Implementing Ecological Sanitation – a study on capabilities and capacities in India

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Foreword

Making sanitation the topic of a dissertation might come as a surprise to many. As is also stated in this research, sanitation is not a very 'sexy' topic.

My interest for this field of research started during my semester at the University of Basel, where it was part of the class 'sustainability and capabilities'. During this course I got familiar with the capabilities approach, which was empirically translated into the example of sanitation. By approaching the topic from a capabilities perspective I learned a lot about the many aspects in life that are affected by sanitation. Improved sanitation does not solely mean living in a healthier environment, but it has a much broader influence and can thereby improve quality of life. For the first time in my life I started to think about the way sanitation is organised. Before taking this class and doing this research, I lived in a world where I flushed and forgot as well.

By discussing sanitation practices with my respondents, I learned more and more about the impact that the lack of sanitation can have on people's lives. They explained how, for example, women often had to go through harsh circumstances when sanitation was not available. Women would only go for open defection in the dark, as being scared of getting harassed by men. One respondent even told me that girls do not always go to school when sanitation is not available near the school building.

Since the topic has so much influence on all aspects of human life and is related to environmental limits and sustainability I believed to have found an interesting topic for a thesis. My interest in sociology, which I studied as a bachelor degree, and the master in sustainability science, have both been of use and have been integrated during this research.

I will probably not contribute in making sanitation a real attractive topic. As one respondent states "people just don't like to talk about their shit". But since my research was, simply taken, about shit (and urine), I did discuss it with many people in my surroundings. I therefore hope to have made a very modest contribution to getting the sanitation topic a bit more in the picture. And who knows, I might inspire a few people to ask themselves for the first time when flushing their toilets: What is exactly happening with my waste?

There are many people who have contributed in making this research possible. As a start, I would like to thank Paul Burger, for inspiring me to work with the capabilities approach and introducing me to the world of ecological sanitation. Likewise, Gijs van Donselaar, taught me many things related to theories of justice, a field that definitely caught my interest. Special thanks go to my supervisor Carel Dieperink. He has been available at those times I needed some help and directions. He kept me sharp for scientific quality and taught me a lot about doing research.

Furthermore, I would like to thank Michael Kropac for making the link with ESF and giving me the opportunity to collaborate with this organisation. Within the staff of ESF, special thanks go to Sreevidya Satish, for supervising me in a great way and providing me with the data needed. In addition, Priyanka Patange has helped me with making contacts with the course participants and joined me to several interviews, something for which I am very

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Abstract

The following research question has been discussed: *Which capacities are present in India and how successfully is ESF in developing these with their training programme to increase the amount of implemented projects?*

In order to answer what is a successful sanitation programme the capability approach has been central. A capability is defined as the opportunity for a person to fulfil certain functions he or she highly values. Improved capabilities thereby improve quality of life for people by increasing the choices they are able to make. In relation to ecological sanitation (ecosan) it shown how ecological sanitation improves people's capabilities, moreover improving quality of life for people. The research of Enssle (2010) supplemented by Messmer (2011) provided a list of capabilities that are improved by ecological sanitation practices. They show that projects are only successfully promoted, implemented and maintained if they meet people's capabilities. Since a full assessment of the presence of capabilities in the visited projects has not been possible it is assessed whether the capabilities can be found in the vocabulary and training of the ESF staff and if this vocabulary was subsequently adopted by the former course participants. This task is performed as it is believed that good project implementation can only take place if the ones implementing projects are familiar with most of the relevant capabilities. Although there was a lot of knowledge present in ESF and the course participants, some capabilities were not addressed, making the training not fully inclusive and therefore less successful.

When attempts are made to develop capabilities in relation to ecological sanitation, capacities are needed. This for the reason that: *"capacity development involves long term and contributes to sustainable, social and economic development and is demand driven*" (Lusthaus et al. 1999: 5). There are many capacity spheres to take into consideration. These are: cultural and awareness capacity, institutional capacity, organisational capacity, human capacity, scientific capacity, technical capacity, process capacity and, added at a later time, financial capacity. All these different components contribute to making ecosan a flourishing practice. When these capacities are enabling and do not throw up barriers, successful ecological sanitation implementation will be likely. A capacity gap that is visualised by the Ecosan Services Foundation is the lack of experts in the field. To solve this issue they provide a training programme which needs to solve this gap. Taken that they use the training as a tool, criteria to evaluate the training are used. These are the reactions, learning and behaviour of the course participants, and moreover the final results of a training programme.

