Title	The ISWM approach to EcoSan: a research agenda
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ABSTRACT

WASTE, in Gouda, the Netherlands, manages the Dutch-funded programme “Integrated Support for a Sustainable Urban Environment (ISSUE)”, which has an EcoSan focus. This programme builds on the experiences of WASTE and its network of Southern partners, some of whom are present in Durban. WASTE and the partners are committed to opening a space for poor people to make key decisions about the communities and the cities they live in, and how to maintain a healthy living environment. WASTE and partners focus on elaborating knowledge about the urban environment in the South and countries in transition, and in keeping that knowledge and capacity in the South, where it builds up institutional memory, credibility, experience, and the capacity to intervene to improve the urban environment and the lives of urban dwellers, especially the poorer ones.

WASTE has, since 2001, been developing a line of EcoSan projects and an EcoSan research agenda, based on the Integrated Sustainable Waste Management (ISWM) framework. The ISWM framework gives a set of aspects to look at urban environmental management policy and practice. For EcoSan, the ISWM framework is useful for organising questions about the state of the art, and also for setting a research agenda. The key overarching question here is: **which parts of the research agenda are most critical for building a willingness to attempt EcoSan at city or community level?** A range of research topics has been formulated, organised according to the ISWM framework.

INTRODUCTION

WASTE, in Gouda, the Netherlands, manages the Dutch-funded programme “Integrated Support for a Sustainable Urban Environment (ISSUE)”, which has an EcoSan focus. This programme builds on the experiences of WASTE and its network of Southern partners, some of whom are present in Durban. The ISSUE programme is implemented in five countries in South Asia, South East Asia, Central America, West Africa and East Africa. Objectives of the ISSUE programme are to create an enabling environment, through demonstration and seed projects, development of the private sector, knowledge sharing and strategic sanitation planning.

WASTE and the partners are committed to opening a space for poor people to make key decisions about the communities and the cities they live in, and how to maintain a healthy living environment. WASTE and partners focus on elaborating knowledge about the urban environment in the South and countries in transition, and in keeping that knowledge and capacity in the South, where it builds up institutional memory, credibility, experience, and the capacity to intervene to improve the urban environment and the lives of urban dwellers, especially the poorer ones.

THE ISWM FRAMEWORK

WASTE has, since 2001, been developing a line of EcoSan projects and an EcoSan research agenda, based on the Integrated Sustainable Waste Management (ISWM) framework, as shown in Figure 1.

