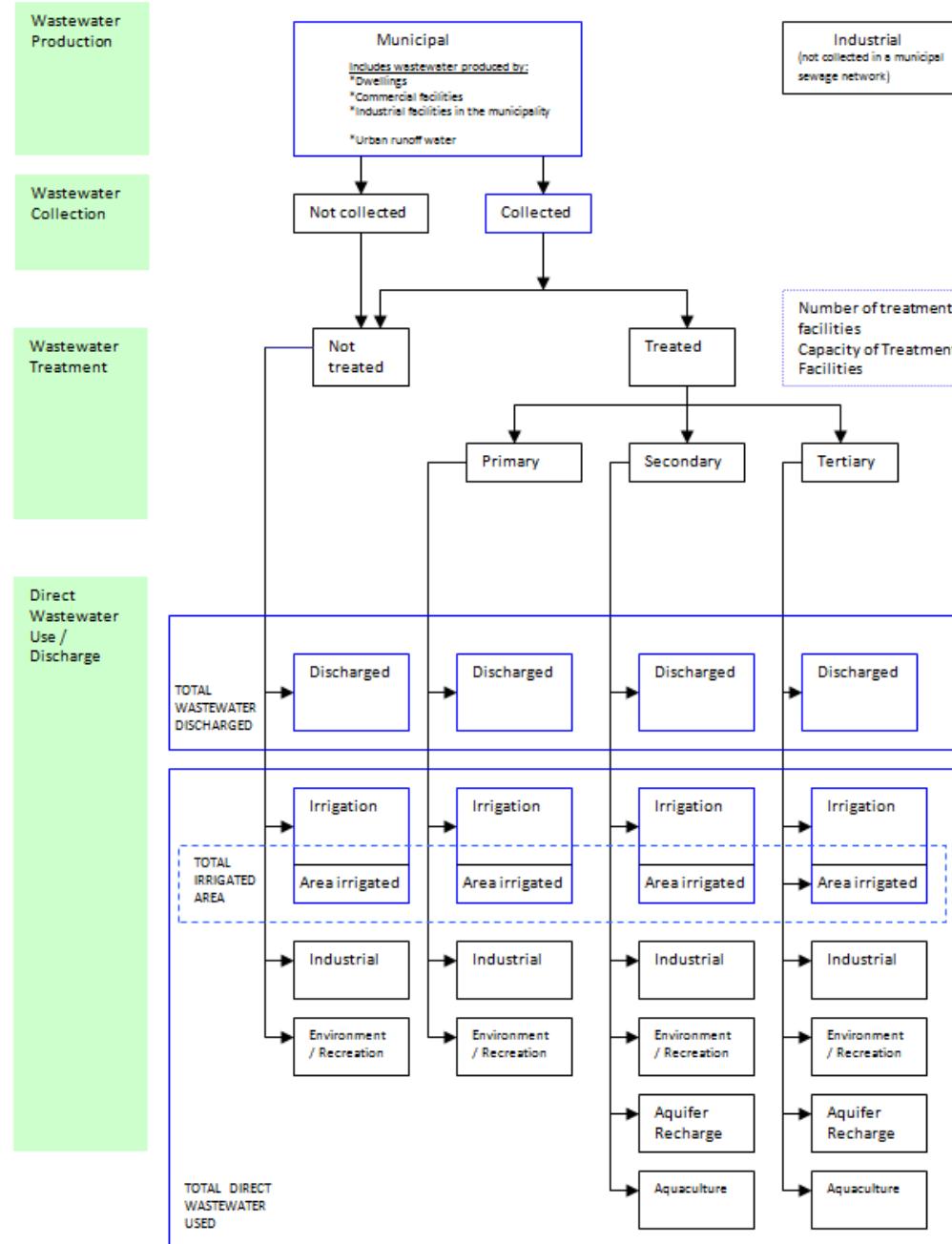
 aquastat  
Database Query

**SELECT VARIABLES**

- Water resources
  - +  Precipitation
  - +  Internal renewable water resources
  - +  External renewable water resources
  - +  Total renewable water resources
  - +  Exploitable water resources and dam capacity
- Water use
  - +  Water withdrawal by sector
  - Water withdrawal by source
    - Surface water withdrawal 
    - Groundwater withdrawal 
    - Total freshwater withdrawal (surface water + groundwater) 
    - Desalinated water produced 
    - Reused treated wastewater 
  - Wastewater
    - Wastewater: produced volume 
    - Wastewater: treated volume 

**SELECT PERIOD**

1960	1965	1970	1975	1980	1985	1990	1995	2000
1958-1962	1963-1967	1968-1972	1973-1977	1978-1982	1983-1987	1988-1992	1993-1997	1998-2000



Accounting wastewater production, treatment and use/discharge at **country** level can help with the diagnosis!!

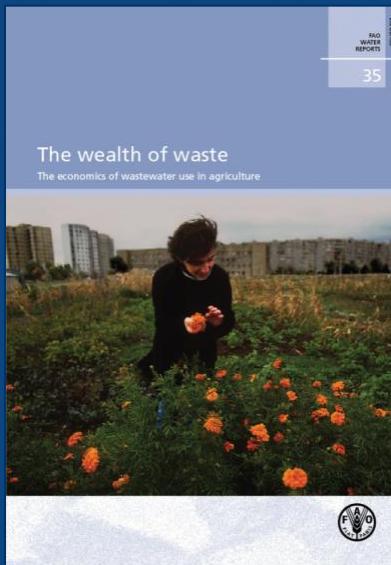


Reporting at **global** level will help to identify **hot spots** and target the **international support**





# Selected knowledge products



sustainable  
sanitation  
alliance



World Health Organization



Do these materials cover  
your knowledge needs?

How can them be improved  
and completed?

# THANK YOU!