The outcome of the interviews show that many of the training participants were highly satisfied with the training course and could recall many aspects of ecosan, implying that learning has taken place. If the behaviour of the course participants has changed after following the course could not be directly researched, since the course participants could not be followed on a daily basis. Although some projects came out of the training, the success of this is believed to be not very high. Many course participants found several personal barriers, such as a lack of influence in an organisation or being an individual without any financial back up, which prevented them from project implementation.

Besides the personal barriers, many capacity gaps were discovered. Making it difficult for individuals to successfully implement projects and form a barrier for a flourishing ecosan practice in India. A single organisation cannot solve all these issues, but it is suggested that a programme will be developed that addresses more than merely the development of knowledge of the course participants, as a way of improving human capacity. ESF should provide the course participants with a broader programme where they learn how to implement projects within a broader environment in which many capacity gaps are present. Another option would at least be to choose the participants by a stakeholder approach, getting relevant people together who can truly influence project implementation.

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1. Introduction

1.1. Introducing sanitation problems

Worldwide, an estimated 2.6 billion people have no access to improved sanitation services (A: www.who.int last measure in 2008). The term improved sanitation refers to: "any facility that hygienically separates human waste from the environment" (B: www.who.int). For lack of improved sanitation defecation in open water is a common practice (A: www.who.int). As the water is contaminated by human waste, many diseases are transmitted through it, such as diarrhoea, cholera, dysentery, typhoid, and hepatitis A (A: www.who.int). But not only health issues are of importance. Improved access to sanitation can also prevent environmental contamination (C: www.who.int) and discomfort to those women who, according to their cultural norms, are forced to leave home before dawn or come back after nightfall in order to avoid being seen while defecating (Enssle, 2010: 7-8). Access to sanitation can increase many more possibilities for human beings, which will be discussed in this thesis. The majority of the people without access to basic sanitation (87%) are living in rural areas (B: www.who.int) The regions with the least access are sub-Saharan Africa (37%), southern Asia (38%) and eastern Asia (45%) (A: www.who.int).

Access to sanitation is considered as particularly relevant by the United Nations. They adapted a sanitation target in one of their eight Millennium Development Goals. The Millennium goals served as a global action plan to achieve eight anti-poverty goals by their 2015 target date (A: www.un.org). In the subdivision of millennium development goal seven, which addresses environmental sustainability, the following target have been set:

Target. 7.C: **Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation**
• The world is on track to meet the drinking water target, though much remains to be done some regions • Accelerated and targeted efforts are needed to bring drinking water to all rural households • Safe water supply remains a challenge in many parts of the world • With half the population of developing regions without sanitation, the 2015 target appears to be out of reach • Disparities in urban and rural sanitation coverage remain daunting • Improvements in sanitation are bypassing the poor

Table 1.1. Target 7 Millennium goals, Source: B: www.un.org

By adding sanitation as one of the anti-poverty goals, the UN made a clear call to increase the access to improved sanitation. When access to sanitation is improved, in the words of the UN, one of the basic needs of the world's poorest will be met (C: www.un.org). However, when assessing the progress made in 2010 (B: www.undp.org), the general assembly of the United Nations already recalled that the targets are, with half of the population in development countries without access to basic sanitation, out of reach (C: www.un.org). In

the light of the vast amount of people without sufficient access, conditions which improve access to sanitation practices are needed.

This research will focus on a more specific element of sanitation than the broad definition of improved sanitation- used by the United Nations. As improved sanitation refers to techniques which safeguard human health and prevents direct environmental contamination, other points regarding, for example, the use of resources are not included in the definition. For a technique to be sustainable in the long run, nevertheless, sanitation services need to be resource efficient by the (re)use of water and human waste. Many of the sanitation techniques falling under the improved sanitation label have not been free of bad practice and could often not prevent soil contamination (see Enssle, 2010: 4-5 & A: www.sswm.com). For these reasons, the focus in this thesis will be on a specific form of improved sanitation, the concept of ecological or, put in different terms, sustainable sanitation. This concept incorporates the idea of recycling water and human waste and includes techniques which increase the likelihood of protecting against soil contamination. The more specific techniques that fall under the denominator of ecological or sustainable sanitation will be put under closer scrutiny in the next chapter. For now, it is important to notice that sustainable sanitation also refers to a broader field besides the improvement of human health and the protection of the environment and natural resources. Sustainable sanitation, additionally, has to be economically viable, socially acceptable and technically and institutionally appropriate (B: www.sswm.com). All these different elements form a basis for successful, long term sanitation projects.

