

Safe wastewater use in agriculture

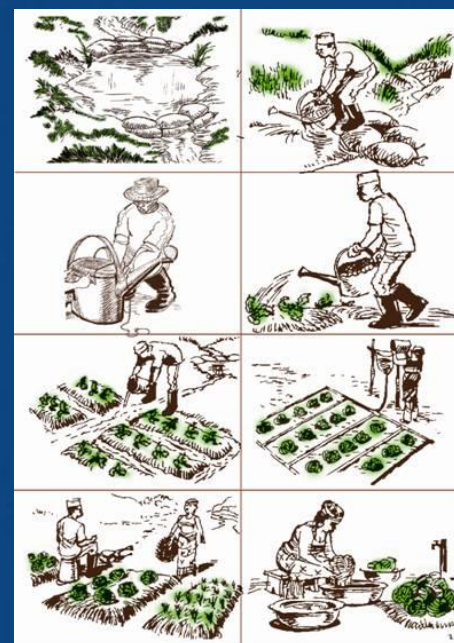
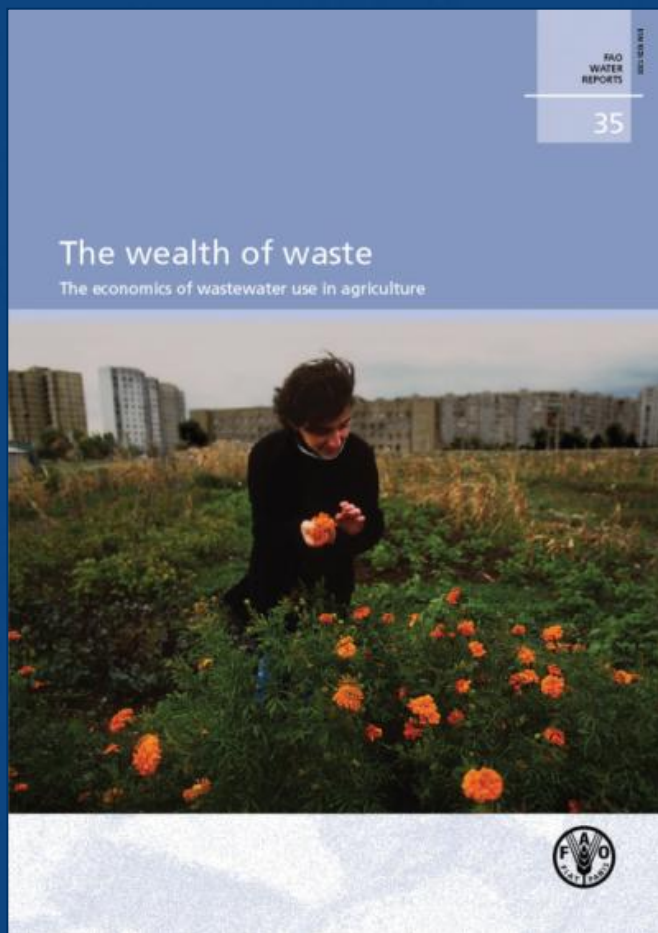
Selected **FAO** materials

Javier Mateo-Sagasta Dávila
(javier.mateosagasta@fao.org)

FAO Land and Water Division

Different schemes of direct use of treated or untreated wastewater





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?

