

Main Contributors:**capacity building for ecological sanitation – ecosan resource material**

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Federal Ministry
for Economic Cooperation
and Development**Table of contents**

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Acknowledgements

A comprehensive collection of materials on capacity building for ecosan has been made in a large cooperative effort between many organisations and aims to serve a broader dissemination of information on ecosan. The collection was presented to the general public in the form of a CD-ROM during the World Water Forum in Mexico (March 2006). This file makes the collection available on-line.

A large number of organisations have contributed materials to this collection, among them EcoSanRes (Sweden), WASTE (The Netherlands), GTZ (Germany), UNESCO-IHP (France), UNESCO-IHE (The Netherlands), CSIR (South Africa), EcosanClub (Austria), International Ecological Engineering Society (Switzerland), University of Agricultural Sciences (Norway), SARAR (Mexico), SCOPE-Trichy (India), Eawag-Sandec (Switzerland), Technical University Hamburg Harburg (Germany), the International Water and Sanitation Centre - IRC (The Netherlands), the World Conservation Union - IUCN, the DFID funded resource centre for water, sanitation and environmental health – WELL (UK), and from the Water and Sanitation Collaborative Council – WSSCC (Switzerland).

GTZ gratefully acknowledges the support of all these organisations for providing their materials, to enhance dissemination and capacity building for ecosan and for their contribution to achieving the sanitation Millennium Development Goals by 2015.

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Copyrights

The materials in this collection come from a number of organisations. In most cases, they are freely available on the internet with the original authors / organisations, following the open-source concept for capacity building and non-profit use, so long as proper acknowledgement of the source is made when used. The publication of these materials on the CD-ROM and this related collection does not alter any existing copyright. Material published here for the first time follows the same open-source concept for capacity building and non-profit use, with all rights remaining with the original authors / producing organisations.

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Introduction

Ecological sanitation is a new paradigm in sanitation that recognises human excreta and water from households not as a waste but as resources that can be recovered, treated, where necessary, and safely used again.

Ecological sanitation systems offer a range of low cost to high tech sanitation options which are hygienically safe, comfortable to use, environmentally friendly and often more economic than conventional systems. In addition, they ideally enable a complete recovery of nutrients in household wastewater and their reuse in agriculture. In this way, they help preserve soil fertility and safeguard long-term food security, whilst minimising the consumption and pollution of water resources.

However, the knowledge available on ecological sanitation still needs to be further developed, and the current lack of capacity is considered a crucial limiting factor in meeting the increased demand for the implementation of ecological sanitation. The participants at a side-event on "Ecological Sanitation Capacity Building" held during the 3rd International Ecological Sanitation Conference in Durban, South Africa (24 May, 2005) therefore recommended the establishment of an international network of interested organisations and training institutions, in order to accelerate the formation of a capacity building initiative for ecosan.

As a contribution to this initiative, GTZ together with several other organisations has collected, assembled and made available published material relevant for education and training purposes in this ecosan resource collection. The CD-ROM and this related online-collection has been produced in parallel to the UNESCO-GTZ publication "Capacity building for ecological sanitation - concepts for ecologically sustainable sanitation in formal and continuing education", which is available in section A below.

This collection should be of use to teachers interested in developing their own teaching material for formal and continuing education and vocational training, to those planning awareness raising activities, and to those who need educational material during the planning and implementation of an ecosan project. To provide inspiration for the development of your own ecological sanitation capacity building activities, a range of examples of ecological sanitation syllabi, workshop contents and awareness raising presentations are included along with the most relevant existing basic literature on ecosan.

This collection is seen as the core of the current ecological sanitation knowledge base, and will be used as a starting point for a broader web-site on education and training material for ecological sanitation capacity building which will be further developed as a support to the international ecosan capacity building initiative.

A Capacity building for ecological sanitation**Capacity building for ecological sanitation - concepts for ecologically sustainable sanitation in formal and continuing education (UNESCO-IHP, GTZ, 2006)**

This publication addresses the educational, training and research issues related to ecologically sustainable sanitation (referred to as ecosan) and is the result of a substantive collaborative effort between UNESCO's International Hydrological Programme (IHP) and the German Technical Cooperation Agency GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit GmbH, Eschborn)

<http://www2.gtz.de/Dokumente/oe44/ecosan/en-ecosan-capacity-building-2006.pdf> MB (English)

B Documentation of exemplary ecosan workshops and trainings**B01 ecosan introduction course in Norway (2005)**

The Agricultural University of Norway (NLH) offers different courses which include ecological sanitation in their curricula. The schedule presented here refers to the course "Appropriate sanitation in the developing world" - a 5-day course for both professionals and students.

Course schedule

<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-schedule-ecosan-introduction-course-norway-2005.pdf> 0,1 MB (English)

Available material

- Ecological sanitation - an overview (Jenssen P. D.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecological-sanitation-overview-2005.pdf> 4,9 MB (English)
- Ecological sanitation in developing and emerging countries (Mang H.P.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecosan-developing-and-emerging-countries-2005.pdf> 3,4 MB (English)
- Composting and dry sanitation toilets (Jenssen, P.D.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-composting-dry-toilets-2005.pdf> 1,8 MB (English)
- Vacuum toilets and vacuum transport (JETS)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-vacuum-toilets-transport-2005.pdf> 1,8 MB (English)
- From blackwater and organic waste to fertilizer (Morken J.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-blackwater-organic-waste-to-fertilizer-2005.pdf> 1,2 MB (English)
- Urine diverting systems - an overview (Kvarnström E.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ud-systems-examples-experiences-2005.pdf> 4,1 MB (English)
- Groundwater : supply and protection (Jonasson S.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-groundwater-supply-protection-2005.pdf> 1,0 MB (English)
- Soil for groundwater protection and wastewater treatment (Jenssen P.D. / Jonasson S.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-soil-groundwater-protection-ww-treatment-2005.pdf> 4,9 MB (English)
- Nutrients in waste fractions - greywater composition and treatments (Jenssen P.D.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-nutrients-greywater-treatment-systems-2005.pdf> 5,5 MB (English)
- Some reflections on distributed energy and micro wave pyrolysis (Heyerdahl P.H.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-distributed-energy-micro-wave-pyrolysis-2005.pdf> 0,8 MB (English)
- Biogas sanitation systems (Mang H.P.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-biogas-sanitation-systems-2005.pdf> 7,7 MB (English)
- Experience from Munksogaard eco-village (Wulfson D.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecovillage-experience-denmark-2005.pdf> 0,6 MB (English)
- Organizing decentralized systems – a GIS based tool (Borch H.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-organizing-decentralized-systems-gis-2005.pdf> 8,1 MB (English)
- Economic aspects of ecological sanitation (Hanserud O.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-economic-aspects-ecological-sanitation-2005.pdf> 0,1 MB (English)

B 02 Advanced ecosan training course in Sweden (2005)

This 3 plus 2 weeks advanced ecosan training course by Stockholm Environment Institute (SEI) and funded by SIDA, Sweden, is aimed at professionals (engaged in town planning, water supply, waste management, and socio-economic development), researchers and trainers (in the field of environmental sanitation), and key persons (e.g. engaged in NGOs with projects related to improved sanitation and water supply). The course material is currently being transformed into a coherent e-learning

tool by EcosanRes, which shall be ready during 2006. An announcement of this tool is found below under "C04 Teaching material under preparation". The course schedule is presented here, and gives an overview of its scope, structure and content.

Course schedule

<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-schedule-advanced-ecosan-training-sweden-2005.pdf> 0,2 MB (English)

B 03 ecosan workshop in Eritrea (2005)

This in-depth Workshop on Ecological Sanitation was aimed principally at representatives from the Water Resources Department under the Ministry of Land, Water and Environment (MoLWE), but was also attended by representatives from the Ministry of Agriculture, the Ministry of Health and other local authorities. The workshop was planned to be a forum for presenting the roles and responsibilities of the different authorities on national level with regard to sanitation, discussing the overlap of roles in sanitation issues. It addressed the existing sanitation situation in the country, and presented the ecosan concept, along with its potential to improve the current situation.