The choice has been made to use the term ecological sanitation (ecosan) in this thesis, as most respondents were more familiar with this term. This does however not mean that the social and economical aspects, the other two sustainability pillars, have not been taken into consideration. Given that ecological sanitation and sustainable sanitation are often used as synonyms, ecological sanitation is chosen as the central concept. Since the term sanitation is often used to refer to clean drinking water and therefore to water supply schemes (see e.g. http://oxforddictionaries.com) it is important to notice that this research will be limited to a smaller field of attention. This will be the provisioning of toilets and the treatment of human waste and water. Therefore, the reader should keep in mind that when the term sanitation is used in this research, the supply of clean drinking water is not directly considered.

1.2. Conventional systems and sustainable solutions in the Indian context

1.2.1 State of sanitation in India

With a 31% coverage, India has one of the lowest percentages of access to improved sanitation on the Asian continent (only Cambodia scores lower). However, the access to sanitation improved since 1990, while at that time only 18% of the population had sufficient access (D: www.who.int). The access to improved sanitation is 54% for urban households and 21 % for households in rural areas, a difference which corresponds with global trends (different percentages, based on different measurements, are available at the Planning Commission Government of India (PCGI), 2002).

Problems with sanitation are strongly related to water supply issues, since the traditional flush toilets are using a large amount of water. Küng (2008: 27) shows that conventional sanitation systems, based on flush toilets and centralised waste water treatment, are historically designed for conditions in moderate climates. The high water consumption of these techniques makes them unsuitable for dry environments. India, although very diverse in landscape, does face a water scarcity problem. As shown in figure 1.1, large parts of India are suffering from physical water scarcity or are approaching this situation. Other parts of India show to be in the state of economic water scarcity meaning that human, institutional and financial capital limit access to water even though natural water is locally available to meet human demands.

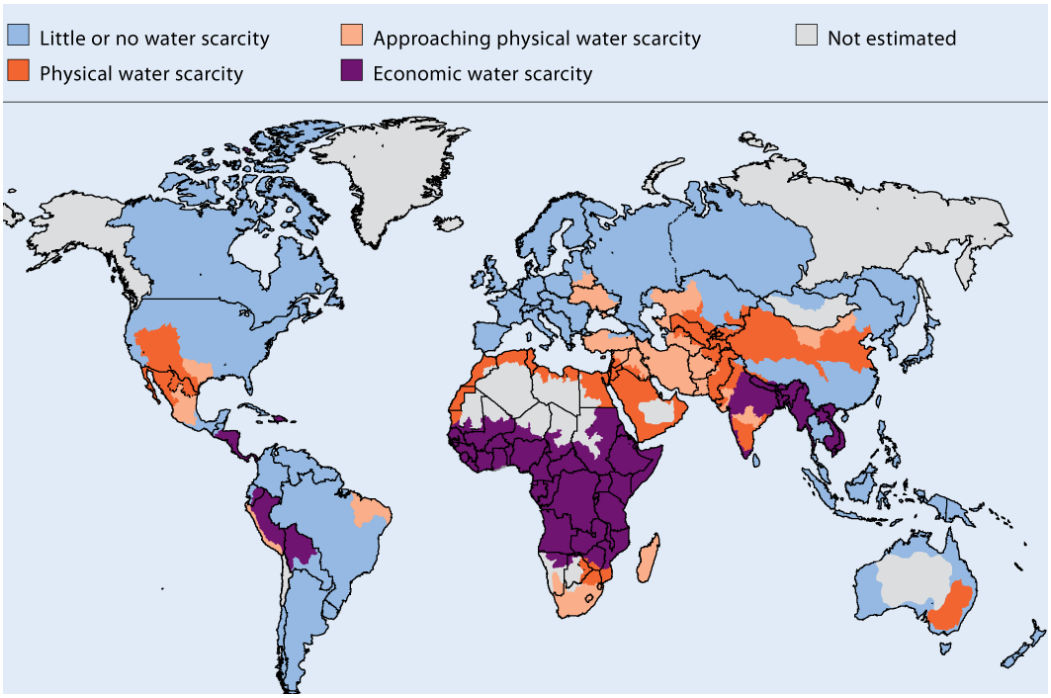

Figure 1.1 Global picture of water scarcity (http://maps.grida.no)