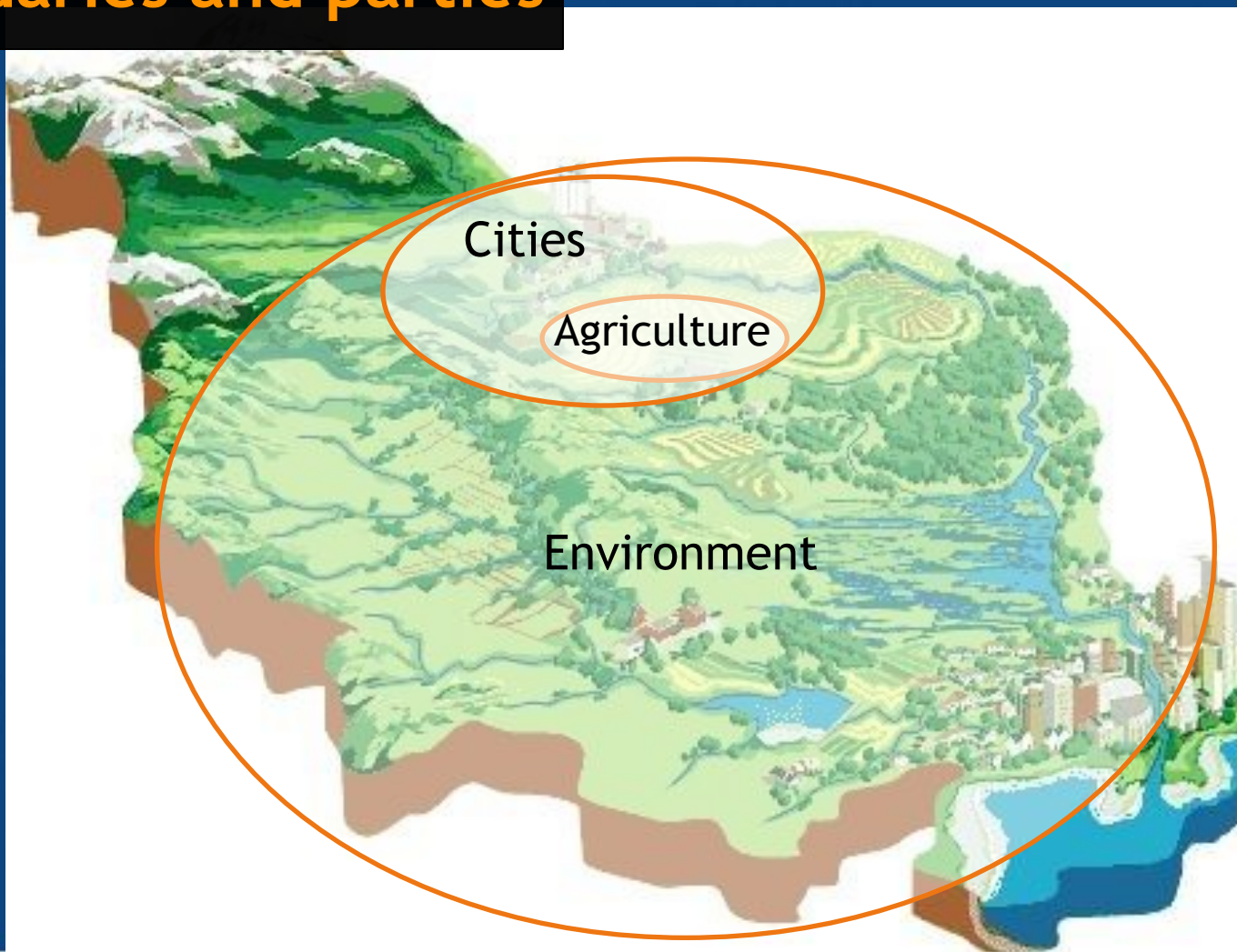
Cost-effectiveness analysis

- 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



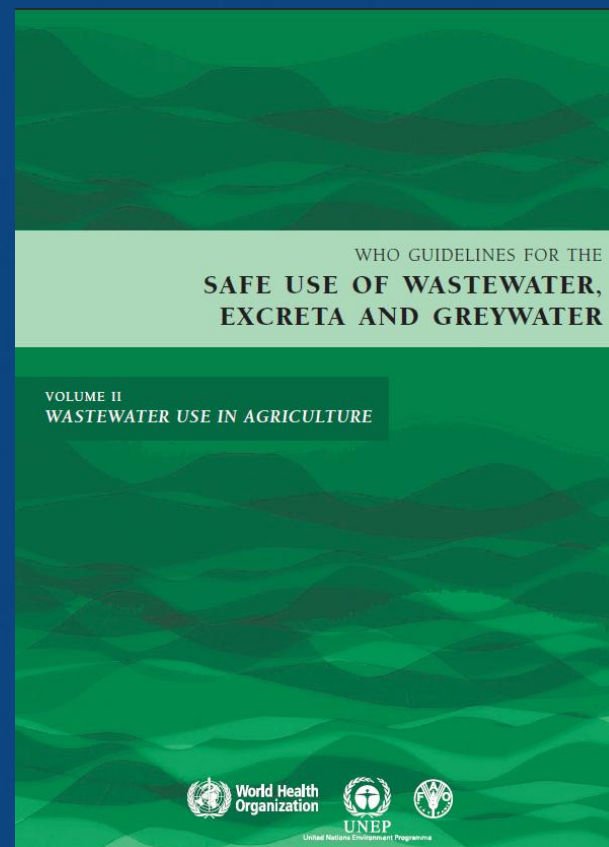
Cost-Benefit analysis

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



?

