Overview on the global development of ecosan - Introduction, guidelines, technologies and financing

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commissioned by

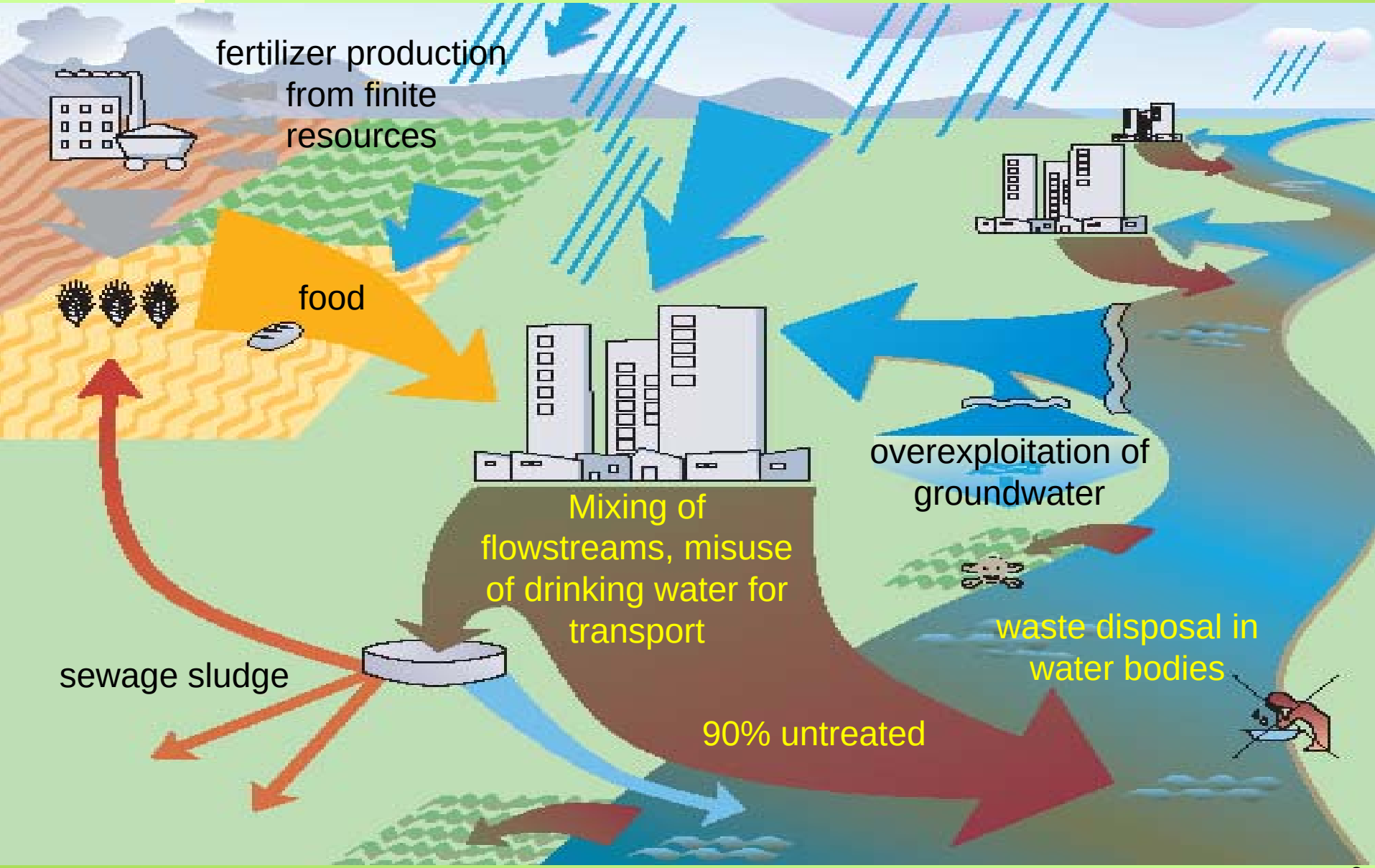
gtz

Federal Ministry
for Economic Cooperation
and Development

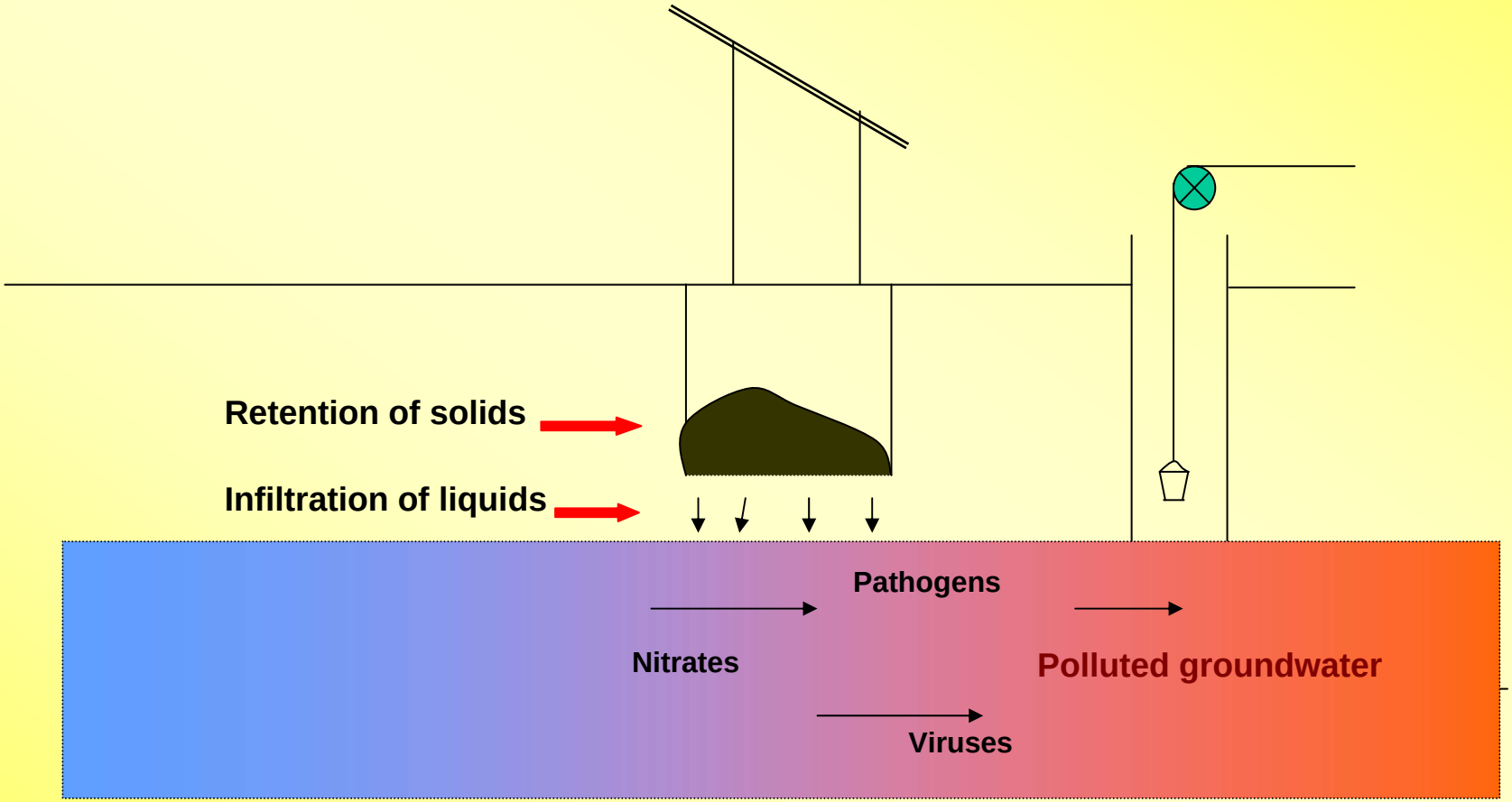
Overview

- Short introduction to “ecological sanitation”
- Refreshment on the “10 Recommendations for Action” from Lübeck 2003
- Progress on the recommendations for action – overview on national and international developments and advances
- Conclusion