This picture does, however not state that dry areas are automatically water scarce by climate conditions only, since water availability has been related to the water demand. Water scarcity is in fact not only a matter of pure physical availability, but also of human choices and thereby related to human demand (Rijbersman, 2005). Besides, when discussing the Indian economic and social-cultural context, the Indian industry has shown rapid growth, together with increased urbanization and population growth. These processes have been the cause for the increase of water demand, the decrease of the per capita water availability (PCGI, 2002: 8) and pressure on the local water bodies (see figure 1). Therefore, water scarcity, although partly related to human demand, provides an important basis to step away from conventional water systems.

The necessity of improving the sanitation situation is shown by the Planning Commission Government of India, which states that barely 30 % of wastewater in the metropolitan cities of India is treated before disposal. A practice that causes serious water pollution when the water finds its way into water systems such as rivers, lakes, groundwater and coastal waters (PCGI, 2002: 9). Simultaneously, the overloaded and imperfect functioning of many present wastewater treatment systems, especially during rain seasons, causes conventional water

sanitation to be an inappropriate solution for the lack of sanitation in divergent contexts (Küng, 2008: 27). Other shortcomings of the conventional system are its high investment and maintenance costs (Hegger et al. 2010; 736), the high use of chemicals and energy during the treatment process (Schertenleiber, 2005: 7; van Vliet, 2006: 338) and the mixture of faecal material with large amounts of water, making the treatment inefficient (Hegger et al, 2010: 736) by increasing the problem of mixing potentially harmful material with large amounts of water (Langergraber & Muellegger, 2005: 435). Also, human waste which contains valuable nutrients are now treated as waste instead of using them as a valuable resource (Hegger et al, 2010: 736 & Schertenleiber, 2005: 7). The magnitude of the system with the extensive sewer lines makes the system vulnerable to variations in rainfall and water flow (Howard & Bartram, 2010).

There are various different models in India which are used in addition to the conventional flush system. Often seen examples are the pit latrine, the septic tank and the dry toilet. However, several problems can be observed with these techniques as well. Pit latrines are, for example, often a cause of contamination of the groundwater as they are used too intensively or left abandoned after being full. Sceptic tanks are, moreover, often not emptied properly which is similarly seen with dry toilets. It is a common practice that the sludge of the sceptic tanks is dumped into the river. Dry toilets, moreover, are often emptied by manual scavengers, belonging to the lowest caste, the untouchables, using their bare hands (Enssle, 2010: 5-6). The different techniques described here have been subjected to too many bad practices and can therefore not be considered as a sustainable solution to the sanitation problem. In the next paragraph some more sustainable techniques will be explored.

1.2.2. The ecological solution

Ecological sanitation is taking a different position as compared to conventional systems. Instead of making use of the so-called 'flush and forget' systems, based on large sewer systems and centralised treatment with no involvement of the user, ecological sanitation is based upon an idea that can be explained as a closed loop system. This is a system where water is reused and nutrients are recovered by, for example, separating urine from the faeces. Ecological sanitation operates on a small scale and requires by its decentralised character a higher level of involvement, or even the co-management, of the toilet user. Government or other water bodies, now often responsible for the treatment of human waste, will be replaced by individuals or new intermediaries (van Vliet, 2006). An explanation of the different techniques will be given in this section, to make the reader familiar with the topic. At this stage, however, it has to be noticed that projects that are too much technology-driven and do not focus on the broader sustainability picture, have not always proven to be successful (van Vliet, 2006). Therefore, the techniques here presented need to be seen as examples. Once implementing, the main focus should be on the improvement of services for human beings instead of a one sided focus on implementing certain techniques.