Workshop schedule

<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-schedule-ecosan-workshop-eritrea-2005.pdf> 0,1 MB (English)

Available presentations

- Ecological sanitation - Innovative wastewater management systems (Bracken P.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecosan-innovative-ww-management-systems-2005.ppt> 2,8 MB (English)
- Agricultural aspects of ecological sanitation (Bracken P.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecosan-agricultural-aspects-2005.ppt> 1,9 MB (English)
- Ecological sanitation planning and economics (Bracken P.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecosan-planning-economics-2005.ppt> 1,4 MB (English)

Workshop report (documented and compiled by WRD and GTZ)

<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecosan-in-depth-workshop-report-eritrea-2005.pdf> 0,2 MB (English)

B 04 ecosan symposium in Syria (2005)

The symposium on ecosan was organised by the Syrian order of engineers, the University of Damascus, and the GTZ for water professionals in 2005.

It provided a general introduction to ecosan, draws on local experience, (e.g. from wetlands designed to produce hygienic safe irrigation water from waste water), and included a case study excursion.

Symposium schedule

<http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-schedule-ecosan-symposium-syria-2005.pdf> 0,2 MB (Arabic)

<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-schedule-ecosan-symposium-syria-2005.pdf> 0,2 MB (English)

Available presentations

Day 1

- German cooperation in the water sector with the Syrian Arab Republic (Heidtmann H.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-en-german-syrian-cooperation-water-sector-2005.pdf> 0,3 MB (Arabic, English)
- Water pollution control and the environmental law (Abed-Rabboh R.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-water-pollution-control-environmental-law-2005.pdf> 1,3 MB (Arabic)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-water-pollution-control-environmental-law-2005.pdf> 0,8 MB (English)
- Introduction to ecological sanitation (Werner C.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-introduction-ecological-sanitation-2005.pdf> 3,3 MB (Arabic)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-introduction-ecological-sanitation-2005.pdf> 8,8 MB (English)
- An overview of ecological sanitation technology (Jenssen P.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-overview-ecological-sanitation-technology-2005.pdf> 11,5 MB (Arabic)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-overview-ecological-sanitation-technology-2005.ppt> 16,4 MB (English)
- Wastewater management course in Germany - Experiences gained - Head of Sewage treatments plants for four years (Jarad J.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-wastewater-management-course-germany-2005.pdf> 0,5 MB (Arabic)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-wastewater-management-course-germany-2005.pdf> 0,4 MB (English)
- Experiences from a one-year training course for the management of sewage treatment plants in Germany (Al-Fandi H.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-training-sewage-treatment-plants-2005.pdf> 6,3 MB (Arabic)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-training-sewage-treatment-plants-2005.pdf> 6,0 MB (English)
- International experiences: project examples (Werner C.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-international-experiences-project-examples-2005.pdf> 6,1 MB (Arabic)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-international-experiences-project-examples-2005.pdf> 6,4 MB (English)

Day 2

<ul style="list-style-type: none"> – Modified Syrian standard for reclaimed waste water for irrigation use (Mardini I.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-syrian-standard-reclaimed-wastewater-irrigation-2005.pdf 0,6 MB (Arabic) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-syrian-standard-reclaimed-wastewater-irrigation-2005.pdf 0,6 MB (English)
<ul style="list-style-type: none"> – International standard and guidelines: Health and agriculture aspects (Werner C.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-international-standard-guidelines-health-agriculture-2005.pdf 7,6 MB (Arabic) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-international-standard-guidelines-health-agriculture-2005.pdf 6,6 MB (English)
<ul style="list-style-type: none"> – Anaerobic systems for biological treatment in ecological sanitation systems (ecosan) for biogas and fertilizer production (Köttner M.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-anaerobic-system-ecosan-biogas-fertilizer-2005.pdf 1,7 MB (English)
<ul style="list-style-type: none"> – Demonstration of anaerobic technology for cost-effective municipal wastewater treatment and reuse - experience from Germany and Egypt (Abdel-Halim) http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-anaerobic-technology-wastewater-treatment-reuse-2005.pdf 4,5 MB (Arabic) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-anaerobic-technology-wastewater-treatment-reuse-2005.pdf 5,2 MB (English)
<ul style="list-style-type: none"> – Constructed wetlands for the provision of irrigation water- a resource for a production of regrowing raw products (Müller R.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-constructed-wetlands-provision-irrigation-water-2005.pdf 3,2 MB (Arabic) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-constructed-wetlands-provision-irrigation-water-2005.pdf 3,1 MB (English)
<ul style="list-style-type: none"> – Use of reclaimed water in Jordan (Valentin A.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-use-reclaimed-water-jordan-2005.pdf 3,9 MB (Arabic) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-use-reclaimed-water-jordan-2005.pdf 5,0 MB (English)
<ul style="list-style-type: none"> – Greywater treatment and reuse (Jenssen P.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-greywater-treatment-reuse-2005.pdf 7,8 MB (Arabic) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-greywater-treatment-reuse-2005.pdf 10,0 MB (English)
<ul style="list-style-type: none"> – Reuse of greywater in the Kingdom of Saudi Arabia (Jäger) http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-reuse-greywater-saudi-arabia-2005.pdf 0,7 MB (Arabic) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-reuse-greywater-saudi-arabia-2005.pdf 0,6 MB (English)

Day 3

<ul style="list-style-type: none"> – German Association for Water, Wastewater and Waste - standards, capacity building and networking (Knitschky R.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-german-association-water-wastewater-waste-2005.pdf 4,6 MB (Arabic) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-german-association-water-wastewater-waste-2005.pdf 4,6 MB (English)
<ul style="list-style-type: none"> – Humification of sewage sludge in plant beds (Pabsch H.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-humification-sewage-sludge-plant-beds-2005.pdf 3,1 MB (Arabic) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-humification-sewage-sludge-plant-beds-2005.pdf 3,0 MB (English)
<ul style="list-style-type: none"> – Constructed wetland – experiences from a pilot project Harran Al-Awamed, Syria (Mohamed A.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-constructed-wetland-experiences-syria-2005.pdf 2,0 MB (Arabic) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-constructed-wetland-experiences-syria-2005.pdf 1,6 MB (English)
<ul style="list-style-type: none"> – Planning process of WWTP for small communities in Syria, overview of difficulties and solutions (Zahr) http://www2.gtz.de/dokumente/oe44/ecosan/cb/ar-planning-wwtp-small-communities-syria-2005.pdf 0,1 MB (Arabic) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-planning-wwtp-small-communities-syria-2005.pdf 0,1 MB (English)

B 05 ecosan workshop in Zambia (2004)

This 3-day workshop was organised by the Water and Sanitation Association of Zambia (WASAZA), with the support of GTZ. It was intended as an initial awareness raising and capacity building activity for experts and decision-makers in water supply and sanitation in Zambia, and was attended by a broad cross sectoral group of national participants, from both governmental and non-governmental organisations. At the same time, the attendance of regional ecosan experts ensured that it served to support regional networking between ecosan initiatives and pilot projects in Southern African countries.