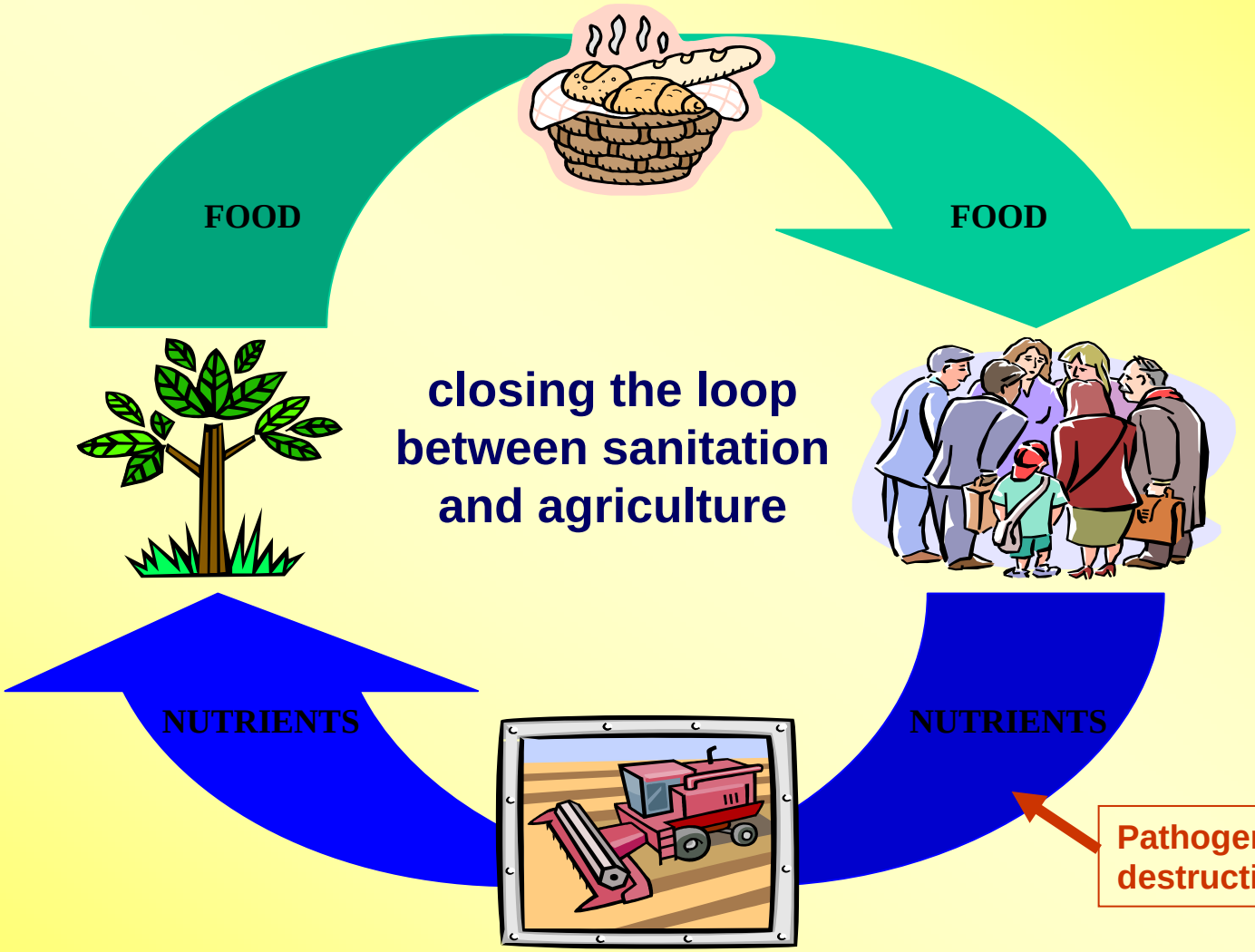
shortcomings of conventional watercarriage sanitation



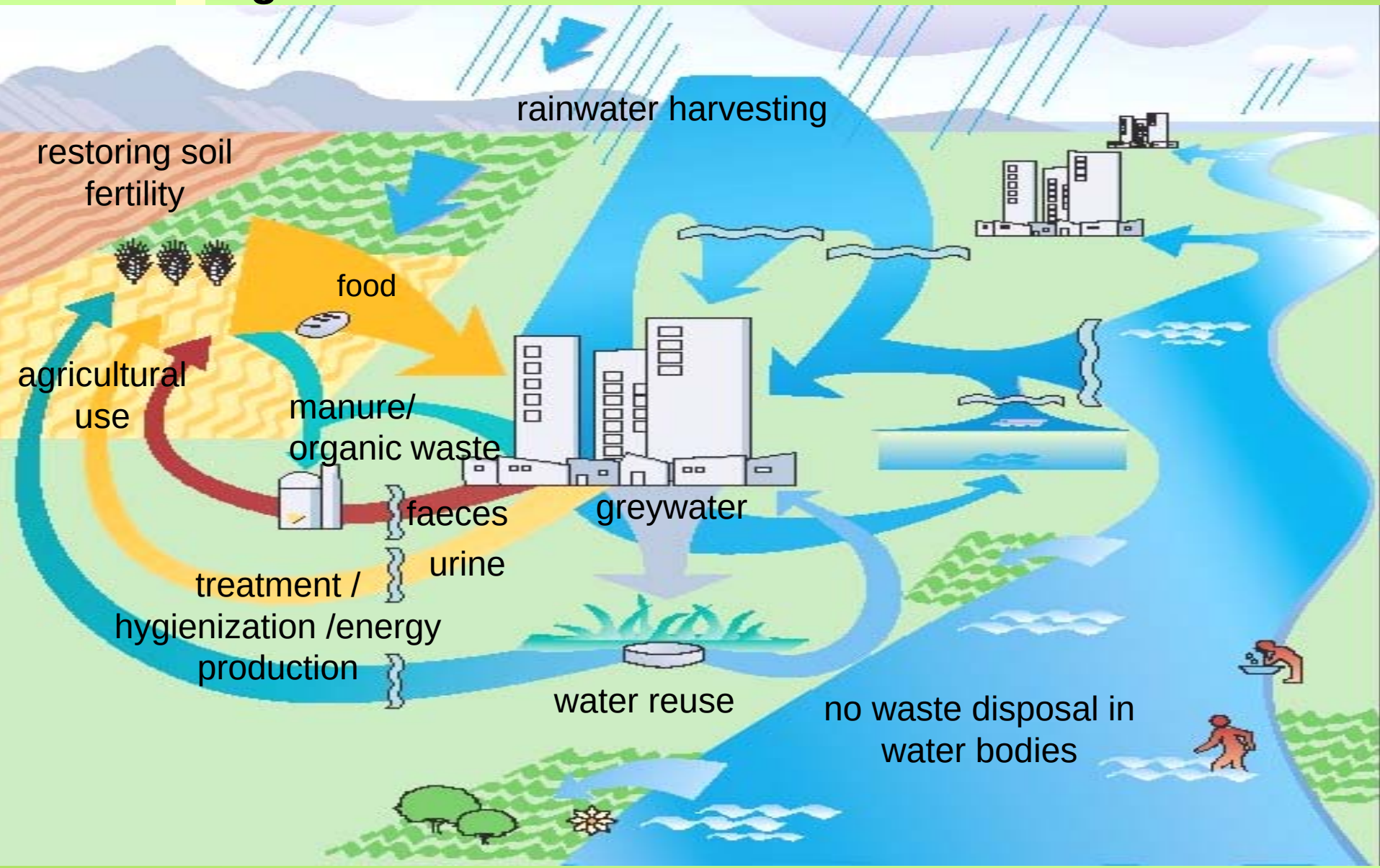
shortcomings of conventional „drop and store“ sanitation