A few examples of ecosan techniques are: Urine Diversion Dehydration Toilets (UDDTs), vacuum toilets (Ennsle, 2010: 8), waterless urinals and flush toilets connected to decentralised treatment systems (for a complete overview, C: www.sswm.info). The focus in this research will be on two different techniques, which are applicable in different

geographical and demographic situations. One will be the urine diversion dehydration toilets, as it is, although in slightly varying forms, the most widely spread ecological toilet in India (Enssle, 2010: 5-6). This technique is most frequently used in rural settings. The other ecological sanitation technique described here will be the flush toilet or the waterless urinal connected to a decentralised treatment system, which is often more appropriate in the urban context.

The urine diversion dehydration toilet (UDDT) is a technique which is built above the ground, without pipes or pits. It stores faecal matter which, when mixed with sand, ash or saw dust in several stages, can be used as a soil fertilizer after one year. Urine is collected separately from the faeces and can be used as a fertilizer after 6 months storage in a separate sealed container by which time most germs will be gone (Enssle, 2010: 10). An example of a UDDT is displayed in figure 1.2. The toilet visit looks different from that of a flush toilet, as the urine and faeces separation has to be done by the user and water cannot be mixed with the urine and faeces in order to prevent smell. Washing purposes, thereby, have to be separated and cannot take place within the same jar. This can form a barrier for the Indians, taken that they are typically washers, instead of wipers (Kumar, 2011, personal communication) and therefore have to actively adapt their toilet visit to the separation of water which cannot come into the faecal chamber or urine jar.

The higher level of the toilet decreases the likelihood of soil contamination, even during heavy rainfall. Other advantages of the toilet are the use of faecal matter as a fertilizer and the reduced use of water. A conventional toilet or a septic tank needs 5 to 12 litre per use, while the UDDT requires only 3-4 litre. The difference in water usage emerges whereas the UDDT does not need to be flushed and water is only used for hand washing and anal cleansing, when a water connection is available (Enssle, 2010: 11). The UDDT shows to be one of the most sustainable sanitation services from a resource point of view. If the technique, however, is sustainable from a financial and social point of view is a question that needs further consideration. For now it is important to notice that some critical points can be made about the UDDT from a technical point of view. To be fully composted free of germs and parasites, the faecal material needs to reach a certain temperature in the UDDT. This is however often not reached, due to composting processes (Baretto-Dillon, 2011: ecosan expert course) so the faecal material will not always be parasite free.

Image 1.1, example of an ecosan toilet in the rural area of Tamil Nadu

The other technique described in this research, the Decentralised Wastewater Treatment System (DTS), is more suitable in the urban context. The UDDT takes the reuse of faecal material and urine as a fertilizer as a main goal. The reuse of human waste as a fertilizer is useful for farmers who own some land where they can install the toilet and actively use the resource as a substitution for the now often used artificial fertilizers, decreasing their expenses. The DTS technique, however, seems to be problematic for the urban context, where the density of people is much greater and a great amount of the inhabitants live in multi-storey buildings where the installation of UDDTs will be unfeasible. Moreover, there would be a lack of land where the fertilizers could be used (Panse, 2011, personal communication). This issue could potentially be solved by transporting the fertilizers to farmer lands in the nearby rural area. This solution, however, that would cause infrastructural problems (Wafler, 2011, personal communication). Infrastructural problems will especially be big, when the human waste is not collected in a centralised point, but is divided by many households in densely populated areas. For these reasons, a new technique is required for implementation in this different geographical context. The DTS can provide a solution for the urban context. A decentralised wastewater treatment system stands for an onsite treatment of the wastewater with a wastewater plant. When the circumstances are appropriate, the system makes use of gravity and does not depend on energy. In Image 1.2. an example of a DTS is displayed. This DTS is connected to flush toilets in a school sanitation block.

Image 1.2. Example of a DTS in Badlapur

This way of waste water treatment uses anaerobic treatment. The process taking place, the anaerobic digestion, is "*the degradation of organic material by microbial activity in the absence of air transforming it into* biomass *and* biogas*, a mixture of methane (CH_4), carbon dioxide (CO_2)*" (D:www.sswm.info). The advantage of the use of this technique is the generation of biogas, which can be used as a green form of energy used for electricity or cooking and the transformation of organic waste into high quality fertilizers (D: www.sswm.info). In the whole process almost no nutrients are getting lost. Also, when treatment is done properly, the water used for flushing the toilets and washing hands can be used for watering plants and similar purposes and is therefore not completely wasted as a resource (Wafler, 2011, personal communication). When using onsite treatment the expenses are much lower compared to centralised systems. Waffler explains that: "*In general 70 to 80 % of the money is invested in a sewerage (…) and 20 to 30 % in the treatment plant itself, (…). Especially when side conditions are unfavourable and you frequently have to lift the water, using a pumping station. The faster you can reach the sewer*