Workshop schedule

<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-schedule-ecosan-workshop-zambia-2004.pdf> 0,1 MB (English)

Available presentations

<ul style="list-style-type: none"> – The ecosan system-economical, ecological sanitation / ecosan toilet (Edström G.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-economical-ecological-sanitation-2004.pdf 2,5 MB (English) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecosan-toilet-2004.pdf 1,7 MB (English)
<ul style="list-style-type: none"> – Experiences in piloting ecosan projects in Zambia - the case of Siavonga district (Hamalila E.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-experiences-piloting-ecosan-projects-zambia-2004.pdf 0,1 MB (English)
<ul style="list-style-type: none"> – “CBNRM-missing link”-piloting ecological sanitation in Botswana (Wirbelauer C.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-piloting-ecological-sanitation-botswana-2004.pdf 1,7 MB (English)
<ul style="list-style-type: none"> – Health and safety aspects of ecosan and excreta handling (Austin A.)

	http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-health-safety-aspects-ecosan-2004.pdf 0,5 MB (English)
–	National strategy and experience in promoting ecological sanitation in Uganda (Tushabe A.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecosan-strategy-experiences-uganda-2004.pdf 0,9 MB (English)
–	Integrated sustainable waste management ISWM The concept - Waste system elements – Stakeholders (de Bruijne G.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-iswm-concept-2004.pdf 0,4 MB (English) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-iswm-dimension-waste-system-element-2004.pdf 0,3 MB (English) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-iswm-dimension-stakeholders-2004.pdf 0,3 MB (English)
–	Design of dry ecosan systems (Austin A.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-design-dry-ecosan-systems-2004.pdf 1,7 MB (English)
–	The ecosan concept closing the loop (Terrefe A.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecosan-concept-2004.pdf 2,7 MB (English)
–	Ecological sanitation in peri-urban areas – main opportunities and constraints (Hangoma) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecological-sanitation-peri-urban-areas-2004.pdf 0,2 MB (English)
–	Regulator and issues of ecological sanitation (Chanda O.M.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-regulator-issues-sanitation-2004.pdf 3,0 MB (English)
–	Logistics for sanitation (de Bruijne G.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-logistics-sanitation-2004.pdf 0,2 MB (English)
B 06 ecosan workshop in Botswana (2003)	
The Ecosan approach, implemented by the IUCN-PTB “Missing Link” project (supported by GTZ) in Botswana consists of small-scale integrated natural resources management activities around the households and within the communities. The schedule presented below is from a workshop held in the frame of this project. It was held to present and discuss the results of the first phase of the project, and to consider options for up-scaling ecosan to the national level.	
Workshop schedule	
	http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-schedule-ecosan-workshop-botswana-2003.pdf 0,1 MB (English)
Workshop proceedings	
	http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-proceedings-ecosan-workshop-botswana-2003.pdf 4,7 MB (English)
B 07 ecosan workshop in El Salvador (2003)	
This is an example of a 4-day ecosan workshop organized by Oikos and WASTE in co-operation with GTZ and others to consolidate the link between organisations, which have realized ecosan projects and activities in Latin-America.	
The programme was designed to expose different components of an ecosan system each day, providing those who were unfamiliar with the topic, with a clear idea of the principles of ecological sanitation and the problems of conventional systems. It combined presentations of experiences in ecosan and practical exercises.	
Workshop schedule	
	http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-schedule-ecosan-workshop-el-salvador-2003.pdf 0,1 MB (English)
Available presentations	
–	Participatory diagnosis on ecological sanitation Diagnóstico participativo de saneamiento ambiental (Ogazón A.Y.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/es-participatory-diagnosis-ecological-sanitation-2003.pdf 0,1 MB (Spanish)
–	Some principles and questions on ecological sanitation Algunos principios y preguntas acerca del saneamiento eco-lógico (de Bruijne G.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/es-principles-questions-ecological-sanitation-2003.pdf 0,2 MB (Spanish)
–	Ecological sanitation in intervention areas Saneamiento ecológico en las áreas de intervención (Hernández V.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/es-ecological-sanitation-intervention-areas-2003.pdf 1,0 MB (Spanish)
–	Situation of the environmental health in El Salvador Situación de la salud ambiental en El Salvador (Aparico H.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/es-situation-environmental-health-el-salvador-2003.pdf 1,3 MB (Spanish)
–	Technical standards of waterless toilets Normas técnicas para letrinas secas sin arrastre de agua (Sorto J.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/es-waterless-toilet-standards-2003.pdf 0,9 MB (Spanish)
–	Environmental sanitation and health Saneamiento ambiental y salud (Ogazón A.Y.) http://www2.gtz.de/dokumente/oe44/ecosan/cb/es-environmental-sanitation-health-2003.pdf 1,4 MB (Spanish)

<ul style="list-style-type: none"> - Evaluation of the fertilizing family solar latrines (LAFS) in El Salvador Evaluación de las letrinas aboneras familiares y solares en El Salvador (Moe C.) http://www2.qtz.de/dokumente/oe44/ecosan/cb/es-fertilizing-family-solar-latrines-el-salvador-2003.pdf 0,4 MB (Spanish)
<ul style="list-style-type: none"> - Latrination and parasite infections in rural areas in El Salvador - Letrinización y prevalencia de infecciones de parásitos intestinales en El Salvador Rural (Corrales L.) http://www2.qtz.de/dokumente/oe44/ecosan/cb/es-latrination-parasite-infections-rural-areas-2003.pdf 1,0 MB (Spanish)
<ul style="list-style-type: none"> - Cultural and gender aspects in ecological sanitation Aspectos culturales y de género en el saneamiento ambiental (Diaz S.) http://www2.qtz.de/dokumente/oe44/ecosan/cb/es-ecosan-cultural-gender-aspects-2003.pdf 0,2 MB (Spanish)
<ul style="list-style-type: none"> - Improvement of the nutritional security and sanitation in peri-urban areas: City of Pachacutec Ventanilla – Peru Mejora de la seguridad alimentaria y del saneamiento en zonas periurbanas: ciudad Pachacútec Ventanilla – Peru (Loyola O.C.) http://www2.qtz.de/dokumente/oe44/ecosan/cb/es-nutritional-security-sanitation-pachacutec-peru-2003.pdf 1,6 MB (Spanish)
<ul style="list-style-type: none"> - Nutrient recycling - ecological sanitation and alimentary self-sufficiency Reciclaje de nutrientes - el saneamiento ecológico y la autosuficiencia alimentaria (Arroyo F.) http://www2.qtz.de/dokumente/oe44/ecosan/cb/es-nutrient-recycling-self-sufficiency-2003.pdf 1,9 MB (Spanish)
<ul style="list-style-type: none"> - Holistic and Sustainable Management of Waste Manejo Integrado y Sostenible de desechos (Rudin V.) http://www2.qtz.de/dokumente/oe44/ecosan/cb/es-holistic-sustainable-management-waste-2003.pdf 1,0 MB (Spanish)
<ul style="list-style-type: none"> - Experiences on the introduction of the ecological sanitation concept in Ecuador Experiencias de la introducción del concepto de saneamiento ecológico en Ecuador (Aragundi J.) http://www2.qtz.de/dokumente/oe44/ecosan/cb/es-experiences-ecological-sanitation-ecuador-2003.pdf 4,3 MB (Spanish)
<ul style="list-style-type: none"> - The integrated microsystem of alternative sanitation, Ecodess, an ecological sanitation instrument in Lima - Perú El Microsistema integrado de Saneamiento alternativo ECODESS, un instrumento del Saneamiento Ecológico en Lima - Perú (Calizaza J.C.) http://www2.qtz.de/dokumente/oe44/ecosan/cb/es-ecodess-ecosan-instrument-peru-2003.pdf 1,4 MB (Spanish)
<ul style="list-style-type: none"> - Tepoz-Eco- pilot project on urban ecological sanitation for the municipality of Tepoztlán TepozEco -un proyecto piloto de saneamiento ecológico urbano para el Municipio de Tepoztlán (Sawyer R.) http://www2.qtz.de/dokumente/oe44/ecosan/cb/es-tepoz-eco-urban-ecological-sanitation-2003.pdf 2,5 MB (Spanish)
<ul style="list-style-type: none"> - Feasibility study in the archipelago of San Andrés, Providencia and Santa Catalina Estudio de Factibilidad en el Archipiélago de San Andrés, Providencia y Santa Catalina (Newball P.) http://www2.qtz.de/dokumente/oe44/ecosan/cb/es-feasibility-study-archipelago-2003.pdf 2,7 MB (Spanish)

B 08 ecosan workshop in India (2005)

A series of regional workshops were organised by the Innovative Ecological Sanitation Project India (IESNI) with support from Norway, Sweden, the Netherlands, Switzerland and Germany aiming to introduce ecological sanitation, initialise pilot projects, and support capacity building and networking in ecological sanitation in India.