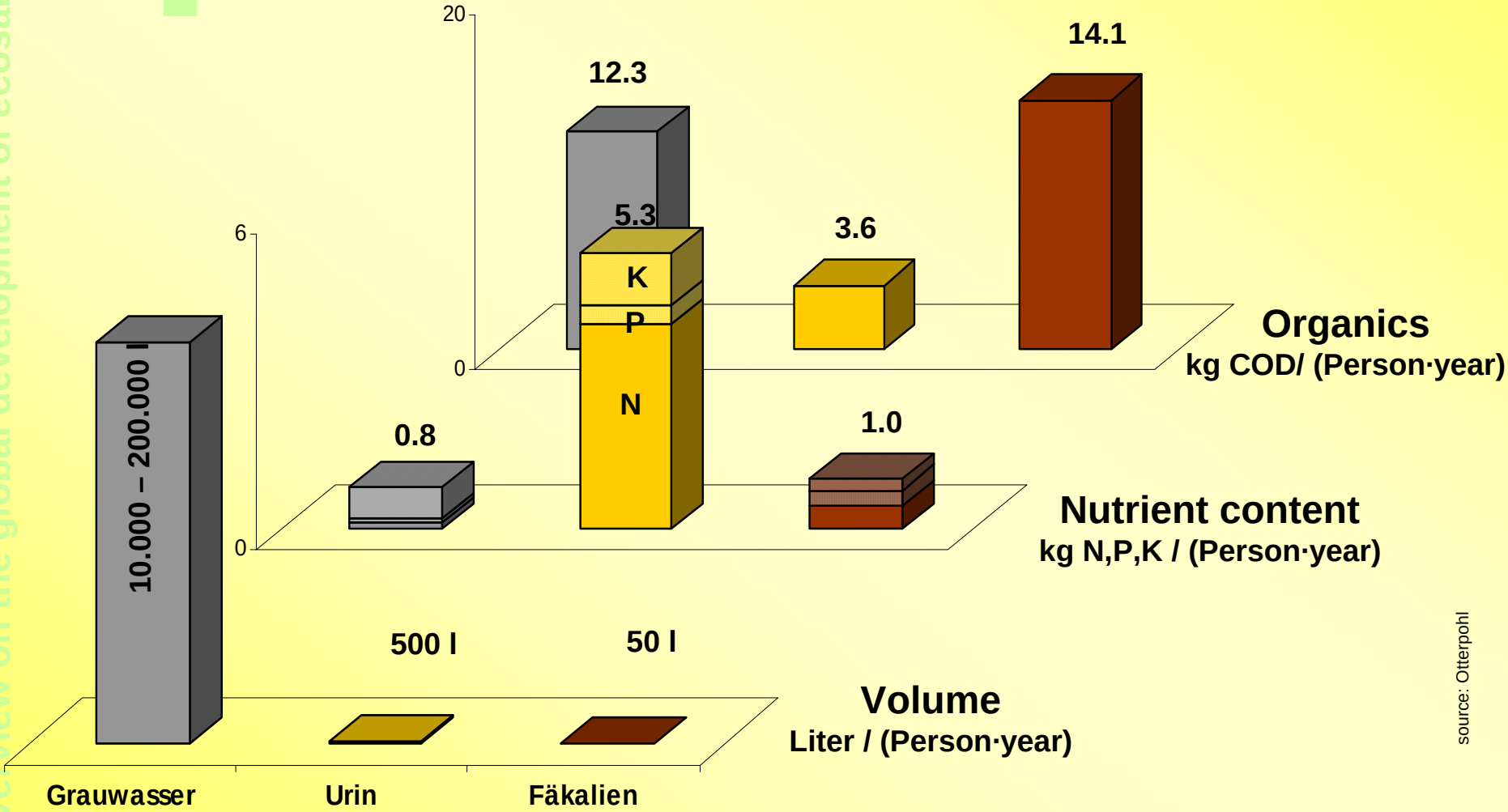
principles of ecosan



closing the loop between sanitation and agriculture

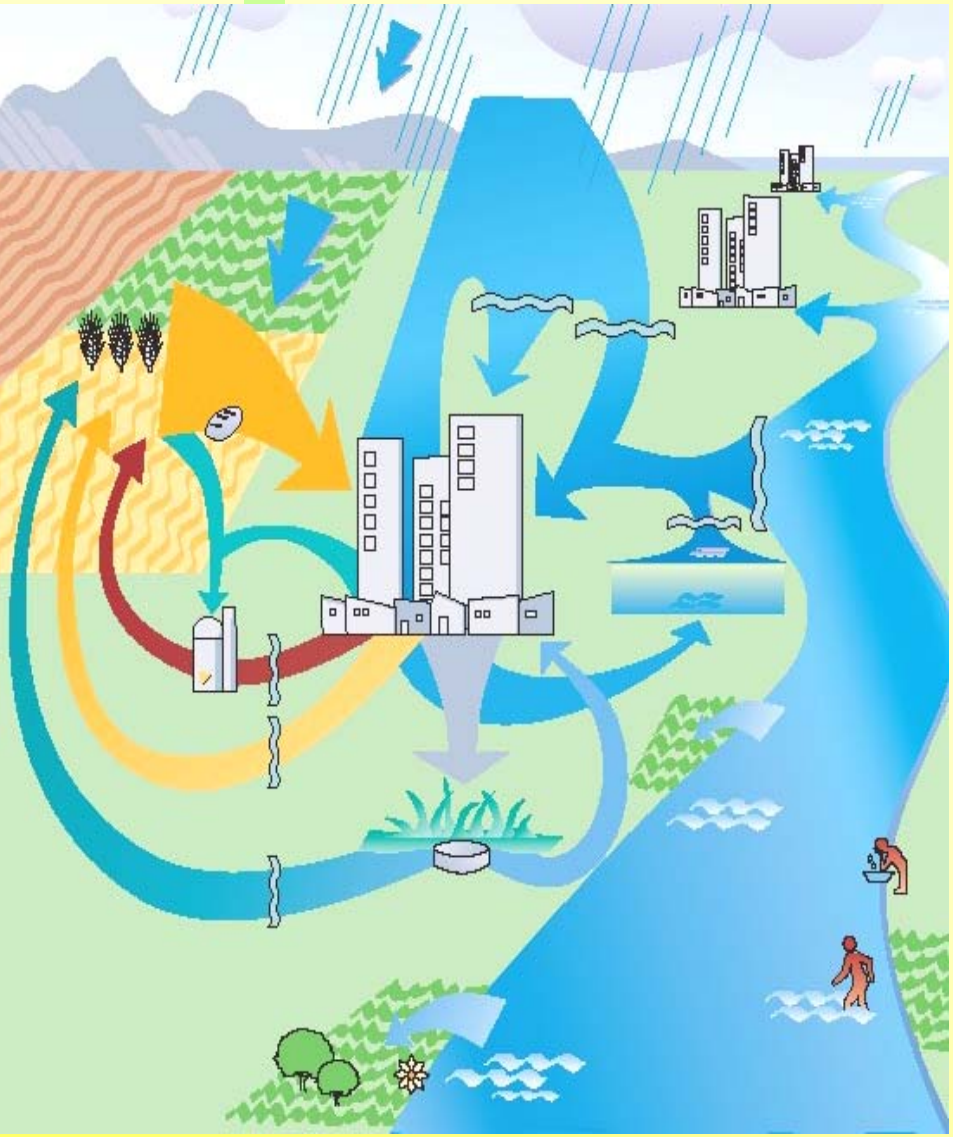


composition of household wastewater



source: Otterpohl

advantages of ecological sanitation



- *Improvement of health by minimizing the introduction of pathogens from human excrements into the water cycle*
- *Promotion of safe, hygienic recovery and use of nutrients, organics, trace elements, water and energy*
- *Preservation of soil fertility, Improvement of agricultural productivity*
- *Conservation of resources*
- *Preference for modular, decentralised partial-flow systems for more appropriate, cost-efficient solutions*
- *Promotion of a holistic, interdisciplinary approach*
- ***Material flow cycle instead of disposal***

Prinzipien von ecosan

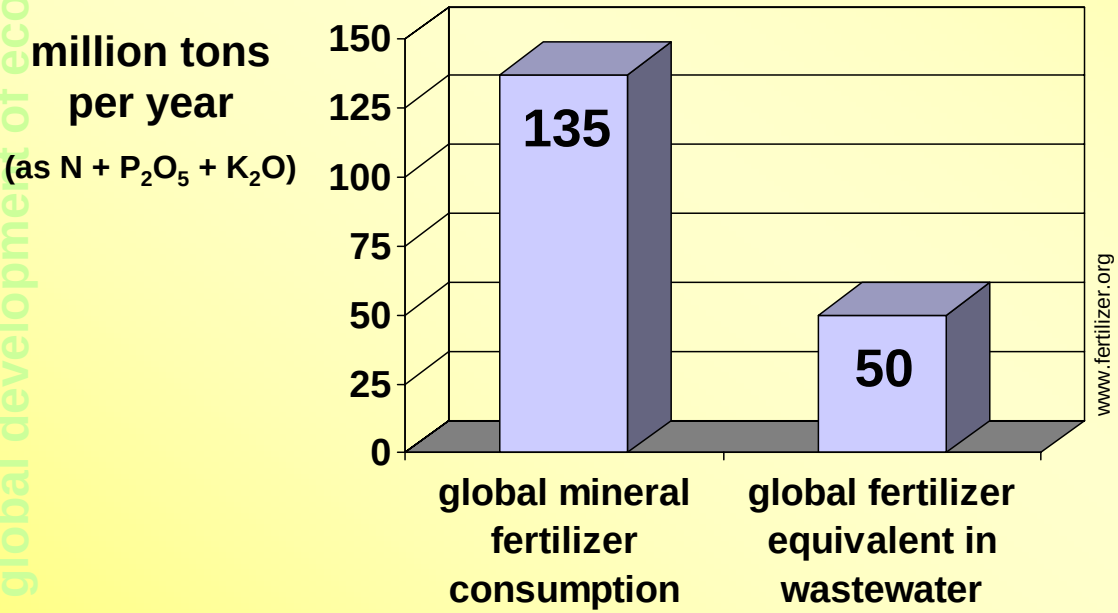
Overview on the global development of ecosan

ecosan is not a specific technology, but a new philosophy - based on an eco-system-oriented view of material flows.

It considers human excreta and waste water not as wastes but as natural resources

It applies the basic natural principal of closing the loop by using modern and safe sanitation and reuse technologies

excreta are a valuable resource



- *more than 1/3 of global mineral fertilizer consumption can be covered by the reuse of human excreta*
- *over 15 billion US$ fertilizer equivalent are annually flushed down the toilet*

benefits of ecological sanitation

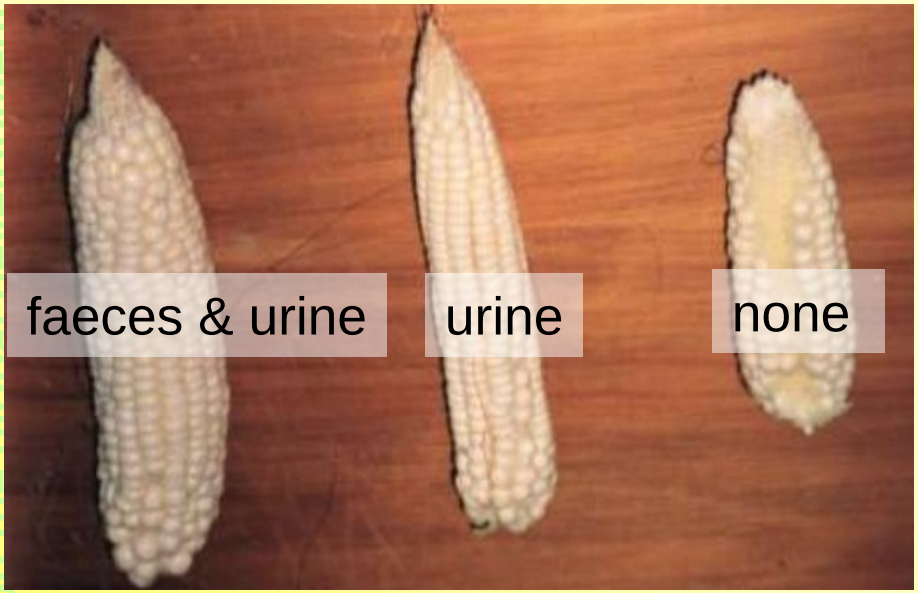
- recovery of energy content
  (covering about 20% of cooking energy needs for a typical family in a developing country)
- energy savings in fertilizer production & wastewater treatment