system the less chance of leakage and the less costs involved" (2011, personal communication). Problems with the DTS technique are the high level of complexity of the process, requiring often also experts for maintenance, the long start up of the process due to seeding of bacteria, de temperature dependency and the sometimes required further treatment of the sludge (D: www.sswm.info). The high quality fertilizers in the form of sludge also need some form of transportation when not used in the surrounding greenery of the area. Although the resources are more centralised then with a UDDT, where toilets are not connected to a system but resources stay in separated toilets, some infrastructure is also required to get the resources at the required place.

These two different techniques have shown to be an interesting solution for the challenging issues coming from conventional toilet systems. Technical solutions are available and could provide a solution as a new, ecologically sound, form of sanitation. Issues with these new techniques are still present. The social reality is not always considered when speaking of these techniques, even though ecological sanitation requires a completely different social organisation of sanitation systems in comparison to conventional systems (van Vliet, 2006). When taking the technique on to the Indian context, where many people live in harsh circumstances, many issues are rising. This idea is supported by Hegger et al. who state that "*Despite the increasing recognition of the social domain in sustainable technology development, engineers still dominate the discussion*" (2007:731). Therefore, the social dimension will be central in this research.

1.3. Scientific gap & research objective

Ecological sanitation proves to be a sustainable practice, by using less water than traditional sanitation services. However, research in this field lags behind. A search on the website Scopus (www.scopus.com), one of the largest scientific databases on scientific articles, shows that the keyword 'ecological sanitation' provides 82 articles and the term 'sustainable sanitation' appears in 51 articles. There is a great difference when using the term sanitation in the database, which gives a total number of 22.437 hits. Moreover, most of the 133 articles address the technical and ecological aspects of the new sanitation forms. How to set up a successful ecosan project in the social reality is, however, barely discussed. This supports the idea that when discussing ecological sanitation engineers still dominate the sanitation discussion and more research on the social part of the technology is desired.

The scientific community is not the only party that has not fully discovered the importance of ecological sanitation yet. Enssle shows that despite the consensus in the WHO and Unicef that ecological sanitation is an improved sanitation facility, less sustainable techniques such as the pit latrine and the septic tank, are too accepted and are falling under the category 'improved sanitation' (2010:9). These techniques -which differ in complexity and water use (Kühn, 2008: VIII) – are both using underground storage. As explained before, both toilets are carrying a high risk of groundwater pollution (Kühn, 2008: 46). When the pit latrine and the septic tank are used intensively they require removal when the tanks are full. A task which endangers human health and the environment when not done in a proper way – a practice of improper management that is common in the developmental context (Enssle, 2010: 9). Moreover, ecological sanitation is not always promoted as such, as the focus of the big agencies is more on sanitation as an overarching practice (Ennssle, 2010: 9; e.g. WHO &

Unicef, 2009; B: www.undp.org). Since there is a lack of knowledge within the scientific community and little attention on ecological sanitation by the large international NGOs provides, there is a need for further research.

This thesis, as a start, aims to contribute in building a bridge between different theoretical foundations, which will be explained in detail in the following chapters. These are the capacity approach and the capability theory in order to see how ecological sanitation can be made to a success. Four master students from the University of Basel, all enrolled in the 'Sustainable Development' programme, have done research on the capability approach in relation to the idea of sustainable development (Ennsle,2010; Kühn, 2008; Lienert, 2011; Messmer, 2011). They used the capability approach to show how ecological sanitation addresses human capabilities and improves quality of life. In this way, they contributed to scientific research on ecological sanitation, where research on the social and policy aspects is lacking behind. In this thesis I will add the capacity development concept in order to see how these capabilities, translated to an empirical reality, can actually be developed in an institutional and organisational environment. A combination between capacities and capabilities, will form the basis for this task. Something which does not come back in the international scientific literature. Although, Lienert (2011) did show interest in the institutional environment, but this was less from a capacity and more from a governance point of view. New insights are necessary on how capacities can be developed in order to build up different successfully ecological sanitation projects.