Workshop schedule

<http://www2.qtz.de/dokumente/oe44/ecosan/cb/en-schedule-ecosan-workshop-india-2005.pdf> 0,1 MB (English)

Available presentations

<ul style="list-style-type: none"> - IESNI - projects and networking in India (Bartels H.) http://www2.qtz.de/dokumente/oe44/ecosan/cb/en-iesni-projects-networking-india-2005.pdf 0,5 MB (English)
<ul style="list-style-type: none"> - IESNI - an overview (Patanker Shri S.N.) http://www2.qtz.de/dokumente/oe44/ecosan/cb/en-iesni-overview-2005.pdf 0,2 MB (English)
<ul style="list-style-type: none"> - General overview about ecosan (Werner C.) http://www2.qtz.de/dokumente/oe44/ecosan/cb/en-general-overview-ecosan-2005.ppt 4,8 MB (English)
<ul style="list-style-type: none"> - Indo-German bilateral project capacity building and training Maharashtra state (IGBP-CB&T) - Part of Innovative ecological sanitation network india (IESNI) (Wafler M.) http://www2.qtz.de/dokumente/oe44/ecosan/cb/en-bilateral-project-capacity-building-maharashtra-2005.pdf 6,5 MB (English)
<ul style="list-style-type: none"> - Dalit Shakti Kendra (DSK) run by Navsarjan Trust and Navsarjan School Projects in Gujarat - Part of Innovative ecological sanitation network india (IESNI) (Wafler M.) http://www2.qtz.de/dokumente/oe44/ecosan/cb/en-proposal-implementation-ecosan-dsk-2005.pdf 5,0 MB (English)
<ul style="list-style-type: none"> - ecosan – closing the loop in wastewater management and sanitation – case study India (Heeb J.) http://www2.qtz.de/dokumente/oe44/ecosan/cb/en-case-study-india-mynetworks-2005.pdf 0,7 MB (English)
<ul style="list-style-type: none"> - Vacuum technology - collection and transport of sewage by means of low pressure (Mosel U.) http://www2.qtz.de/dokumente/oe44/ecosan/cb/en-vacuum-technology-2005.pdf 4,9 MB (English)

- Fertilising guidelines for urine and faeces (Vinneras B.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-fertilising-guidelines-urine-faeces-2005.pdf> 0,5 MB (English)
- Secondary treatment of faecal matter (Vinneras B.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-secondary-treatment-faecal-matter-2005.pdf> 0,8 MB (English)
- Networks for sustainable solutions (nn)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-networks-sustainable-solutions-2005.pdf> 0,7 MB (English)
- Ecological engineering - new paradigm for integrated water resource management (Jana B.B.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecological-engineering-2005.pdf> 2,4 MB (English)
- Current activities - International Centre of Ecological Engineering - University of Kalyani, West Bengal (Jana B.B.)
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-activities-international-centre-eco-engineering-2005.pdf> 2,3 MB (English)

B 09 Expert meetings in the Netherlands (2005)

In January – March 2005, a total of four expert meetings were held to discuss the relationship between sustainable sanitation and integrated urban planning. During these meetings, Dutch participants from various professions were encouraged by international experts from four continents to look beyond the boundaries of their discipline and the borders of the Netherlands. Their observations lead to a critical evaluation of the sustainability of current sanitation systems and to a series of recommendations for CSD13 to ensure the implementation of sustainable and efficient approaches now and in the future.

Workshop schedule

<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-schedule-ecosan-expert-meetings-netherlands-2005.pdf> 0,1 MB (English)

At the End of the Pipe?- Proceedings on expert meetings held in the Netherlands on a shift in the sanitation paradigm January – March 2005 (Geurts M., de Bruijne G., Waste 2005)

The proceedings contain a summary of the workshops and results, including the presentations of Moses Ocholo Otieno (WASTE – IHE, Nakuru), Aussie Austin (CSIR Building and Construction Technology, South Africa), Adriaan Mels (Lettinga Associates Foundation, the Netherlands), Harm Baten (Water Control Board District Rijnland, the Netherlands), Harald Hiessl (Fraunhofer ISI, Germany), Anton Peter-Fröhlich (Berliner Wasserbetriebe, Germany), Viju James - Pragmatix Research & Advisory Services Pvt. Ltd., India), Dan Lapid – CAPS-Centre for Advanced Philippine Studies, the Philippines), Pascal Karlsson (Municipality of Göteborg, Sweden), Lin Jiang (Guangxi Committee JiuSan Society, China), Caroline Schönning (Swedish Institute for Infectious Disease Control, Sweden), Anna Tsvetkova (Mama 86, Ukraine), Ron Sawyer (Sara Transformación SC, Mexico) and Arno Rosemarin (Stockholm Environment Institute, Sweden). The opening speech was held by Joep Bijlmer (DGIS - Dutch Ministry of Foreign Affairs) and the closing speech by Joep Bijlmer (DGIS - Dutch Ministry of Foreign Affairs).

<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-proceedings-ecosan-expert-meetings-netherlands-2005.pdf> 6,4 MB (English)

C Selected ecosan teaching material

C 01 Powerpoint presentations

ecological sanitation: introduction and overview (Otterpohl R. 2005)

Lecture held during M.SC. courses at the Technical University Hamburg Harburg, Germany

<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecosan-high-medium-low-tech-otterpohl-2005.ppt> 5,6 MB (English)

ecological sanitation: principles, technologies and project examples for wastewater and excreta management (Werner C. 2005)

Presentation held during the CeTAmb - International Conference – “The role of Appropriate Technologies in Cooperation Projects”, Desenzano del Garda (Brescia - Italia), 16-17 December 2005

<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecosan-principles-technologies-projects-werner-2005.ppt> 2,9 MB (English)

An overview of ecological sanitation technology (Jenssen P. 2005)

Presentation held during the ecosan conference in Damascus, Syria, organised for water professionals by the Syrian order of engineers, the University of Damascus, and the GTZ, from 11-13 Dec 2005.

<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-overview-ecological-sanitation-technology-2005.ppt> 16,4 MB (English)

Ecological Sanitation Modules for Agricultural Reuse Implemented by the Innovative Ecological Sanitation Network India (IESNI) (Wafler M. et al. 2005)

Presentation held during the third international ecosan Conference Durban, South Africa, 23-25 May 2005

<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecosan-modules-wafler-2005.ppt> 1,0 MB (English)

An overview of greywater reuse technology (Jenssen P. 2005)

Presentation held during the ecosan conference in Damascus, Syria, organised for water professionals by the Syrian order of engineers, the University of Damascus, and the GTZ, from 11-13 Dec 2005.

<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-greywater-treatment-reuse-2005.ppt> 9,8 MB (English)