source: Petter Jenssen

- reuse of water

benefits of ecological sanitation

- restored soil fertility through nutrient reuse



source: Vinnerås, 2003

- improved soil quality through reuse of organics

source: Petter Jenssen

after one week without water

benefits of ecological sanitation

- *safe sanitation*

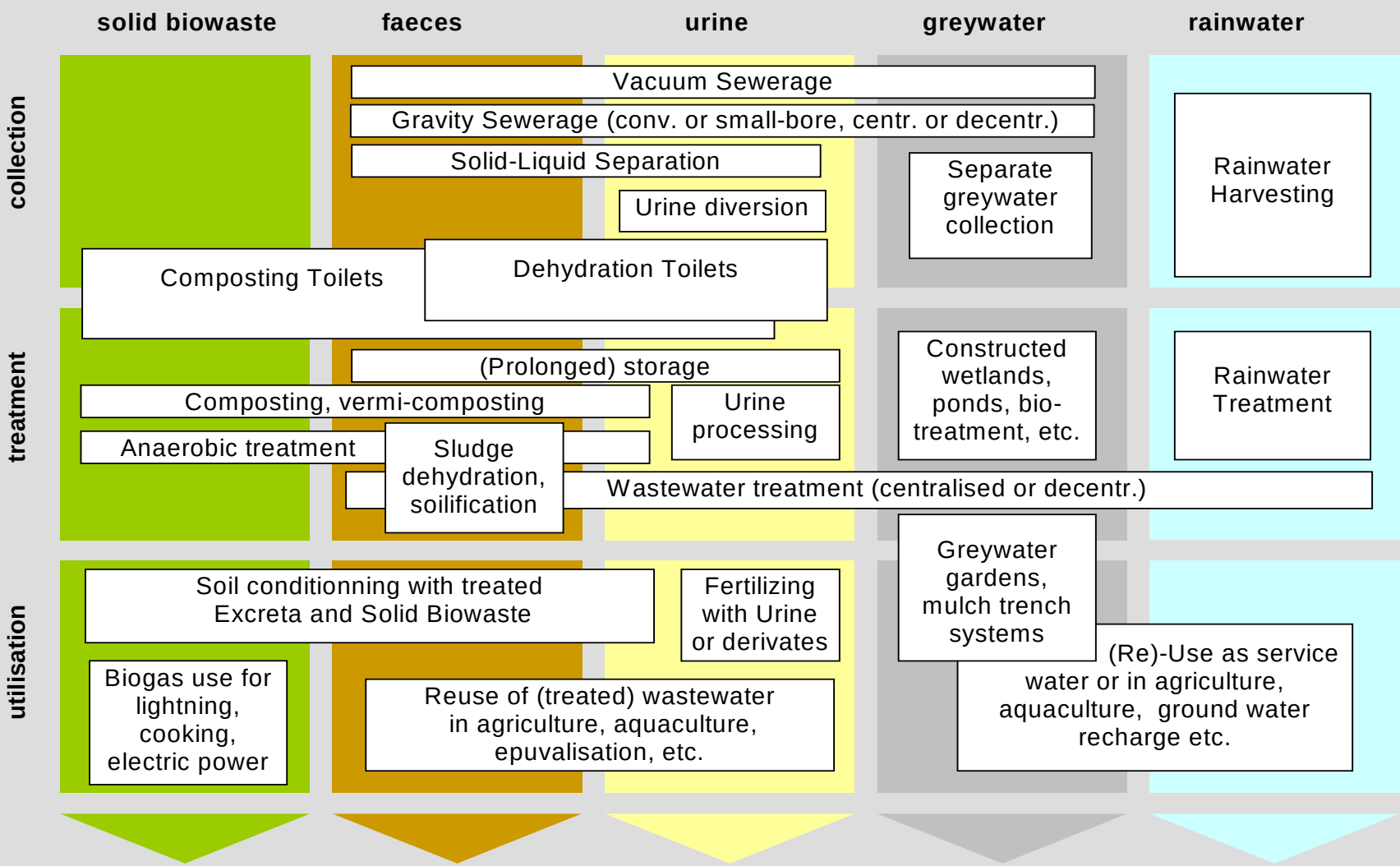
source: Johannes Heeb

ecosan-toilets in Bangalore, India

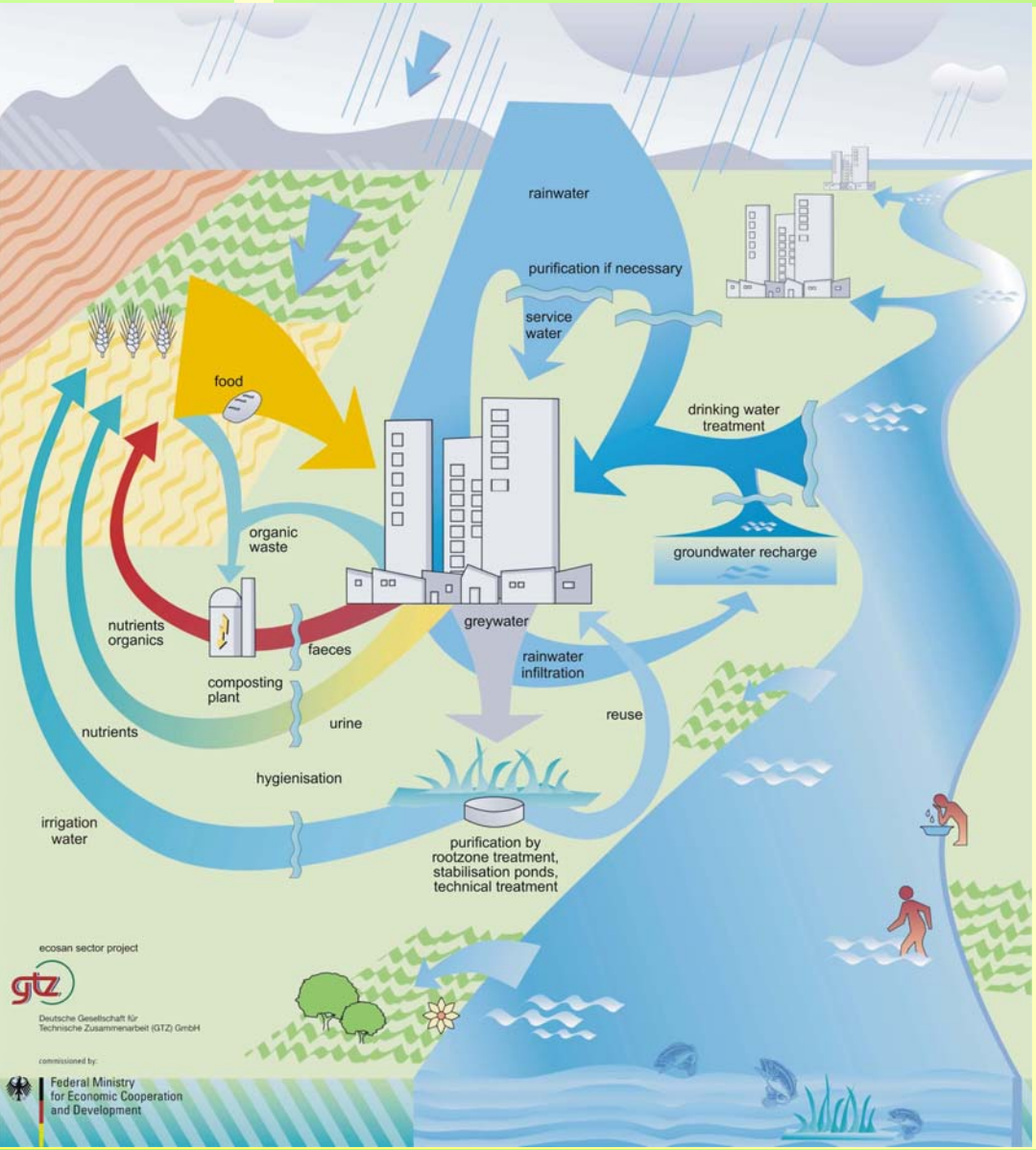
- *healthy environment*

souce: www.virtualmuseum.ca

overview of ecosan technology-components



ecosan puts IWRM into practice



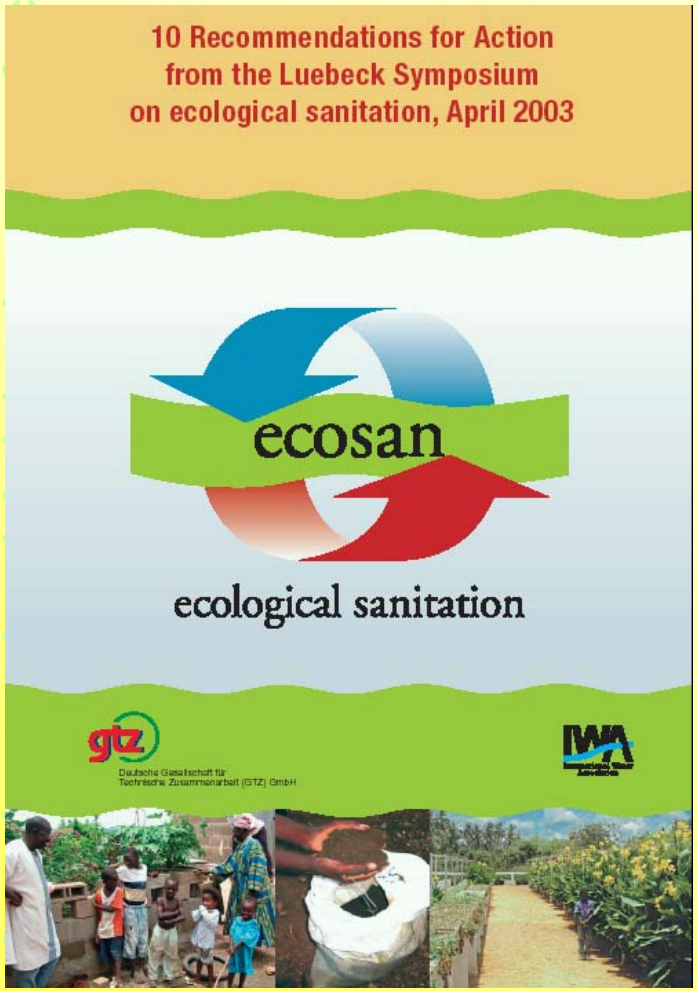
IWRM (Integrated Water Resources Management)

is a process which promotes the co-ordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

Definition of the GWP

Refreshment on the "10 Recommendations for Action"

"10 Recommendations for Action"from 2003 Lübeck conference to accelerate the promotion and up-scaling of ecosan :



1. **Promote ecosan-systems as preferred solutions in rural and peri-urban areas**
2. **Accelerate large-scale applications of ecosan principles in urban areas**
3. **Promote agricultural use**
4. **Raise awareness and create demand**
5. **Ensure participation of all stakeholders in the planning, design, implementation and monitoring processes**
6. **Provide for decisions on an informed basis**
7. **Promote education and training for ecosan**
8. **Adapt the regulatory framework where appropriate**
9. **Finance ecosan**
10. **Apply ecosan principles to international and national Action Plans and Guidelines**

1. Promote ecosan-systems as preferred solutions in rural and peri-urban areas

ecosan toilet pedestal and squatting pan

(source: SIDA)