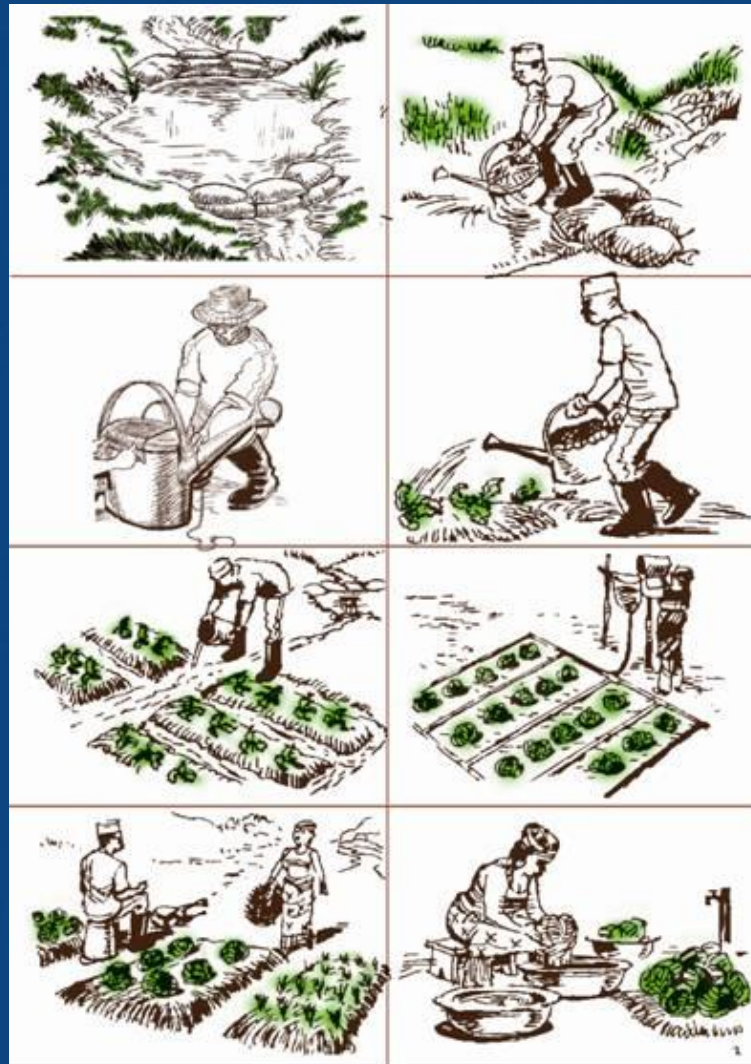
Financial instruments

- 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.