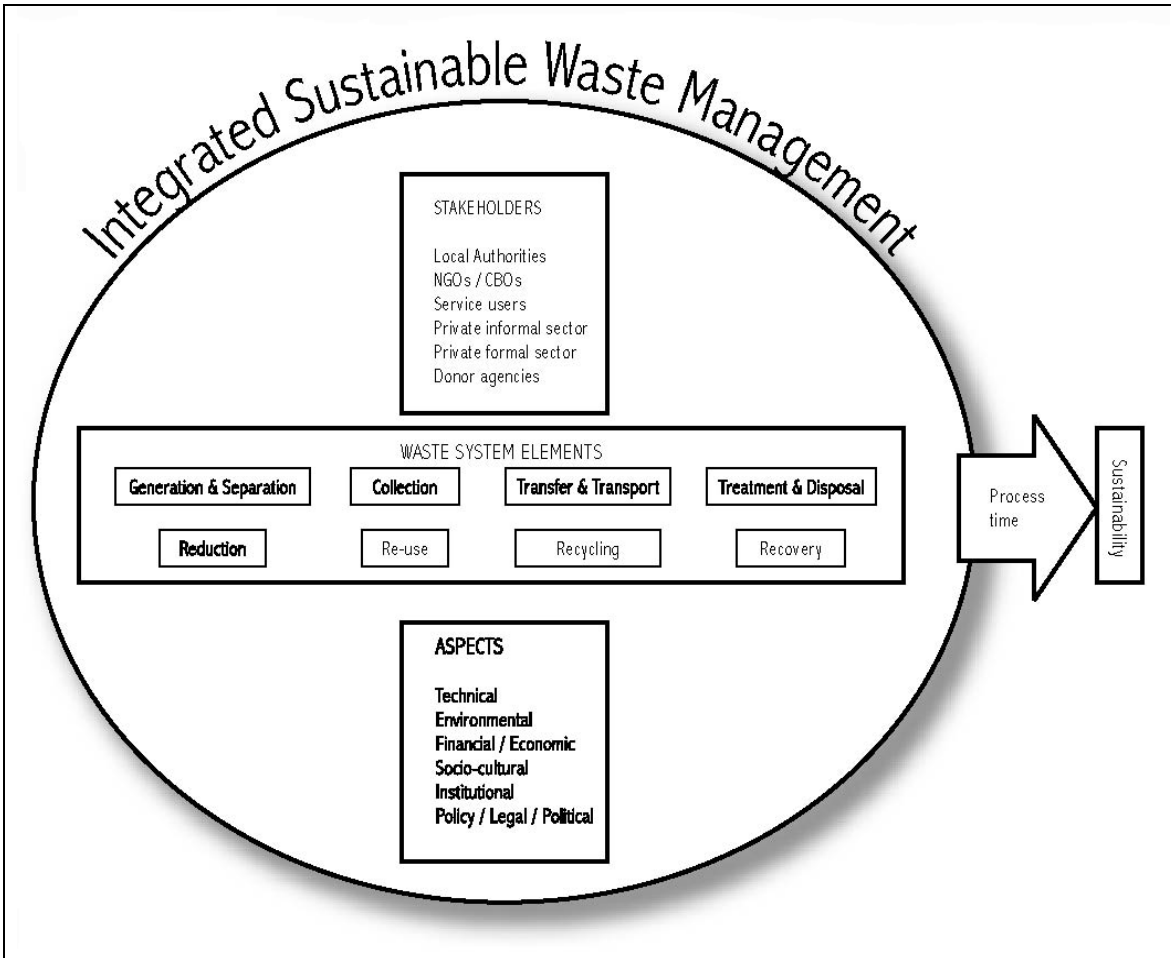

Figure 1. The ISWM Framework

The ISWM framework has been developed originally for solid waste management in the South. With its new projects focusing on EcoSan WASTE has been adapting the ISWM framework to the sanitation context.

Dimensions of the ISWM framework

The ISWM framework gives a set of aspects to look at urban environmental management policy and practice. They can be organised into three dimensions, as shown in Figure 1.

Stakeholders

ISWM is, first and foremost, about participation of stakeholders. A stakeholder is a person or organisation that has a stake, an interest in - in this case- sanitation. A number of key stakeholders are listed in Figure 1.

System elements

The system elements are sometimes referred to as the technical components of sanitation and waste management. For EcoSan it is useful to divide the sanitation system into four basic system elements: (1) household practices, both current and potential, and the interface household-public domain; (2) collection, transfer, transport; (3) treatment and processing; and (4) beneficial reuse, markets, end-users of materials or nutrients.

ISWM aspects

Within ISWM the third dimension consists of six **sustainability aspects**, or lenses, through which the existing waste system can be assessed and with which a new or expanded system can be planned. The sustainability aspects, ranging from political-legal, to social-cultural, institutional-organisational, technical-performance, environmental-health and financial-

economic, cover the range of factors influencing sanitation and waste management activities and, taken together, predict or influence the sustainability of the entire system (Anschütz et al., 2004).

The overall goal of ISWM assessment and planning is improved sustainability of the urban sanitation and waste management system. Work methods in ISWM assessment and planning are participatory, build on existing practices and skills as much as possible and South-South exchange of experiences.

APPLYING ISWM TO ECOSAN

For EcoSan, the ISWM framework is useful for organising questions about the state of the art, and also for setting a research agenda.

The key overarching question here is: **which parts of the research agenda are most critical for building a willingness to attempt EcoSan at city or community level?** In other words: what do we know already and what do we need to know to upscale EcoSan from pilot project/study to city or community level?

Box 1 indicates a range of issues that we can look at, organised according to the ISWM framework.