Agricultural aspects of ecological sanitation (Bracken P. et al. 2005)
Presentation held during an ecosan workshop in Eritrea 2005 that was aimed at representatives from the Water Resources Department under the Ministry of Land, Water and Environment (MoLWE), but was also attended by representatives from the Ministry of Agriculture, the Ministry of Health and other authorities.
http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecosan-agricultural-aspects-bracken-2005.ppt 1,9 MB (English)
International standard and guidelines: Health and agriculture aspects (Werner C., et al. 2005)
Presentation held during the ecosan conference in Damascus, Syria, organised for water professionals by the Syrian order of engineers, the University of Damascus, and the GTZ, from 11-13 Dec 2005.
http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-guidelines-health-agriculture-werner-2005.ppt 1,0 MB (English)
Planning and implantation of ecosan projects (Werner C., et al. 2005)
Presentation held during the 5th International Symposium on Wastewater Reclamation and Reuse for Sustainability, IWA, 8. - 11. November 2005 in Jeju, Korea
http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecosan-planning-implementation-werner-2005.ppt 1,5 MB (English)
Better city, better life (Mang H.-P. et al. 2005)
Presentation on urban ecosan applications held during the International ecosan conference in Mumbai, India, 25-26 November 2005
http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecosan-urban-applications-mang-2005.ppt 1,5 MB (English)
Biogas sanitation systems (Mang H.-P. et al. 2005)
Presentation on biogas sanitation systems held during the third international ecosan conference in Mumbai, India, 25-26 November 2005
http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecosan-biogas-mang-2005.ppt 4,6 MB (English)
C 02 Posters, figures, films
Posters
<ul style="list-style-type: none"> - Shortcomings of conventional wastewater systems and advantages of ecological sanitation systems - posters (Werner C., et al., GTZ, 2003) http://www.gtz.de/de/dokumente/en-ecosan-grafics-2005.zip (English) 0,6 MB http://www.gtz.de/de/dokumente/ru-ecosan-poster-2005.pdf (Russian) 2,5 MB http://www.gtz.de/de/dokumente/ua-ecosan-posters-2005.pdf (Ukrainian) 2,5 MB - ecosan topicsheet (GTZ, 2005) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecosan-topicsheet-2005.pdf (English) 1,0 MB - Closing the loop on sanitation – diagram (EcoSanRes, 2005) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecosanres-cover-poster-2005.pdf (English) 1,1 MB
Figures
<ul style="list-style-type: none"> - Shortcomings of conventional wastewater systems and advantages of ecological sanitation systems - graphics (Werner et al., GTZ, 2003) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-graphic-shortcomings-conventional-wastewater-systems-2005.jpg (English) 0,4 MB http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-graphic-advantages-ecosan-systems-2005.jpg (English) 0,4 MB - advantages of ecological sanitation systems – graphic with text (GTZ, 2005) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-graphic-text-advantages-ecosan-systems-2005.jpg (English) 1,5 MB - Separation of substances and examples of possible ecosan elements (GTZ, 2005) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-graphic-substances-separation-ecosan-elements-2005.jpg (English) 0,3 MB - Essential technological components used in ecosan (GTZ, 2005) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-graphic-essential-technological-ecosan-components-2005.jpg (English) 0,5 MB - The ecosan project steps – key moments, necessary activities and expected results (GTZ, 2005) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-graphic-ecosan-project-steps-2005.jpg (English) 0,7 MB - The characteristics of the 4 basic types of ecosan-projects (GTZ, 2005) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-graphic-characteristics-basic-types-ecosan-projects-2005.jpg - Principal stakeholders in participatory ecosan projects (GTZ, 2005) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-graphic-principal-stakeholders-ecosan-projects-2005.jpg (English) 0,5 MB - Ecological sanitation is an interdisciplinary field and is related to many aspects of modern societies in both developed and developing world (GTZ, 2005) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-graphic-ecosan-inter-disciplinary-field-2005.jpg (English) 0,4 MB - Technical drawing of an urine-diverting dehydration toilet (GTZ, 2005) http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-graphic-ecosan-ud-dehydration-toilet-2005.jpg (English) 0,6 MB

Graphics by Jeff Vivant from C. Elain's French ecosan book

Several awareness raising graphics by Jeff Vivant from C. Elain's (2005) French ecosan book "Un petit coin pour soulager la planète" are now available on this CD.
[Christophe Elain (2005) "Un petit coin pour soulager la planète - toilettes sèche et histoires d'eau." - Editions Goutte Sable, La Roussière, 53400 Athée, France, 288 S. - ISBN 2-9523714-0-7]

- Approche écologique - Ecological approach
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/fr-vivant-p191-ecosan-2005.jpg> (French) 0,7 MB
- Système de gestion classique - Conventional management system
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/fr-vivant-p189-gestion-classique-2005.jpg> (French) 0,7 MB
- Le cycle de contamination - The cycle of contamination
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/fr-vivant-p036-cycle-contamination-2005.jpg> (French) 0,4 MB
- Une tomate bien fertilisée – A well fertilized tomato
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/fr-vivant-p057-tomate-2005.jpg> (French) 1,2 MB
- La sciure – Sawdust
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/fr-vivant-p061-sciure-2005.jpg> (French) 0,2 MB
- Séparation des urines et des matières fécales - Separation of urine and fecal matter
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/fr-vivant-p068-separe-2005.jpg> (French) 0,2 MB
- Modèles de toilettes sèches – Models of dry toilets
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/fr-vivant-p82-modeles-toilettes-seches-2005.jpg> (French) 0,9 MB

Film

The video from an ecosan-information-CD-ROM of the Indian NGO SCOPE-Trichy is an ideal tool to raise awareness for the problem of open defecation and for the advantages of ecosan.

- SCOPE ecosan video [requires flash plug-in]
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/ecosan-awareness-scope-trichy-2005.htm> 7,2 MB

C 03 Interactive teaching modules

This interactive curriculum on ecosan is meant for university and college teachers and students, but also planners, architects, engineers, investors, decision making bodies such as communities, public administration, NGOs, development organisations, or simply interested persons. This is one of the first comprehensive compilations of ecosan related material, structured into a curriculum. The development of the curriculum was undertaken by Johannes Heeb (IEES), Petter D. Jenssen (UMB), Ken Gnanakan (ACTS) and Katharina Conradin (SEECON) and financed by the Swiss Development Cooperation (SDC).

Demo-versions of all tutorials and of all lectures are made available on this CD. The file "Introduction and overview" (link below) provides information on the structure and content of the curriculum. Please note, that in this Demo-Version all external links to other documents or to the internet do not work.

<http://www2.gtz.de/dokumente/oe44/ecosan/cb/introduction-and-overview.pdf> 1,2 MB

Module 1 Water and sanitation in regard to the Millennium Development Goals (MDG)

- M 1.1 The Millennium Development Goals
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m11-millennium-development-goals-lecture-2006.ppt> (English) 1,0 MB
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m11-millennium-development-goals-tutorial-2006.pdf> (English) 1,8 MB
- M 1.2 Water basics
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m12-water-basics-lecture-2006.ppt> (English) 1,2 MB
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m12-water-basics-tutorial-2006.pdf> (English) 1,8 MB

Module 2 ecosan – an approach to human dignity, community health and food security

- M 2.1 ecosan concept
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m21-ecosan-concepts-lecture-2006.ppt> (English) 1,3 MB
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m21-ecosan-concepts-tutorial-2006.pdf> (English) 1,9 MB
- M 2.2 closing the loop between sanitation and agriculture
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m22-closing-the-loop-lecture-2006.ppt> (English) 1,4 MB
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m22-closing-the-loop-tutorial-2006.pdf> (English) 3,0 MB
- M 2.3 ecosan and human dignity
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m23-ecosan-human-dignity-lecture-2006.ppt> (English) 0,7 MB
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m23-ecosan-human-dignity-tutorial-2006.pdf> (English) 1,7 MB
- M 2.4 ecosan and community health
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m24-ecosan-community-health-lecture-2006.ppt> (English) 0,9 MB
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m24-ecosan-community-health-tutorial-2006.pdf> (English) 1,8 MB

Module 3 ecosan systems and technology components

- M 3.1 ecosan technologies to close the nutrient loop
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m31-ecosan-technologies-nutrient-loop-lecture-2006.ppt> (English) 2,8 MB
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m31-ecosan-technologies-nutrient-loop-tutorial-2006.pdf> (English) 4,7 MB

- M 3.2 ecosan technologies to close the water loop
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m32-ecosan-technologies-water-loop-lecture-2006.ppt> (English) 2,1 MB
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m32-ecosan-technologies-water-loop-tutorial-2006.pdf> (English) 3,4 MB

Module 4 Management: planning, implementation and operation

- M 4.1 ecosan – strategies for an informed choice
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m41-ecosan-strategies-informed-choice-lecture-2006.ppt> (English) 1,3 MB
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m41-ecosan-strategies-informed-choice-tutorial-2006.pdf> (English) 2,1 MB

- M 4.2 socio-cultural aspects
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m42-ecosan-socio-cultural-aspects-lecture-2006.ppt> (English) 0,5 MB
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m42-ecosan-socio-cultural-aspects-tutorial-2006.pdf> (English) 1,4 MB

- M 4.3 gender aspects
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m43-ecosan-gender-aspects-lecture-2006.ppt> (English) 0,8 MB
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m43-ecosan-gender-aspects-tutorial-2006.pdf> (English) 2,0 MB

- M 4.4 economic aspects and options
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m44-ecosan-economic-aspects-lecture-2006.ppt> (English) 0,8 MB
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m44-ecosan-economic-aspects-tutorial-2006.pdf> (English) 1,9 MB

- M 4.5 health and hygiene promotion
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m45-ecosan-health-promotion-lecture-2006.ppt> (English) 0,9 MB
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m45-ecosan-health-promotion-tutorial-2006.pdf> (English) 2,7 MB

- M 4.6 awareness building and monitoring
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m46-ecosan-awareness-monitoring-lecture-2006.ppt> (English) 0,6 MB
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m46-ecosan-awareness-monitoring-tutorial-2006.pdf> (English) 1,4 MB

- M 4.7 agricultural aspects and options
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m47-ecosan-agricultural-aspects-lecture-2006.ppt> (English) 1,43 MB
<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m47-ecosan-agricultural-aspects-tutorial-2006.pdf> (English) 2,4 MB

Module 5 Case studies

<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-m-5-ecosan-case-studies-2006.pdf> (English) 3,4 MB

C 04 Teaching material under preparation

An e-learning course is currently being developed by the Swedish ecosan-course team in co-operation with international experts and colleagues. It will be available in the spring of 2006 from the Stockholm Environment Institute (info on www.ecosanres.org) The main target group includes trainers at professional training institutions such as schools of public health, departments of water and sanitation for civil engineers, agriculture and horticulture training institutions, schools of architecture, university departments for social and economic development, etc.