Module 1

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

A training handbook for farmer field schools

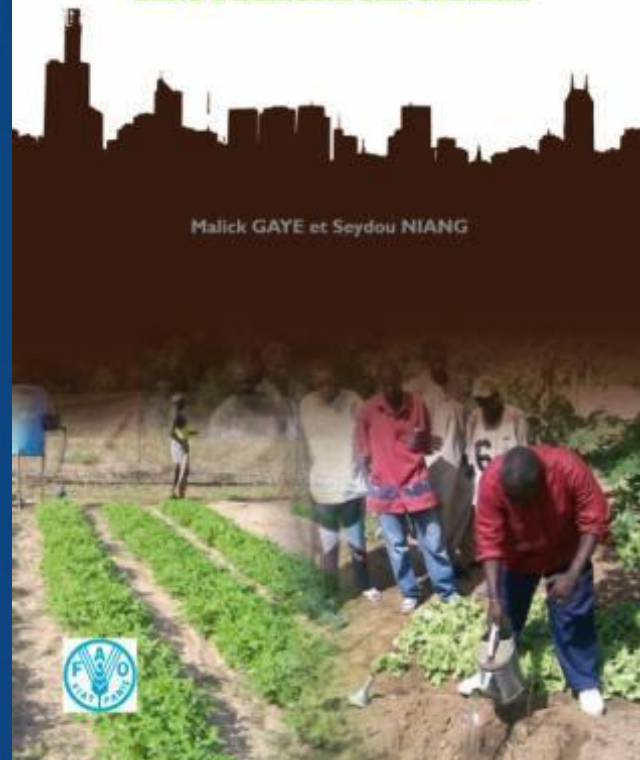


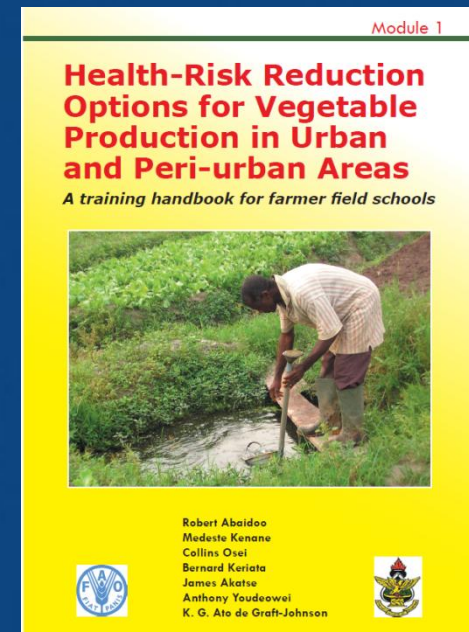
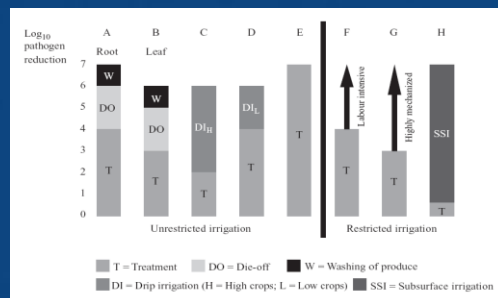
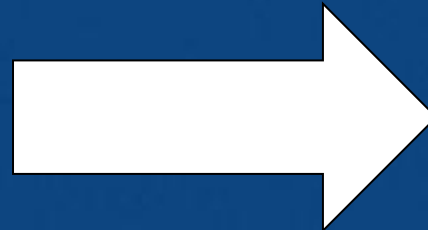
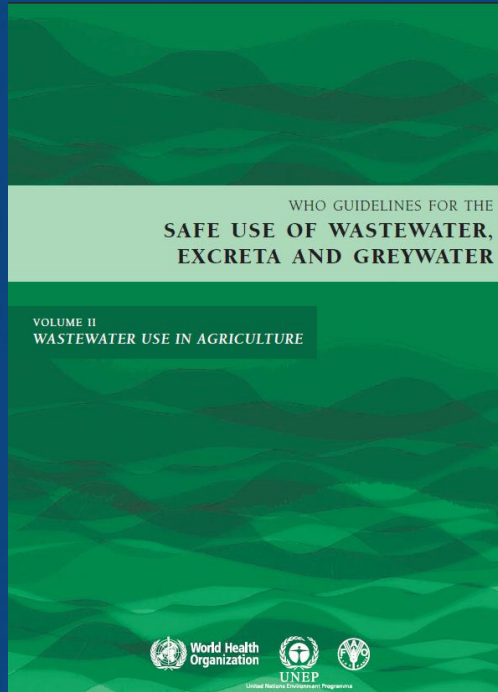
Robert Abaidoo
Medeste Kenane
Collins Osei
Bernard Keriatu
James Akatse
Anthony Youdeowei
K. G. Ato de Graft-Johnson



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

Malick GAYE et Seydou NIANG





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 Keriata
James Akatse
Anthony Youdeowei
K. G. Ato de Graft-Johnson