Four in One closed loop systems

China

1,02 million urine diversion toilets have been installed since 1997 [1997: 70; 1998: 10.000

2003: 650.000 UDDTs]

Biogas 4-in-1 and 3-in-1 closed loop systems are installed in more than 10 million households. Currently a total of 14,2 million biogas-sanitation units exist (equal to 5,7% of country side toilets in China)

1. Promote ecosan-systems as preferred solutions in rural and peri-urban areas

Europe

- On site ecosan systems get increasingly popular where a connection to a centralised network is too expensive

Farm with ecosan-biogas system, Germany

Source: Waldmichelbacherhof

Latin America

- Ecosan-systems being planned or implemented in Bolivia, Chile, Costa Rica, Cuba, Ecuador, El Salvador, Nicaragua, Mexico, Peru…

1. Promote ecosan-systems as preferred solutions in rural and peri-urban areas

Overview on the global development of ecosan

Rural upgrading at Paje, Botswana

Source: gtz-ecosan

Africa

- Ecosan urine diversion toilets successfully introduced in sub-Saharan Africa - Benin, Botswana, Burkina Faso, Cote d'Ivoire, Guinea, Mali, Mozambique, Senegal, South Africa, Togo, Uganda, Zimbabwe…..
- EU-ACP and EU-Research programmes assist in up-scaling

Public Toilet, Bangalore, India

Source: Petter Jenssen

Asia (other than China)

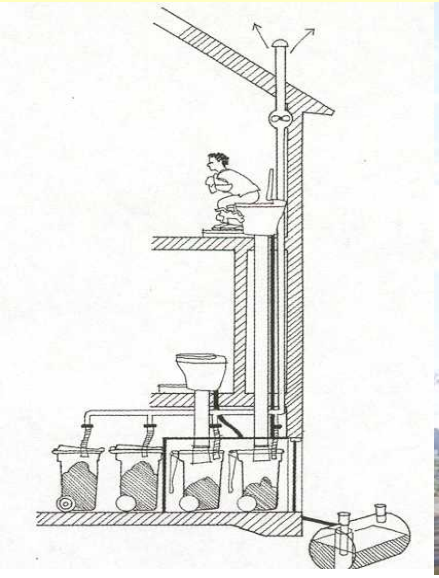
- A variety of ecosan systems being tested an optimised in the Vietnam, Philippines, India etc.

2. Accelerate large-scale applications of ecosan principles in urban areas

Sweden: urine diversion has been used since the 1980 in several urban housing areas for families in the Stockholm area:

- Palsternackan (50 apartments)
- Understenshöjden (44 apartments)
- Gebers (30 apartments)
- Kullan (250 apartments)

Gebers Bulding and system sketch, Sweden

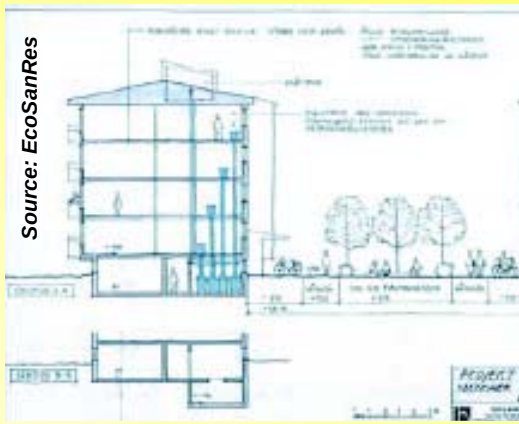


Gebers system sketch (Graphic: SEI)

Gebers Building (Photo.: VERNA Ecology Inc.)

2. Accelerate large-scale applications of ecosan principles in urban areas

In the last three years several large-scale ecosan systems have been planned or implemented in urban areas



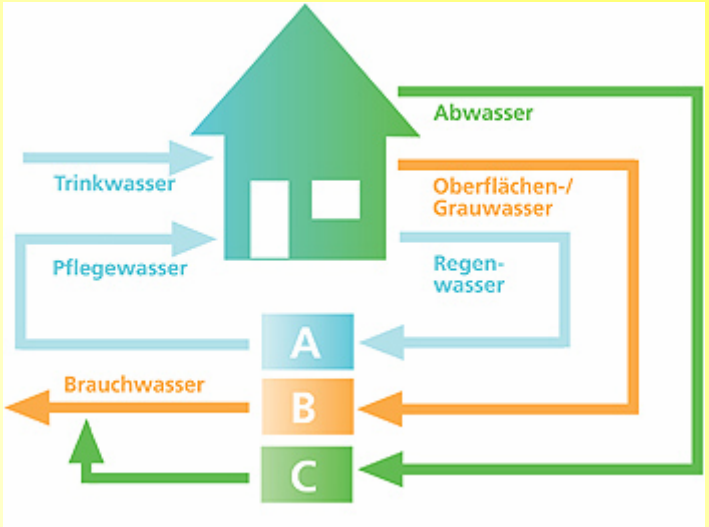
The ERDOS Project

- 800 households in 1-, 2- and 4-story buildings completed in 2006
- dry urine-diverting toilets
- urine collection and recycling
- dry faecal collection, sanitisation and recycling
- greywater collector, treatment & reuse
- kitchen organics collection, composting and recycling
- ECO STATION

2. Accelerate large-scale applications of ecosan principles in urban areas

Germany:

- Knittlingen (100 homes) with semi-centralised bio-membrane treatment and reuse
- KfW office buildings (7 storeys, 300 workplaces and 13 apartments) on downtown Frankfurt with vacuum blackwater collection, greywater bio-membrane treatment and reuse



Flow scheme Knittlingen, Germany

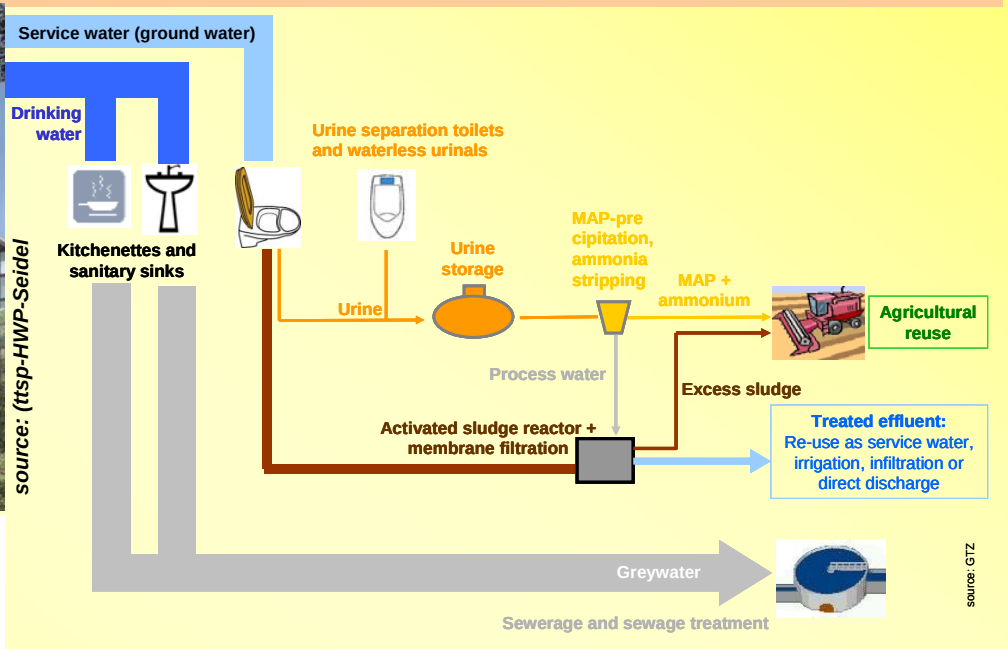
Elements from the sanitation system, KfW offices, Frankfurt, Germany

Source: KfW, GTZ-ecosan

2. Accelerate large-scale applications of ecosan principles in urban areas

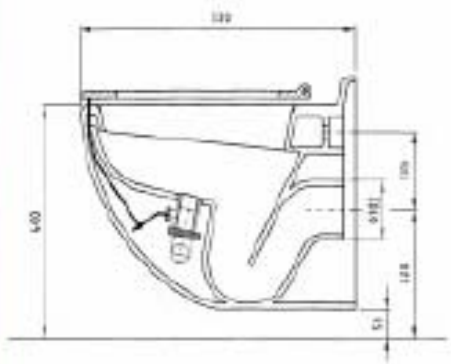
Overview on the global development of ecosan

GTZ's office main building, Eschborn, Germany



Source: GTZ-ecosan

ecosan concept : separation, processing and agricultural use of urine (implementation 2005/2006)



Source: Roediger, GTZ-ecosan

urine diversion toilets and waterless urinals

2. Accelerate large-scale applications of ecosan principles in urban areas

Solar City Linz, Austria

- *New constructed urban setting for 3500 inhabitants*
- *Separate collection of urine and brownwater*
- *Onsite treatment of brownwater*
- *Agricultural reuse of urine*

Urine tanks (photo: Otterwasser GmbH)

Buildings (photo: Otterwasser GmbH)

2. Accelerate large-scale applications of ecosan principles in urban areas

Huber Company, Berching, Germany

- *Huber company: manufacturer of wastewater treatment technology*
- *Office building of Huber company, 200 staff,*
- *Urine separation toilets, waterless urinals*
- *Separate collection of urine, brownwater and greywater*
- *Development of technology for treatment of urine, brownwater and greywater*

2. Accelerate large-scale applications of ecosan principles in urban areas

Ethiopia:

- Ecosan systems to be designed and implemented as part of a low cost housing programme where 10.000 homes are to be constructed per year

Low cost housing and urban agriculure, Addis Abeba, Ethiopia

2. Accelerate large-scale applications of ecosan principles in urban areas

Overview on the global development of ecosan

Urine Diverting Public Toilets in Bangalore, India

Ecosan public toilet, separate collection of urine, washing water and faeces, co-composting of faeces with paper and organic waste, urine and anal cleansing water for fertilizing and irrigation of a banana plantation