Box 1 Examples of EcoSan research questions based on the ISWM framework

Stakeholders	❖ What kinds of stakeholders are currently involved in sanitation? ❖ Which are key stakeholders, and where does the decision making power lie? ❖ What kinds of institutional and bureaucratic claims reinforce conventional sanitation? ❖ What kinds of private sector stakeholders are currently involved, based on the prevailing paradigm of grid-based sewered sanitation? Who would be winners and losers in case there was a move to mixed, complex sanitation systems with a substantial component of non-sewered sanitation?
Sanitation System Elements	Household practices: 1. How is sanitation conceived and designed in various cultures? What is the cultural definition of "good" behaviour in relation to defecation, urination, and the space where this occurs? How do standards of *comfort, cleanliness, and convenience* (as per Shove 1993) relate to facilities in and outside of the house? What kinds of interventions are used by mothers to train babies to urinate and defecate correctly? By analogy, what kinds of interventions are needed in households to trigger discursive attention to these processes, and to change behaviour? Collection, transfer, transport: 2. What are the implications of EcoSan in terms of the necessary system of movement of liquids and solids to safe processing and reuse? Is there a case to be made for adapting the solid waste system to receive those materials, and what are the implications of this? Is there a potential to build a new logistical system, and if so, what are its characteristics? Should system designs be based on desired performance, or on local realities? Treatment and processing: 3. Which parts of the excreta stream, and the media used to transport it (e.g. water, sawdust, containers, etc), can be recovered, and at what level? What kinds of treatment are necessary to preserve health, especially of workers? What are the trade-offs between neutralisation and preparation for beneficial reuse? Beneficial reuse and markets: 4. What are the technical limits for recovering and using the nutrients and materials in excreta? What limitations come with cultural ideas, preserving public health, religious practices? What are the large-volume uses that assure that there is a "market"?
Sustainability aspects	1. Is EcoSan feasible in terms of **cultural and social life**, in specific places at

	this time? Who are the key early adopters, women, men, children? Where is the leadership? 2. What **policy and legal** steps are needed to break the monopolies enjoyed by conventional sanitation, and how can the key decision makers be convinced to try something different? 3. How can key **institutional and organisational structures** be adapted to accept the idea of modern mixed or complex systems for sanitation? How do they need to change? 4. What is the measurement science for monitoring and measuring complex or diverse systems, that have an EcoSan component? How can their impact on **the environment and health** be measured, especially in terms of macronutrients and cycling of nitrogen? 5. What criteria of comfort, cleanliness, and convenience must EcoSan achieve to gain acceptance in terms of **technical aspects and performance**? What kinds of demands does the structure of the built environment in the South, that is, densely populated settlements on the periphery, and a centre of modest density, place on the concept of grid-based sanitation and for EcoSan? 6. What are key **financial and economic** parameters for EcoSan systems, either as stand-alone approaches or as part of mixed or complex systems? What are the units of research for this aspect? How does an EcoSan approach affect planned investments, fee and cost recovery systems, and the like? Who pays for sanitation infrastructure when the grid-based centralised system dominates?

STATE OF THE ART (WHAT DO WE ALREADY KNOW AND PRACTICE)

Looking at the articles submitted for the 2nd international symposium on ecological sanitation in Lübeck, Germany in 2003 (GTZ, 2004a), it is clear that we already know a lot about technical, environmental, social and health aspects of EcoSan and too little about its financial-economic, political and institutional aspects. Just counting the number of articles on different subjects reveals this, as is presented in Table 1.

Table 1Number of articles devoted to various themes during the symposium on ecological sanitation in Lübeck in 2003

	Theme	Number of articles	Remarks
A	Progress, policies and legislation	10	In practice often descriptions of projects and programme such as GTZ EcoSan programme and Swedish EcoSanRes.
B	Social and economic	19	
C	Case studies	20	Mostly technical in focus
D	Hygiene and environmental assessments	15	
E	New technological developments and experiments	26	
F	Hygienic agro-reuse	18	
G	Feasibility studies	10	Mainly focusing on technical and financial feasibility
H	Decision making tools	17	

Source: GTZ, 2004a

Of course this is a rather crude approach, but it gives an indication of the focus of attention, which is confirmed with a review of other literature on EcoSan projects and research, with several technical handbooks but only one planning guide (GTZ, 2004b).