UNIT 1

Contamination of Irrigation Water and Vegetables



UNIT 2

Health-Risk Reduction Options of Wastewater Irrigation



UNIT 3

Monitoring and Evaluating the Performance

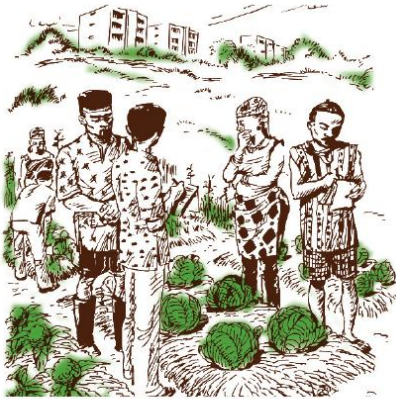
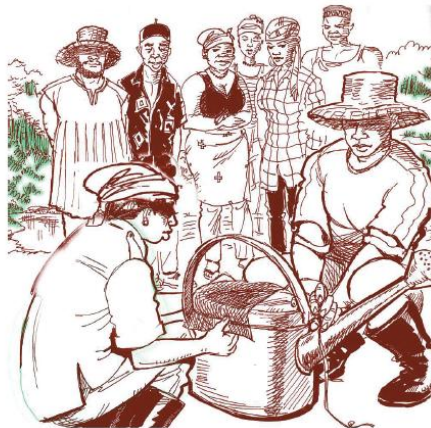


Figure 12: Farmers monitor and discuss field observations

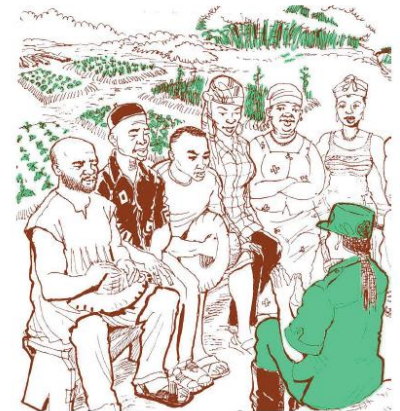
UNIT 4

Farmer-to-Farmer Training



UNIT 5

Disseminate and Communicate Your Strategies for Safe Vegetable Production





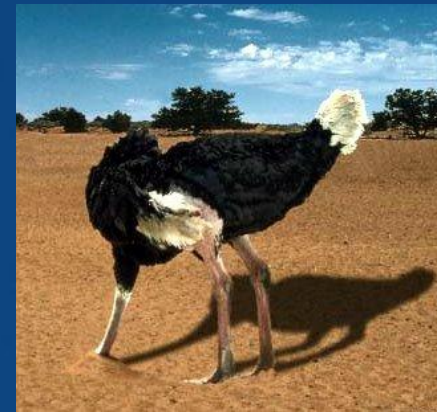
Use of untreated or partially treated WW

5-20 million hectares

50 Countries

Difficult to monitor by public authorities.

May be underreported!



ation System on Wate...



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	<input type="text" value="--- Select a Country ---"/> <input type="button" value="Go"/>
Fact sheets	<input type="text" value="--- Select a Country ---"/> <input type="button" value="Go"/>
Water balance sheets	<input type="text" value="--- Select a Country ---"/> <input type="button" value="Go"/>
Sub-national irrigation	<input type="text" value="--- Select a Country ---"/> <input type="button" value="Go"/>
Dams database	Africa Middle East
Global maps	Thematic maps
MDG water indicator	Millenium Development Goal Indicator 7.5