2. Accelerate large-scale applications of ecosan principles in urban areas

- Further examples exist e.g. in the Philippines and Shanghai
- Urban applications of ecosan are now receiving more attention

Source: GTZ-ecosan

3. Promote agricultural use

- Farmer acceptance for agricultural use has proven unproblematic, but sometimes consumer perceptions are being a concern
- The need to carefully manage the finite resources (part. phosphorus) has added an extra impetus to the necessity of nutrient recovery
- The resulting increase of agricultural production is the best promotion of the use of ecosan products

Havana, Cuba

Source: GTZ-ecosan

Study of options for reuse of urine and faeces in existing urban agriculture in Havana

3. Promote agricultural use

Overview on the global development of ecosan

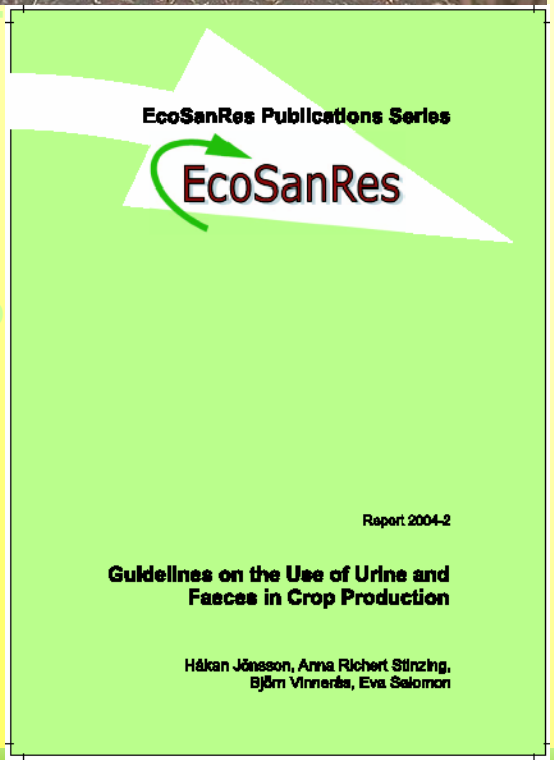
Philippines

Allotment gardens cum ecosan system for 100 poor families in Cagayan de Oro, Philippines

Source: Robert Holmer, Xavier University, Ph.

Construction and inauguration of the UDD-Toilet

3. Promote agricultural use



One part of addressing consumer concerns is to minimise the risks of disease transmission when using treated excreta in agriculture

Technical support

- **Guidelines on the safe use of urine and feaces in ecological sanitation systems (SIDA/EcoSanRes, 2004)**
- **Guidelines on the use of urine and faeces in crop production (SIDA/EcoSanRes, 2004)**

World Health Organization

Set of new WHO guidelines

- **… on the safe use of wastewater in agriculture (2006)**
- **… on the safe use of wastewater in aquaculture (2006)**
- **… on the safe use of excreta and greywater (2006)**

4. Raise awareness and create demand

Increased awareness has led to greater demand for ecosan systems

At International Level

- Recognised by UNSGAB and in recent WHO guidelines as a sanitation approach which can reduce poverty
- Recommended in the recent annual sessions of the United Nations CSD meetings at the UN Headquarters in New York

WASH Forum, Dakar

Source: wsscc

- Included e.g. in the Dakar statement from the Global WASH Forum, 2004, and in the UNSGAB - Hashimoto Action Plan, 2006
- More international organisations becoming involved in ecosan (e.g. UNESCO, WHO, UNDP, EuropAid)

4. Raise awareness and create demand

GTZ ecosan newsletter

(Published in Chinese, English, German, French and Spanish, Readership of over 10 000 people)

ecosan – newsletter - no. 16 - 5/2005 - deutsch

Dies ist ein regelmäßiger news-Service des GTZ-ecosan Projektes für ein Netzwerk von Freunden und Fachleuten, die in Initiativen und Projekten zum Thema kreislauforientierten Abwassermanagements arbeiten.

Liebe Kolleg/inn/en, liebe Freunde!

Willkommen beim GTZ-ecosan-Newsletter, Ausgabe Nr. 16!

Diese Ausgabe wird nur in der englischen Version per e-Mail im Nur-Text-Format verschickt. Zusätzlich bieten wir Ihnen aber wieder die Möglichkeit, eine Version im komfortablen PDF-Format auch auf Spanisch, Französisch, Deutsch, Englisch wie auch auf Chinesisch von unserer Webseite herunterzuladen.

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EcoSan Club

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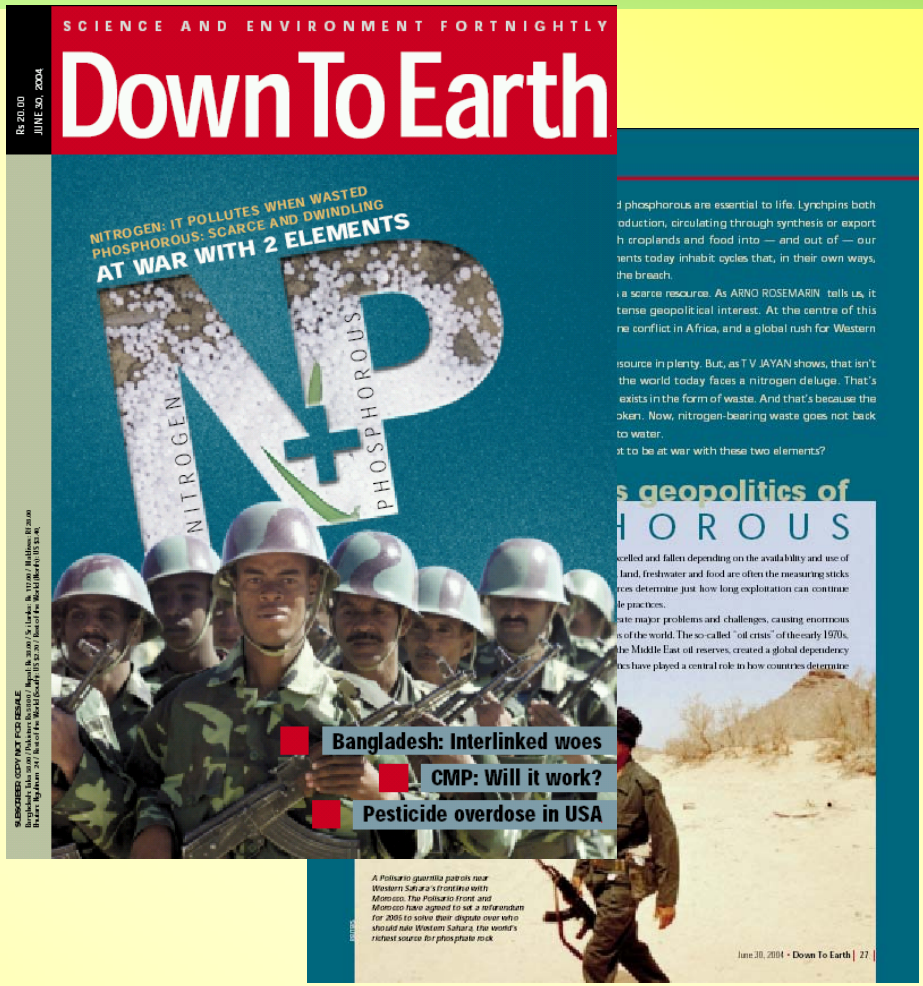
EcoSan (Ecological & Economical Sanitation) bezeichnet eine ganzheitliche Heransgehensweise an das Stoffmanagement in Siedlungen. Ziel ist, Nährstoff- und Wasserkreisläufe mit möglichst geringem Aufwand an Stoffen und Energie zu schließen und damit zu einer nachhaltigen Entwicklung beizutragen. Die Förderung von EcoSan-Konzepten ist also die Strategie, die einen Beitrag zum Erreichen des Zieles, nämlich das Schließen von Stoffkreisläufen, leisten kann. (so definieren wir EcoSan)
Wir bewerten Konzepte des Wassermanagements in Siedlungen nach wirtschaftlichen, ökologischen und sozialen Aspekten. Deshalb fördern wir Lösungen mit möglichst geschlossenen Stoffkreisläufen.
Prinzipien dieser Konzepte sind der optimale Einsatz von

[German] Home [English] last update: 23.11.2004 © BY ECOSAN CLUB



Articles in magazines, newspapers, television programmes etc.