When looked at from a system point of view, the system elements of generation and separation receive a lot of attention, as does treatment. However, collection and transfer on the one hand and reuse on the other seem underdeveloped in EcoSan literature and projects.

Experiments, projects and research regarding EcoSan have been around now for while.

Initially one thinks that EcoSan is a very strong concept with potential in many countries in the South, primarily because it solves sanitation problems. It could be a more affordable alternative than waterborne sewerage and a more attractive option than VIP latrine or pour flush toilets, because of its reuse opportunities and the growing importance of (urban) agriculture in many developing countries

However, in many developing countries EcoSan has not risen above the status of isolated pilot projects or feasibility studies. Why does EcoSan often remain at this heavily subsidised project level? Why does it not reach a wider audience and have more impact at city and national level? Why does spontaneous replication occur so little?

A look at successes and failures in sanitation in general and EcoSan in particular appears to be useful (Austin, 2003; GTZ, 2004a; WSP, 2004a and b). The Water and Sanitation Programme has developed a number of field notes that effectively address these issues for sanitation at large. They seem applicable for EcoSan too. The WSP argues that sanitation have relied on the same worn-out approach of heavily subsidised government or donor-sponsored latrine construction, coupled with health education programmes. This approach has significantly failed in their eyes. It failed to generate demand for sanitation, to produce products of services sustainable beyond the external subsidy, and to provide solutions replicable at scale (WSP, 2004a).

Social marketing is needed to understand what people want and are willing to use and maintain, and to know which sanitation technologies are locally appropriate. For example people decide to install a latrine usually not for health reasons but because of more immediate and direct benefits such as convenience, comfort, cleanliness, privacy, safety and prestige (WSP, 2004a). Holden et al. have demonstrated in a project in South Africa that people in developing countries are not always attracted by the reuse potential of EcoSan toilets (Holden et al., 2003).

Little is known about the demand for EcoSan and these (social) marketing aspects. How to decrease subsidies is another one (Sudgen, 2003).

GAPS IN EXISTING PROJECTS AND RESEARCH (WHAT DO WE NEED TO KNOW)

What do we need to know to convince stakeholders to consider EcoSan as a valid option for sanitation? The answer to this question depends on the stakeholder. Various stakeholders in sanitation exist who all have their own interests in sanitation and attitudes towards EcoSan. They have different reasons why they may not accept EcoSan, some examples of which are mentioned in Table 2.

Table 2 Reasons of various stakeholders for not accepting EcoSan

Stakeholder group(s)	Possible reasons why they do not accept EcoSan
Households and other service users	Lack of cultural acceptance for handling excreta, comparative cost to other latrines and toilets, lack of access to information and knowledge of EcoSan, perceived status and lack of prestige, gender differences in need for sanitation and decision making power in the household
Local government	Vested interests (e.g. they may have their own latrine emptying equipment), inflexible regulations and codes, conventional education and perception of the 'right type' of sanitation (i.e. waterborne sewerage), ignoring of existing practices, not used to a role as enabler and regulator for the private sector, issue has no political sex appeal
National government (Ministry of Water Supply and Sanitation, Ministry of Environment, etc.)	Inflexible regulations and codes, conventional education and perception of the 'right type' of sanitation, ignoring of existing practices
Private service providers like pit emptiers and latrine builders	Vested interests in building conventional systems like VIP latrines and soakaways, lack of access to information and knowledge of EcoSan technologies, low social status
Consultants and engineers, academic and educational sectors	Traditional education, lack of access to information and knowledge of EcoSan

NGOs and CBOs	Lack of access to information and knowledge of EcoSan, used to building of conventional systems like VIP latrines and soakaways.
Farmers and other users of treated excreta	Lack of cultural acceptance for using excreta, comparative cost of using it, logistics, lack of knowledge on application
Donor agencies	Lack of access to information and knowledge of EcoSan, used to funding of conventional systems like VIP latrines and soakaways.

Creating an enabling environment to upscale EcoSan from household to city or community level means removing some or all of these obstacles. For example in many developing countries the use of raw or partly treated excreta is a common practice (Konde & Diallo, 2003; KIT, 1999; Sugden, 2003). Local decision makers tend to ignore these existing practices and at the same time refuse to regulate them. EcoSan projects could build on these practices, but need to get the government on their side to promote hygienic reuse.