Announcement and course – outline

<http://www2.gtz.de/dokumente/oe44/ecosan/cb/en-ecosan-sida-curriculum-2006.pdf> 0,1 MB (English)

D Recommended reading

D 01 Basics

Ecological sanitation – Revised and Enlarged Edition (Winblad et al., Sida, 2004)

The book discusses what is currently known about ecological sanitation systems, their strengths and their weaknesses, concentrating mainly on urine diversion systems. It gives advice on how to make such systems work with regard to the selection, design and management of devices as well as about the promotion and support aspects.

<http://www2.gtz.de/dokumente/oe44/ecosan/en-ecological-sanitation-2004.pdf> (English) 1,24 MB

Ecological sanitation (Esrey et al., Sida, 1998)

First edition of the Sida ecological sanitation book

<http://www2.gtz.de/dokumente/oe44/ecosan/en-ecological-sanitation-1998.pdf> (English) 1,27 MB

<http://www2.gtz.de/dokumente/oe44/ecosan/fr-assainissement-ecologique-1998.pdf> (French) 1,52 MB

<http://www2.gtz.de/dokumente/oe44/ecosan/es-saneamiento-ecologico-1999.pdf> (Spanish) 1,42 MB

<http://www2.gtz.de/dokumente/oe44/ecosan/cn-ecological-sanitation-1998.pdf> (Chinese) 9,24 MB

<http://www2.gtz.de/dokumente/oe44/ecosan/vn-nha-tieu-sinh-thai-1998.pdf> (Vietnamese) 2,0 MB

Closing the loop - ecological sanitation for food security (Esrey et al., UNDP/SIDA, 2000)

Description of ecosan principles and technologies, health aspects of reuse of faeces and urine, the contribution of ecosan towards food security, and case studies from Mexico and Zimbabwe.

<http://www2.gtz.de/dokumente/oe44/ecosan/en-closing-loop-food-security-2000.pdf> (English) 1,2 MB

<http://www2.gtz.de/dokumente/oe44/ecosan/es-ecosan-closed-loop-2001.pdf> (Spanish) 3,2 MB

Ecological sanitation and reuse of wastewater – a think piece on ecological sanitation (Jenssen et al., NLH, 2004)

Ecosan discussion paper commissioned by the Norwegian Ministry of the Environment for the 13th meeting of the UN commission for sustainable development in New York, 2004, short and clear representation of the ecosan theme.

<http://www2.gtz.de/dokumente/oe44/ecosan/en-thinkpiece-ecosan-wastewater-reuse-2004.pdf> (English) 0,9 MB

Final report SanRes 1992-2001 (Uno Winblad, Sida, 2002)

Final report of the first supra-regional ecosan project SanRes (Sida), experiences from pilot projects, studies and capacity building.

<http://www2.gtz.de/dokumente/oe44/ecosan/en-sanres-final-report-2002.pdf> (English) 0,8 MB

10 recommendations for action (Werner et al., GTZ, 2003)

Recommendations for action from the Luebeck symposium on ecological sanitation, April 2003

<http://www.gtz.de/de/dokumente/en-ecosan-recommendations-for-action-2003.pdf> (English) 1,8 MB

<http://www.gtz.de/de/dokumente/de-ecosan-handlungsempfehlungen-2003.pdf> (German) 1,3 MB

<http://www.gtz.de/de/dokumente/es-ecosan-recomendaciones-para-la-accion-2003.pdf> (Spanish) 1,3 MB

<http://www.gtz.de/de/dokumente/fr-ecosan-recommandations-pour-l-action-2003.pdf> (French) 1,8 MB

Urine separation - closing the nutrient cycle (Johansson et al., Stockholm Vatten, 2000)

Detailed report on experiences with urine separation and urine utilization in Sweden. Final report of a R+D project of the Stockholm water services.

<http://www2.gtz.de/dokumente/oe44/ecosan/en-source-separated-human-urine-fertilizer-2000.pdf> (English) 4,0 MB

Introduction to greywater management (Ridderstolpe, EcoSanRes, 2004)

Overview on the possibilities of greywater treatment and reuse within the framework of ecosan concepts, predominantly based on experiences from industrialized countries.

<http://www2.gtz.de/dokumente/oe44/ecosan/en-greywater-management-2004.pdf> (English) 2,0 MB

Sustainable Pathways to Attain the Millennium Development Goals: Assessing the Key Role of Water, Energy and Sanitation (Rockström, Axberg, Falkenmark, Lannerstad, Rosemarin, Caldwell, Arvidson, Nordström, SEI 2005)

The purpose of this study is twofold. First, to manifest the importance of the environment to attain the MDGs. Secondly, to make the case, based on scientific analyses on freshwater, energy and sanitation, where environmentally sustainable management strategies are a prerequisite for long term and resilient improvement of the lives of poor people in the world. This study introduces innovative and sustainable solutions to reduce poverty within the context of the MDGs. We argue that such solutions are required not only to reach the 2015 targets, but also for sustaining the results forming a platform for the continued work to eradicate hunger and poverty in the years to come thereafter.

<http://www2.gtz.de/dokumente/oe44/ecosan/en-sustainable-pathways-mdg-2005.pdf> (English) 3,3 MB

D 02 Planning and strategy

ecosan source book (Werner et al., GTZ, 2003)

Ecosan source book with a detailed introduction to ecosan principles, a planning guide for ecosan projects with emphasis on awareness raising and stakeholder participation in decision making, as well as a collection of methods and instruments for practical application. Available as draft version, publication planned for 2006.

<http://www.gtz.de/de/dokumente/en-ecosan-source-book-2005.pdf> (English), 8,9 MB

ecosan toolbox (Werner et al., GTZ, 2005)

The ecosan-toolbox contains a broad collection of field-tested instruments being used in the different preparation and implementation steps for ecological sanitation projects. It provides much broader planning approach and range of tools that go far beyond the scope of conventional sanitation. The toolbox suggest tools that range from awareness raising materials to technical data sheets, design and planning tools.

<http://www.gtz.de/de/dokumente/en-ecosan-toolbox-2005.pdf> (English) 0,3 MB

Implementing the Bellagio Principles in urban environmental sanitation services: provisional guideline for decision-makers (SANDEC/WSSCC, 2005)

Guideline for the conception and planning of urban water supply and disposal, based on the Bellagio Principles: interdisciplinary planning and stakeholder participation in decision making; solutions re-

spond to actual user demand; problems are solved on lowest possible level (e.g. household level); and material flow cycles are closed. Strategic approach that is perfectly suitable for the implementation of ecosan programmes.

<http://www2.gtz.de/dokumente/oe44/ecosan/en-household-centered-environmental-sanitation-guideline-2005.pdf> (English) 0,7 MB

Instrumentos Educativos para el Saneamiento Ecológico (El Taller Artes y Oficios AC – Sarar Transformación SC)

- Biofiltro - La jardinera que filtra las aguas grises para reciclarlas (Buenfil J.)

<http://www2.gtz.de/dokumente/oe44/ecosan/es-biofiltro-aguas-grises-2005.pdf> (Spanish) 0,4 MB

- El sanitario de huerto - un sanitario compostero alternativo que no usa agua (Morgan P.)