Internet sites and web-based discussion fora

Overview on the gl

4. Raise awareness and create demand

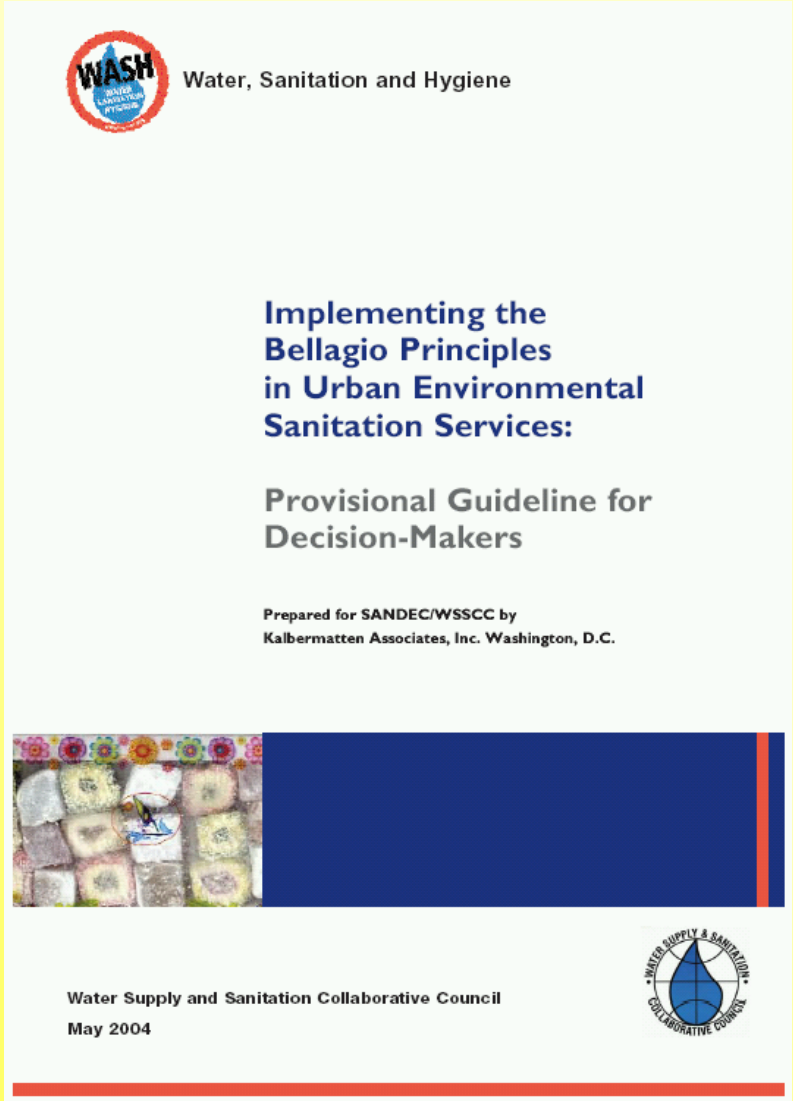
At National Level

- Initial information workshops lead to the establishment of intra-disciplinary ecosan networks in several countries including e.g. Vietnam, the Philippines and India
- Multi-stakeholder meetings have highlighted the potential of ecosan (e.g. by WASTE in The Netherlands)
- Pilot demonstration projects have served to create demand all around the world

Source: Akbar Talebi

Awareness raising exhibition at a fair, Iran

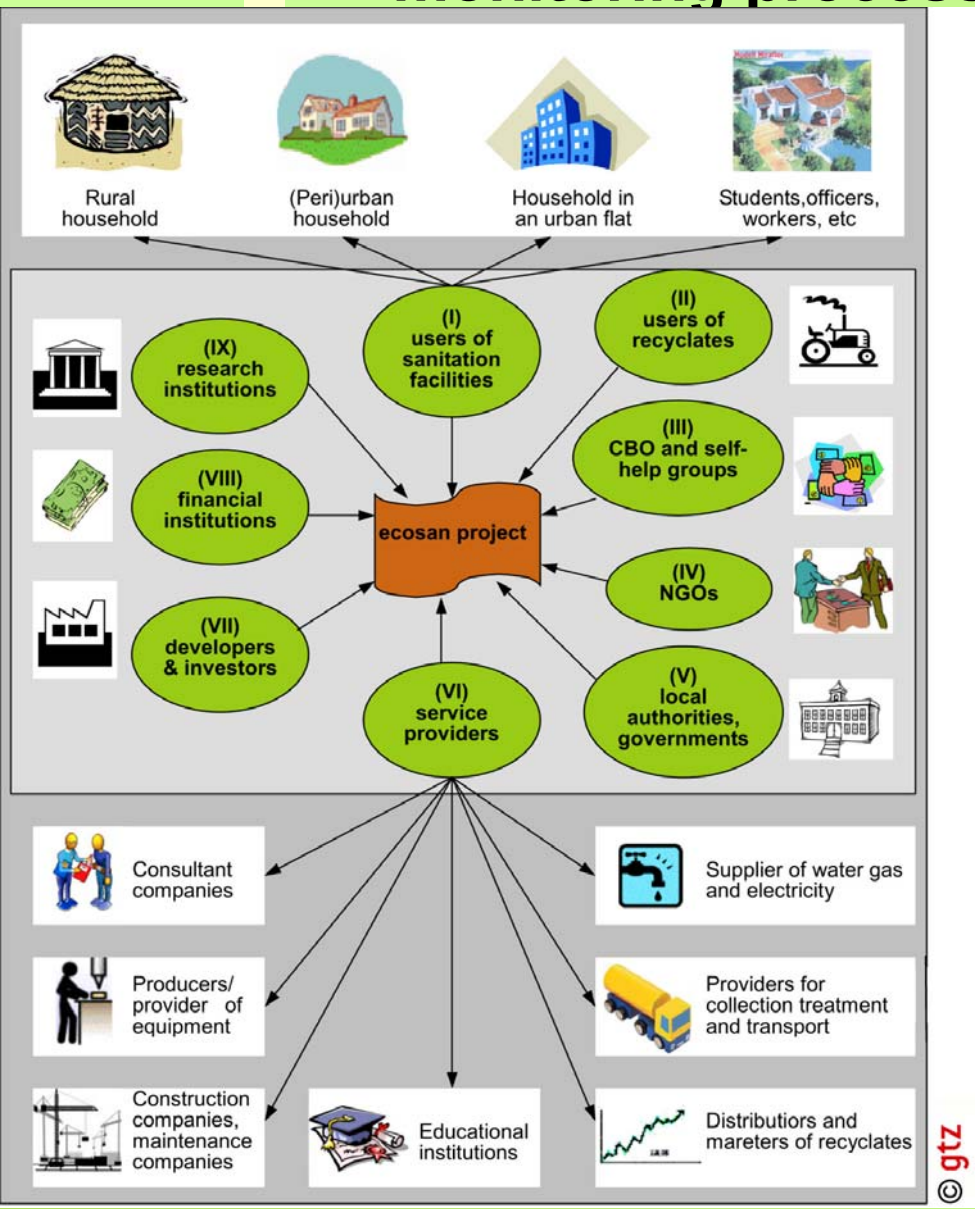
5. Ensure participation of all stakeholders in the planning, design, implementation and monitoring processes



Publication support

- Guidelines for implementing the Bellagio Principles in urban environmental sanitation services - (HCES, as developed by the WSSCC, 2005)
- The ecosan source book (GTZ ecosan sector project, 2004)
- The publication “Open planning of Sanitation Systems” (Kvarnström and af Petersen, 2004)

5. Ensure participation of all stakeholders in the planning, design, implementation and monitoring processes



Stakeholder analysis with a focus on the household level

- Adoption of participatory approaches is useful in almost all ecosan projects and programmes

workshop on a village level, Botswana

Source: GTZ-ecosan

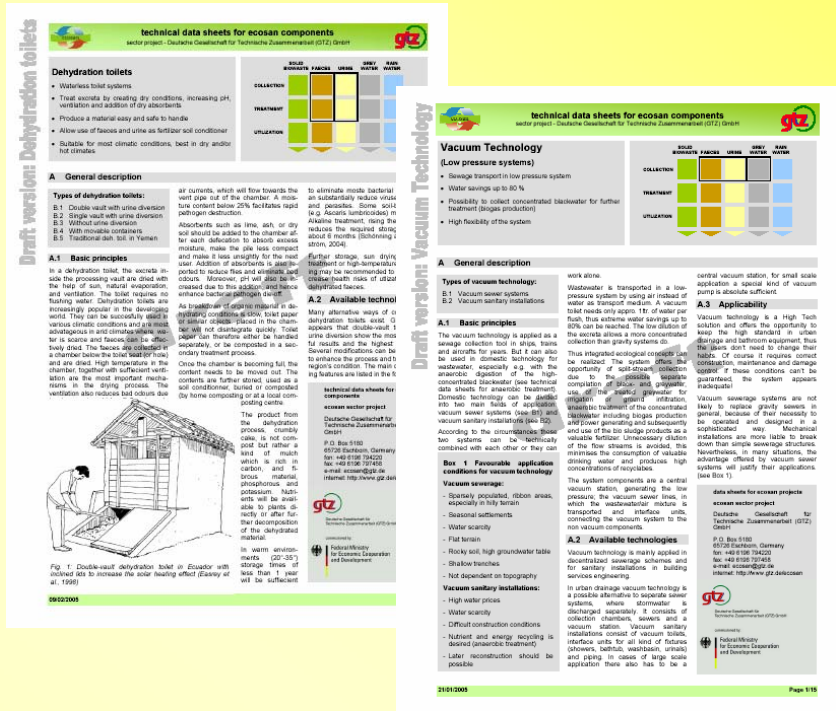
6. Provide for decisions on an informed basis

At local level

- At local level numerous workshops with presentations from both local and international practitioners have helped get ecosan activities off to a start (Benin, Botswana, Burkina Faso, Chile, China, Costa Rica, Ecuador, Eritrea, the Netherlands, India, Iran, and many other countries)
- Experiences and material for such workshops are available

National multi-stakeholder ecosan workshops (left, Zambia, right, Burkina Faso)

6. Provide for decisions on an informed basis



ecosan project data sheets

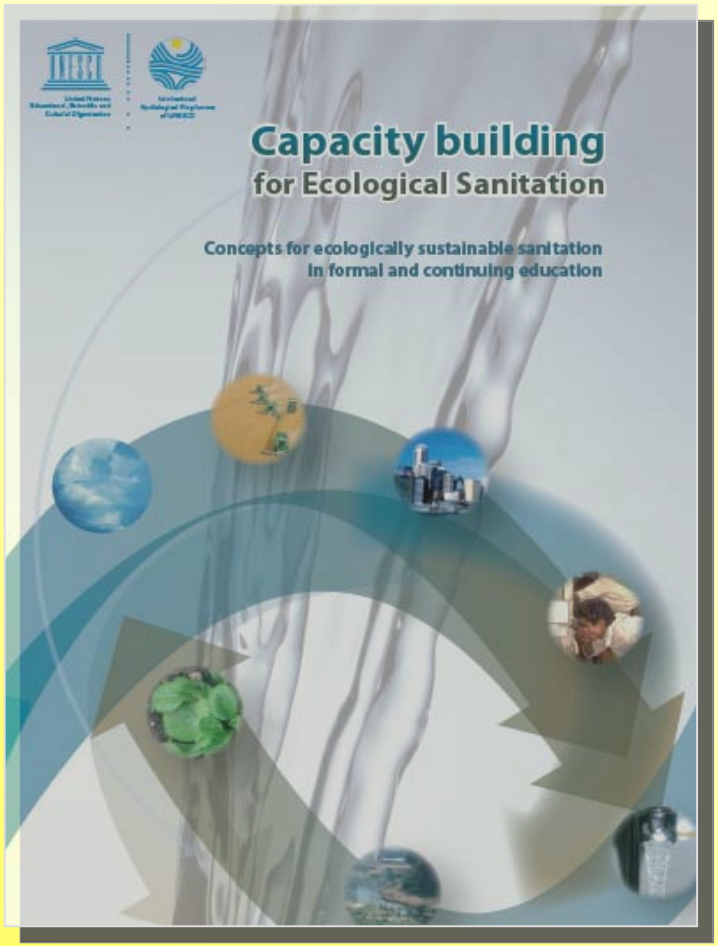
available information gained from the existing wide range of pilot projects and interesting case studies

ecosan technical data sheets

a range of data sheets on specific ecosan technology modules with detailed practical information