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

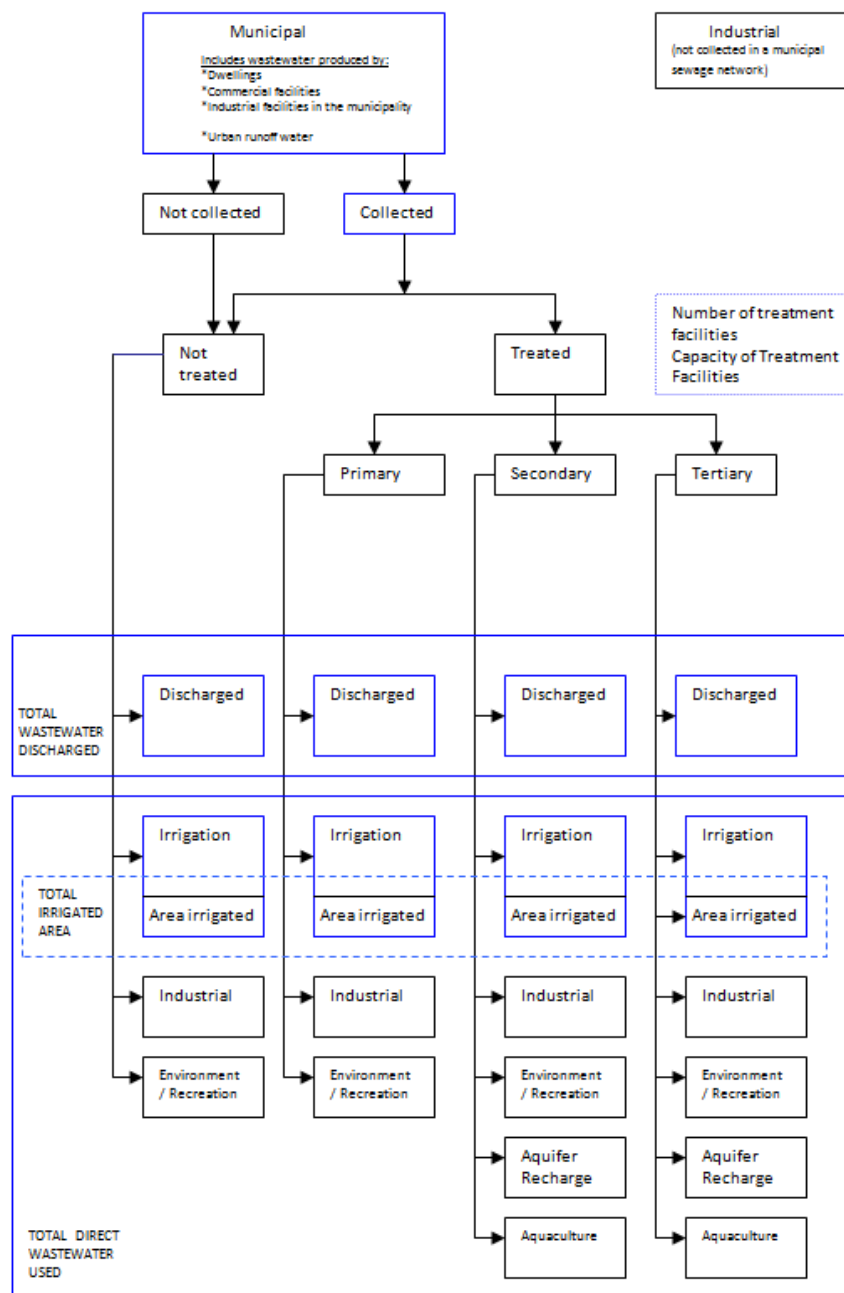
1960	1965	1970	1975	1980	1985	1990	1995	2000
1958-1962	1963-1967	1968-1972	1973-1977	1978-1982	1983-1987	1988-1992	1993-1997	1998-2000

Wastewater
Production

Wastewater
Collection

Wastewater
Treatment

Direct
Wastewater
Use /
Discharge

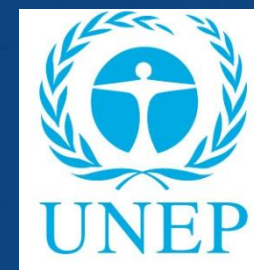
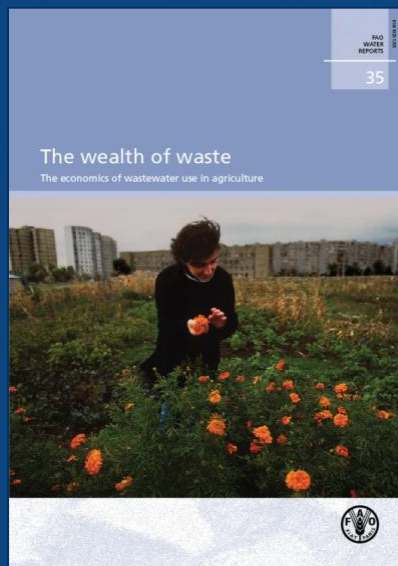
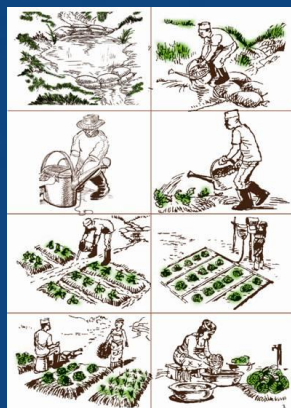


Accounting wastewater production,
treatment and use/discharge at
country level can help with the
diagnosis!!



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





Do these materials cover
your knowledge needs?

How can them be improved
and completed?

THANK YOU!