<http://www2.gtz.de/dokumente/oe44/ecosan/es-sanitario-huerto-compostero-2005.pdf> (Spanish) 0,8 MB

- Hortaliza de traspatio - como producir alimentos nutritivos y seguros reintegrando nutrientes de la orina a los suelos (Arroyo F., Bulnes M.)

<http://www2.gtz.de/dokumente/oe44/ecosan/es-hortaliza-traspatio-nutrientes-orina-2005.pdf> (Spanish) 0,8 MB

D 03 Agricultural reuse

Guidelines on the use of urine and faeces in crop production (Jönsson et al., EcoSanRes, 2004)

The publication describes the mechanisms of nutrient uptake by plants and treatment methods for faeces and urine. It provides detailed guidance on the use of urine and faeces for fertilization and soil improvement.

<http://www2.gtz.de/dokumente/oe44/ecosan/en-use-urine-faeces-crop-production-2004.pdf> (English) 2,3 MB

D 04 Health aspects

Sanitation and Cleanliness for a Healthy Environment (Conant, Hesperian Foundation, SIDA, UNDP, 2005)

This booklet addresses the different sanitation and hygiene needs of women and men. It gives communities information about how significant sanitation improvements can be made by better use of indigenous skills and local resources. Communities are offered a choice of affordable, safe, and environmentally sound sanitation alternatives. This booklet is designed to be an important part of the Community Water Initiative, stimulating communities to take charge of their sanitation development for a better life.

<http://www2.gtz.de/dokumente/oe44/ecosan/en-household-centered-environmental-sanitation-guideline-2005.pdf> (English) 2,0 MB

Guidelines on the safe use of urine and faeces in ecological sanitation systems (Schönning et al., EcoSanRes, 2004)

Detailed description of pathogen transmission mechanisms from reuse of urine and faeces. Provides risk assessment for different practices and recommendations of treatment methods and safety measures for safe reuse of urine and faeces as fertilizer.

<http://www2.gtz.de/dokumente/oe44/ecosan/en-safe-use-urine-faeces-ecological-sanitation-systems-2004.pdf> (English) 2.5 MB

Health aspects of dry sanitation with waste reuse (Peasey, WELL, 2000)

Description of hygiene aspects of dry sanitation based on the findings from various case studies. Discussion of advantages and disadvantages regarding health risks of dry sanitation systems.

<http://www2.gtz.de/dokumente/oe44/ecosan/en-health-aspects-dry-sanitation-with-waste-reuse-2000.pdf> (English) 0,3 MB

D 05 Socio-cultural aspects

Norms and attitudes towards ecosan and other sanitation systems (Drangert, EcoSanRes, 2004)

Extensive study on attitudes and acceptance of users in different cultures concerning different sanitation systems and reuse of urine and faeces in ecosan systems.

<http://www2.gtz.de/dokumente/oe44/ecosan/en-ecosan-norms-attitudes-2004.pdf> (English) 1 MB

Cultural influences that affect the acceptance of compost toilets: psychology, religion and gender (Warner et al., NLH, 2000)

Short paper on the effect of cultural criteria of users, influenced by psychology, religion and gender, on the acceptance of composting sanitation systems.

<http://www2.gtz.de/dokumente/oe44/ecosan/en-cultural-influence-affects-acceptance-2000.pdf> (English) 0,2 MB

Public awareness and mobilisation for ecosanitation (Wegelin-Schuringa, IRC, 2000)

Short paper on the importance of information and awareness building for the success of ecosan projects. Gives key elements for successful information and communication strategies.

<http://www2.gtz.de/dokumente/oe44/ecosan/en-ecosan-public-awareness-mobilisation-irc-2000.pdf> (English) 0,2 MB

Gender perspectives on ecological sanitation (Hannan, EcoSanRes, 2002)

Short paper on gender specific aspects of planning, implementation and operation of latrines and other components of ecosan systems.

<http://www2.gtz.de/dokumente/oe44/ecosan/en-gender-perspectives-ecological-sanitation-2002.pdf> (English) 0,2 MB

D 06 Conference proceedings

Third international ecological sanitation conference 2005, Durban, South Africa

Around 250 participants attended the 3rd international ecosan symposium, from 23rd to 27th May, in Durban, South Africa. The conference highlighted the fact that the ecosan approach is no longer of marginal interest, but a serious alternative to conventional wastewater concepts.

All papers and presentations from the conference are available online at:

[→ <http://conference2005.ecosan.org>]

Proceedings of the 2nd international symposium on ecological sanitation "ecosan - closing the loop - including the 1st IWA specialist group conference on Sustainable Sanitation", 7. - 11. April 2003, Lübeck (Werner et al., GTZ/IWA, 2004)

Very extensive collection of papers covering current developments of ecosan on more than 1000 pages. Topics cover issues such as policy and legislation, social and economic aspects, case studies, hygiene and environment, technology, agricultural reuse, decision making aids, etc.

- First page, imprint, foreword and acknowledgment

<http://www.gtz.de/de/dokumente/en-ecosan-symposium-luebeck-imprint-firstpage-foreword-2004.pdf> (English) 0,1 MB

- Content

<http://www.gtz.de/de/dokumente/en-ecosan-symposium-luebeck-content-2004.pdf> (English) 0,2 MB

- Opening session: ecosan - a realistic tool to achieve the Millennium Development Goals

<http://www.gtz.de/de/dokumente/en-ecosan-symposium-luebeck-opening-session-2004.pdf> (English) 0,7 MB

<http://www.gtz.de/de/dokumente/es-ecosan-symposium-luebeck-sesion-inaugural-2004.pdf> (Spanish) 0,7 KB

- Session A: Progress, policies and legislation

<http://www.gtz.de/de/dokumente/en-ecosan-symposium-luebeck-session-a-2004.pdf> (English) 1,5 MB

<http://www.gtz.de/de/dokumente/es-ecosan-symposium-luebeck-sesion-a-2004.pdf> (Spanish) 1,1 MB

- Session B: Social and economic aspects

<http://www.gtz.de/de/dokumente/en-ecosan-symposium-luebeck-session-b-2004.pdf> (English) 2,9 MB

<http://www.gtz.de/de/dokumente/es-ecosan-symposium-luebeck-sesion-b-2004.pdf> (Spanish) 1,8 MB

- Session C: Rural and peri - urban case studies

<http://www.gtz.de/de/dokumente/en-ecosan-symposium-luebeck-session-c-2004.pdf> (English) 2,3 MB

<http://www.gtz.de/de/dokumente/es-ecosan-symposium-luebeck-sesion-c-2004.pdf> (Spanish) 2,2 MB

- Session D: Hygiene and environmental assessments

<http://www.gtz.de/de/dokumente/en-ecosan-symposium-luebeck-session-d-2004.pdf> (English) 1,2 MB

<http://www.gtz.de/de/dokumente/es-ecosan-symposium-luebeck-sesion-d-2004.pdf> (Spanish) 1,5 MB

- Session E: New technological developments and experiments

<http://www.gtz.de/de/dokumente/en-ecosan-symposium-luebeck-session-e-2004.pdf> (English) 4,8 MB

<http://www.gtz.de/de/dokumente/es-ecosan-symposium-luebeck-sesion-e-2004.pdf> (Spanish) 1,2 MB

- Session F: Hygienic agro-reuse

<http://www.gtz.de/de/dokumente/en-ecosan-symposium-luebeck-session-f-2004.pdf> (English) 1,4 MB

<http://www.gtz.de/de/dokumente/es-ecosan-symposium-luebeck-sesion-f-2004.pdf> (Spanish) 1,1 MB

- Session G: Feasibility studies

<http://www.gtz.de/de/dokumente/en-ecosan-symposium-luebeck-session-g-2004.pdf> (English) 1,4 MB

<http://www.gtz.de/de/dokumente/es-ecosan-symposium-luebeck-sesion-g-2004.pdf> (Spanish) 1,4 MB

- Session H: Decision making tools

<http://www.gtz.de/de/dokumente/en-ecosan-symposium-luebeck-session-h-2004.pdf> (English) 1,6 MB