Components of an enabling environment are, according to the Water Supply and Sanitation Council in their guidelines for decision makers on household-centred environmental sanitation (WSSCC, 2004) are:

1. Government support, e.g. political support and favourable national policies and strategies
2. Legal framework, e.g. laws, regulations, standards and codes at national and municipal levels
3. Institutional arrangements, especially at city and neighbourhood level
4. Required skills, ensuring that all participants understand and accept the concepts through possessing the required skills
5. Credit and other financial arrangements, both for households and for private constructors and service providers
6. Information and knowledge management: providing access to relevant information, sharing of experiences, training and resource materials, the development of new approaches and the dissemination of findings

Creating an enabling environment for EcoSan is at the core of the ISSUE programme. The way we are dealing with these six different topics is mentioned below.

Political and legal aspects: How to change the attitude of decision makers and politicians is one of the central problems in upscaling EcoSan to city level. The ISSUE programme aims at local policy change and including EcoSan as an option in strategic sanitation planning at city level. In addition the programme supports regional review meetings on the draft WHO guidelines for the safe reuse of excreta and greywater.

Institutional arrangements: within institutional arrangements logistics appear to be a neglected area, especially in urban high-density areas logistics, where reuse at household level is often difficult. How to transport excreta from households to places for treatment and reuse? This involves the choice for setting up a new system for urine and/or faeces, joining with existing solid waste management systems, using existing latrine emptying services, etc. The ISSUE programme is undertaking a pre-study in India focusing on logistics.

Credit and other financial arrangements: the issue of (social) marketing was already mentioned above as being severely neglected in sanitation projects. Economic comparisons with existing systems need to be done early on in a project and households should be given a choice.

In addition, most experiments with reuse have focused on reuse under controlled test conditions. However, how farmers in practice use it, what combinations of inputs they use for which crops, what level of input they need. This is still relatively unexplored territory. Would it be useful to start with EcoSan in areas where there is a market demand for the resulting materials, instead of starting from the point of generation?

ISSUE programme is providing support to its local partners to learn from social marketing experiences, market analysis and marketing strategies in sanitation and EcoSan elsewhere. The programme also works on the financial arrangements through its 'Waste Ventures' component, focusing on supporting small-scale enterprises in the sanitation and waste management sector. This includes the establishment of local guarantee funds to provide loans to the small-scale private sector above micro finance level.

The remaining two issues are important, but seem to be already receiving adequate attention.

Skill development and training is being institutionalised by, among others, GTZ and EcoSanRes. The ISSUE programme wants to add to these efforts by developing a set of training modules dealing with creating an enabling environment for EcoSan and testing them in the field in various regional settings.

Quite some efforts have been taken by various agencies working on EcoSan to share information and knowledge. Knowledge sharing and management is also a key element in the ISSUE programme. Sharing of experiences between Southern partners through email discussion, Intranet and face-to-face meetings, development of a film on EcoSan in various countries - which will be shown during the Durban conference- and the development of training modules all fit into this concept.

CONCLUSION AND AGENDA FOR FUTURE RESEARCH

Applying the ISWM framework to EcoSan enables us to analyse the shortcomings or one-sidedness of existing practice and indicates directions for future research and practice.

In our view existing projects and research reveal an overemphasis on technical, environmental, social and health issues and too little attention for financial-economic, political and institutional issues as well as for the system elements of collection/transfer and reuse. Within the ISSUE programme WASTE attempts to address some of the missing issues, as they are crucial for creating an enabling environment for EcoSan. The three most essential issues on the future research agenda that will facilitate official decisions in favour of EcoSan and that will enable its inclusion in strategic sanitation plans seem to be:

- Marketing and financing of EcoSan at household level and with private providers (financial-economic aspect)
- Logistics and occupational health, especially in urban areas (collection and transfer)
- Application in agriculture, in particular in areas with cash crops (reuse)

The discussion of critical path issues is just beginning, and we hope to pursue it further in Durban.

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