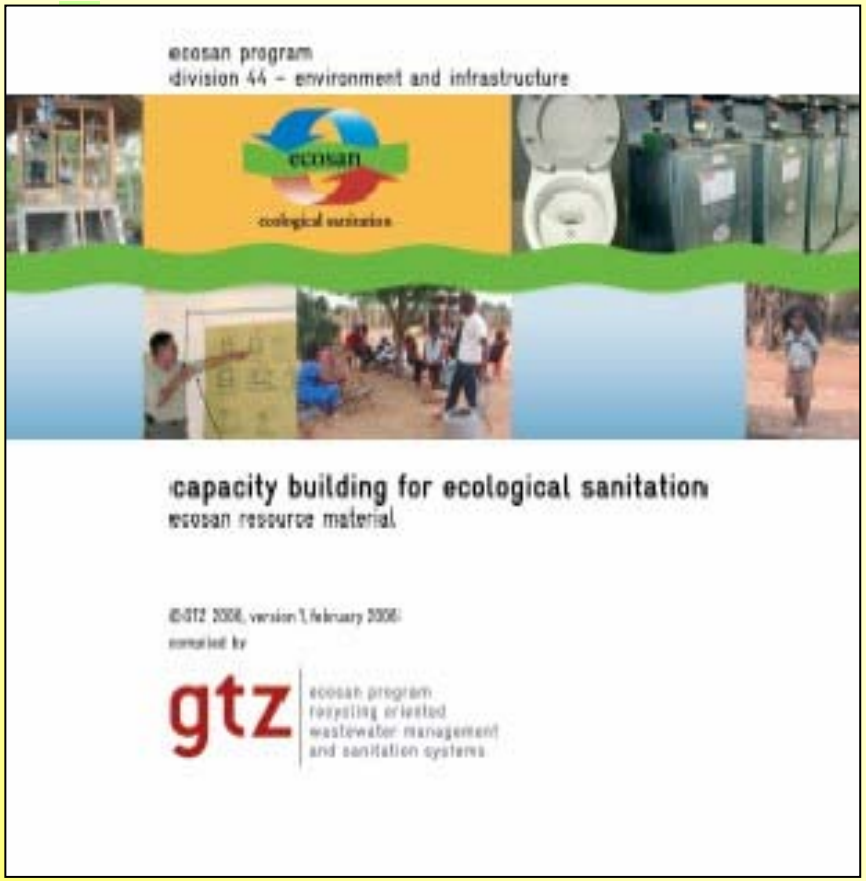
7. Promote education and training for ecosan

Lack of capacity is presently regarded as a crucial factor to meet the increasing demand for implementation of ecosan systems! To joint initiatives are to be mentioned:



- Published in 2006 by the International Hydrological Programme (IHP) of **UNESCO** and Deutsche Gesellschaft für Technische Zusammenarbeit GmbH gtz
- can be downloaded from **www.gtz.de/ecosan**
- can be ordered from BMZ/GTZ ecosan programme **E-mail: ecosan@gtz.de**

7. Promote education and training for ecosan



The CD-Rom „capacity building for ecological sanitation“ is the result of the joint effort of many institutions and provides support for academic institutes, training organisations and individuals in developing training and education material for ecological sanitation.

7. Promote education and training for ecosan

In most universities, vocational trainings and schools, ecosan is not yet present on the curricula –

however some institutions have included or plan to include ecosan in their education programmes or are offering special courses on ecosan – e.g.:

- SIDA/EcoSanRes: Professional Training at International Courses
- Norwegian University of Life Sciences: ecosan summer school and courses for students and professionals
- CREPA: ecosan training courses for sanitary professionals in francophone Africa
- Philippines Xavier University: ecosan training courses for students and sanitary professionals
- UNESCO-IHE: ecosan training and e-courses
- German Water Association DWA (training courses for professionals in preparation); TUHH, Bauhaus Univ. Weimar, …; BMZ/GTZ ecosan programm
- India IESNI; WASTE, …, …, …

8. Adapt the regulatory framework where appropriate

The adaptation of existing regulatory frameworks - a slow process!

- **Recent developments….**
  - WHO Guidelines on the safe use of wastewater, excreta and greywater
  - EcoSanRes set of ecosan related guidelines
  - German Association for Water, Wastewater and Waste (DWA) working group that will look into what changes may be necessary in technical standards to accommodate ecosan systems
  - GTZ ecosan technical data sheets help to form a base line against which standards for ecological sanitation can be set

…can form basis for new or updated regulatory frameworks

9. Finance ecosan

- Budgets for ecosan have been increased e.g. in German, Swedish and Dutch bilateral **development co-operation**
- European **Water Facility** for African, Caribbean and Pacific (EU-ACP-WF) welcomed particularly proposals containing ecosan
- MEDA, ROSA, NETSSAF are **EU-Research projects** which aim in further developing and up-scaling ecosan approaches
- Some **private companies** (e.g. the German based Hans Huber AG and Roediger Company) having recognised market potential - are investing in the development of innovative systems for the international market
- Several **private manufacturers** of dry toilets, waterless urinals or biogas plants, based for example in South Africa, China, Philippines, Germany or Sweden have also been selling their products and consultancy overseas

Wost-Man, Sweden

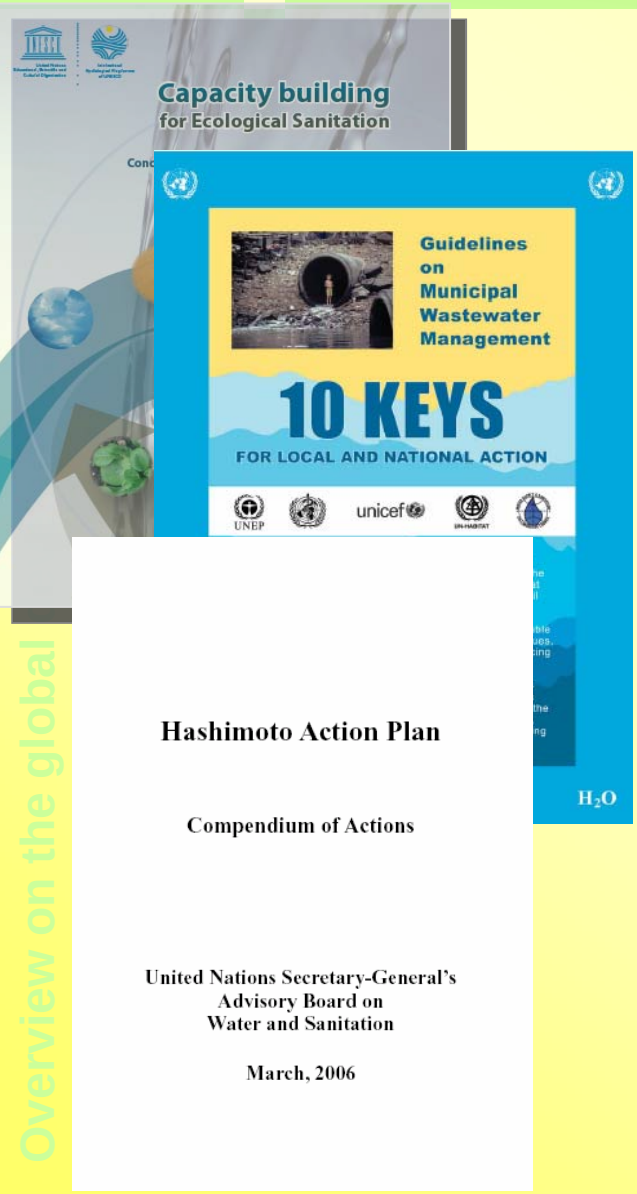
Source: Dan Lapid

CAPS, Philippines

Roediger, Germany

Dubletten, Sweden

10. Apply ecosan principles to international and national Action Plans and Guidelines



- Ecosan strategies are now recommended by several UN-organisations and action plans.

  They still have to be integrated into many national and international action plans including the Implementation Plans for the MDGs (Millennium Developments Goals), PRSPs (Poverty Reduction Strategy Papers)

- It is hoped that with continuing high profile recognition of ecosan (e.g. UNSGAB, UN CSD, UNDP-PEP, new WHO guidelines) its integration into national strategies and up-scaling of existing projects will be accelerated

Conclusion

- Progresses have been achieved on all of the 10 Recommendations for Action
- Ecosan is seen increasingly as a serious, realistic, main-stream alternative to provide safe sanitation, improve health, protect water resources and soil fertility, and optimise resource management

Conclusion

- 9 years to go to reach the MDGs, and 2,6 billion people still without access to adequate sanitary facilities - the need for sustainable, holistic approaches is greater than ever.
- We must therefore continue to use the 10 recommendations as a basis to help guide our work, aiming to have ecological sanitation recognised as the state of the art approach to sustainable sanitary provision

Participants of the 2nd international ecological sanitation conference, 2003

Thanks for your attention & interest!!!

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