<http://www.gtz.de/de/dokumente/es-ecosan-symposium-luebeck-sesion-h-2004.pdf> (Spanish) 1,0 MB

- Session I: Urban case studies

<http://www.gtz.de/de/dokumente/en-ecosan-symposium-luebeck-session-i-2004.pdf> (English) 1,9 MB

<http://www.gtz.de/de/dokumente/es-ecosan-symposium-luebeck-sesion-i-2004.pdf> (Spanish) 1,8 MB

- Additional posters

	http://www.gtz.de/de/dokumente/en-ecosan-symposium-luebeck-additional-posters-2004.pdf (English) 0,5 MB
– Annex	http://www.gtz.de/de/dokumente/en-ecosan-symposium-luebeck-annex-2004.pdf (English) 1,7 MB
– Photos	http://www.gtz.de/de/dokumente/en-ecosan-symposium-luebeck-photos-2004.pdf (English) 1,7 MB
Proceedings of the international conference on ecological sanitation 5. - 8. November 2001 Nanning, China (EcoSanRes, 2001)	
Conference report and collected papers presented at the international ecosan conference in Nanning, 2001, organized by Eco SanRes http://www.ecosanres.org/Nanning%20Conf%20Proceedings.htm 0,3 MB (English)	
Proceedings of the international symposium "ecosan - closing the loop in wastewater management and sanitation", 2000, Bonn (Werner et al., GTZ, 2001)	
Conference proceedings of the first international ecosan Symposium in Bonn, 2000. Extensive collection of ecosan papers, focussing the problems of the current situation and defining the actions needed. http://www.gtz.de/de/dokumente/en-proceedings-1st-international-ecosan-symposium-2000.pdf 3,0 MB (English)	
D 07 ecosan technical data sheets	
ecosan technical data sheets provide technical guidance for technology selection and design in ecosan projects	
Urine diversion	
– 1.A Urine diversion - general description	http://www.gtz.de/de/dokumente/en-ecosan-tds-01-a-urine-diversion-general-description-2005.pdf 0,3 MB (English)
– 1.B.1 Urine diversion – toilets	http://www.gtz.de/de/dokumente/en-ecosan-tds-01-b1-urine-diversion-toilets-2005.pdf 0,6 MB (English)
– 1.B.2 Urine diversion - waterless urinals	http://www.gtz.de/de/dokumente/en-ecosan-tds-01-b2-urine-diversion-waterless-urinals-2005.pdf 0,7 MB (English)
– 1.B.3 Urine diversion - piping and storage	http://www.gtz.de/de/dokumente/en-ecosan-tds-01-b3-urine-diversion-piping-storage-2005.pdf 0,3 MB (English)
Dehydration toilets	
– 2.A Dehydration toilets - general description	http://www.gtz.de/de/dokumente/en-ecosan-tds-02-a-dehydration-toilets-general-description-2005.pdf 0,3 MB (English)
– 2.B.1 Dehydration toilets - double vault with urine diversion	http://www.gtz.de/de/dokumente/en-ecosan-tds-02-b1-dehydration-toilets-double-vault-ud-2005.pdf 0,5 MB (English)
– 2.B.2 Dehydration toilets - single vault with urine diversion	http://www.gtz.de/de/dokumente/en-ecosan-tds-02-b2-dehydration-toilets-single-vault-ud-2005.pdf 0,2 MB (English)
– 2.B.3 Dehydration toilets - without urine diversion	http://www.gtz.de/de/dokumente/en-ecosan-tds-02-b3-dehydration-toilets-without-ud-2005.pdf 0,2 MB (English)
– 2.B.4 Dehydration toilets - with movable containers	http://www.gtz.de/de/dokumente/en-ecosan-tds-02-b4-dehydration-toilets-movable-containers-2005.pdf 0,2 MB (English)
Vacuum technology	
– 4.A Vacuum technology - general description	http://www.gtz.de/de/dokumente/en-ecosan-tds-02-b5-dehydration-toilets-traditional-yemen-2005.pdf 0,5 MB (English)
– 4.B.1 Vacuum technology - vacuum sewer systems	http://www.gtz.de/de/dokumente/en-ecosan-tds-04-a-vacuum-technology-general-description-2005.pdf 1,0 MB (English)
– 4.B.2 Vacuum technology - vacuum sanitary installations	http://www.gtz.de/de/dokumente/en-ecosan-tds-04-b2-vacuum-technology-sanitary-installations-2005.pdf 1,0 MB (English)
D 08 ecosan project data sheets	
These data sheets present concise information on projects from around the world where ecosan concepts have been implemented. They contain technical, organisational, and financial data on the project, as well as a description of particular experience, problems and lessons learned..	

Asia

- Urine diverting dry toilets dissemination programme, Guanxi province, China
<http://www.gtz.de/de/dokumente/en-ecosan-pds-005-china-guanxi-2005.pdf> 0,3 MB (English)

Africa

- Hanahai and Paje, Botswana
<http://www.gtz.de/de/dokumente/en-ecosan-pds-009-botswana-hanahai-paje-2005.pdf> 0,7 MB (English)
- Ecosan pilot installations Koulikoro, Mali
<http://www.gtz.de/de/dokumente/en-ecosan-pds-010-mali-koulikoro-2005.pdf> 0,5 MB (English)
- Humification of sewage sludge, Elminia and Nawaq, Egypt
<http://www.gtz.de/de/dokumente/en-ecosan-pds-014-egypt-nawaq-2005.pdf> 0,4 MB (English)

Middle East

- Use of reclaimed water in the Jordan Valley, Jordan
<http://www.gtz.de/de/dokumente/en-ecosan-pds-013-jordan-valley-2005.pdf> 0,4 MB (English)
- Constructed wetland, Haran-Al-Awamied, Syria
<http://www.gtz.de/de/dokumente/en-ecosan-pds-015-syria-haran-al-awamied-2005.pdf> 0,4 MB (English)

America

- TepozEco urban ecosan pilot program, Tepoztlan, Mexico
<http://www.gtz.de/de/dokumente/en-ecosan-pds-012-mexico-tepoz-eco-2005.pdf> 0,5 MB (English)

Europe

- Innovative wastewater management project “Lambertsmuehle”, Burscheid, Germany
<http://www.gtz.de/de/dokumente/en-ecosan-pds-002-germany-lambertsmuehle-2005.pdf> 0,3 MB (English)
- Vacuum sewerage and greywater recycling, office building “Ostarkade” of the KfW Bankengruppe, Frankfurt am Main Germany
<http://www.gtz.de/de/dokumente/en-ecosan-pds-001-germany-frankfurt-kfW-2005.pdf> 0,4 MB (English)
- Ecological settlement Allermoehe, Neu Allermoehe, Hamburg, Germany
<http://www.gtz.de/de/dokumente/en-ecosan-pds-003-germany-hamburg-allermoehe-2005.pdf> 0,3 MB (English)
- Ecological housing estate Luebeck-Flintenbreite, Luebeck, Germany
<http://www.gtz.de/de/dokumente/en-ecosan-pds-004-germany-luebeck-flintenbreite-2005.pdf> 0,3 MB (English)
- Biogas-ecosan project, Waldmichelbacherhof, Bessenbach, Germany
<http://www.gtz.de/de/dokumente/en-ecosan-pds-006-germany-waldmichelbacherhof-2005.pdf> 0,3 MB (English)
- Öko-Technik-Park, Hannover, Germany
<http://www.gtz.de/de/dokumente/en-ecosan-pds-007-germany-hannover-oekotechnikpark-2005.pdf> 0,6 MB (English)
- Urine separation and reuse project at the main building of GTZ GmbH, Eschborn, Frankfurt am Main, Germany
<http://www.gtz.de/de/dokumente/en-ecosan-pds-016-germany-gtz-eschborn-2005.pdf> 0,3 MB (English)
- Gebers collective housing project, Orhem, Sweden
<http://www.gtz.de/de/dokumente/en-ecosan-pds-008-sweden-gebers-2005.pdf> 0,5 MB (English)
- Ecosan school toilets, Garla Mare, Romania
<http://www.gtz.de/de/dokumente/en-ecosan-pds-011-romania-garla-mare-2005.pdf> 0,5 MB (English)