Moreover, the assessment of NGO-policy, the more practical focus of this thesis, deserves some more attention. Whereas in business literature the success of an organisation can be assessed by looking at the profit it makes, NGOs promote vague and non-quantifiable objectives whose success is harder to measure (Chanrith, 2010: 237). It is therefore necessary to pay more attention to the nongovernmental sector, which is the field in which ecological sanitation is usually developed these days, which had less scientific attention when compared to the business literature. As Chanrith states, *"It is widely accepted that the non-profit sector has not yet developed its own theoretical framework of management*" (2010: 237). This thesis aims at contributing in altering this situation. The focus on an NGO as an active actor also fits into the new and upcoming ideas about environmental governance, where the exclusive role for the government as a manager of environmental problems, is shifting to one where a broad scope of actors are involved in a co-operative process of developing and carrying out solutions to the corresponding problems (see e.g. Glasbergen, 1998). The objective of this thesis is therefore to provide some categories which are serving successful NGO strategies within the ecological sanitation field and to analyse the field within which an NGO is developing its policy.

This research will be in line with one of the main objectives of the Copernicus institute, which states that: *"We are interested in the 'what, why, how and when' of efforts meant to bring about sustainable development"* (Copernicus institute, 2009: 18). This research will address the, what (ecological sanitation), why (capabilities) and how (capacities) to come to a sustainable practice. Moreover, different actors besides state intervention that are involved in the process of capacity building (e.g. NGOs, local participants) will be researched. This is in accordance with the governance focus of the research programme (Copernicus institute, 2009).

1.4. Research question

It has been decided to research a specific organisation, the Ecosan Services Foundation (ESF), for this thesis. This organisation provides training programmes, which have the objective to increase the amount of projects implemented on the ground by educating the course participants and stimulate them to pursue with the topic individually. The following research question has been formulated:

Which capacities are present in India and how successfully is ESF in developing these with their training programme to increase the amount of successfully implemented projects?

In order to answer the main research question a division into the following sub-questions is made. They will step by step describe how they will answer the main research question:

1. *What is a successful sanitation project?*
   A first step in answering the research question, while successful sanitation projects are the desired outcome of the training programme and within this programme the new experts need to learn how to come to sound ecological sanitation projects. Therefore the training needs to address the issues that are related to a successful sanitation project. To answer this question, a literature review will form the basis of chapter 2, with a special focus on the four different theses that were written at the University of Basel. These theses have built a bridge between the capability and sustainability theories, claiming that a successful sanitation project needs to enrich people's abilities to make choices in their life (capabilities) and needs to be environmentally sound (sustainability). It is not within the scope of this thesis to assess the projects by a full sustainability assessment framework of ecological sanitation practices. It is however considered necessary to develop an idea upon which projects and training needs to be based to be as inclusive as possible. When addressing the several sustainability issues and capabilities the content of the training can be called successful.
2. *Which capacities contribute to a sustainable practice?*
   In the third chapter, it is explained that several capacities contribute to implementing a successful, sustainable project which meets human capabilities. Capacities that partly need to be present in ESF and in the institutional environment to enable starting up an ecosan project and which subsequently need to be transferred or at least made familiar to the course participants to help them during the project implementation process. Since the main tool for capacity development in ESF is the training programme it is also discussed how a training programme can be assessed and when this can be considered a successful capacity response. Capacities are also there to overcome several barriers to come to successful implementation, which will too be discussed in this chapter. A literature review will form the basis for answering this question. Different capacities are identified which will be taken on to the next question, to form the basic reference for the case study. In the end a comparison can be made of the capacities identified in the theory and the ones found in the empirical reality. It will also form the basic reference upon which strengths and weaknesses in the capacity development programme of ESF will be assessed. It is here claimed that

when addressing the capacities in a right way, the chance on successful project implementation will be increased.

3. *What is the state of capacities in relation to ecosan in India and how successful is ESF in developing these?*
   This question will be assessed in chapter 6, which will be explained in detail in the next section. All answers to the last three research questions have been adopted in the questionnaires, while they form the basic framework within the further research takes place. It will be evaluated, if ESF is successful in addressing the right capabilities, developing the right capacities in order to reach successful project implementation by the former participants. Also, the state of capacities in India, in relation to ecosan, is addressed in this section to see where they are enabling and where they cause barriers to a flourishing ecosan practice.

The different steps in the research are visualised in figure 1.1.

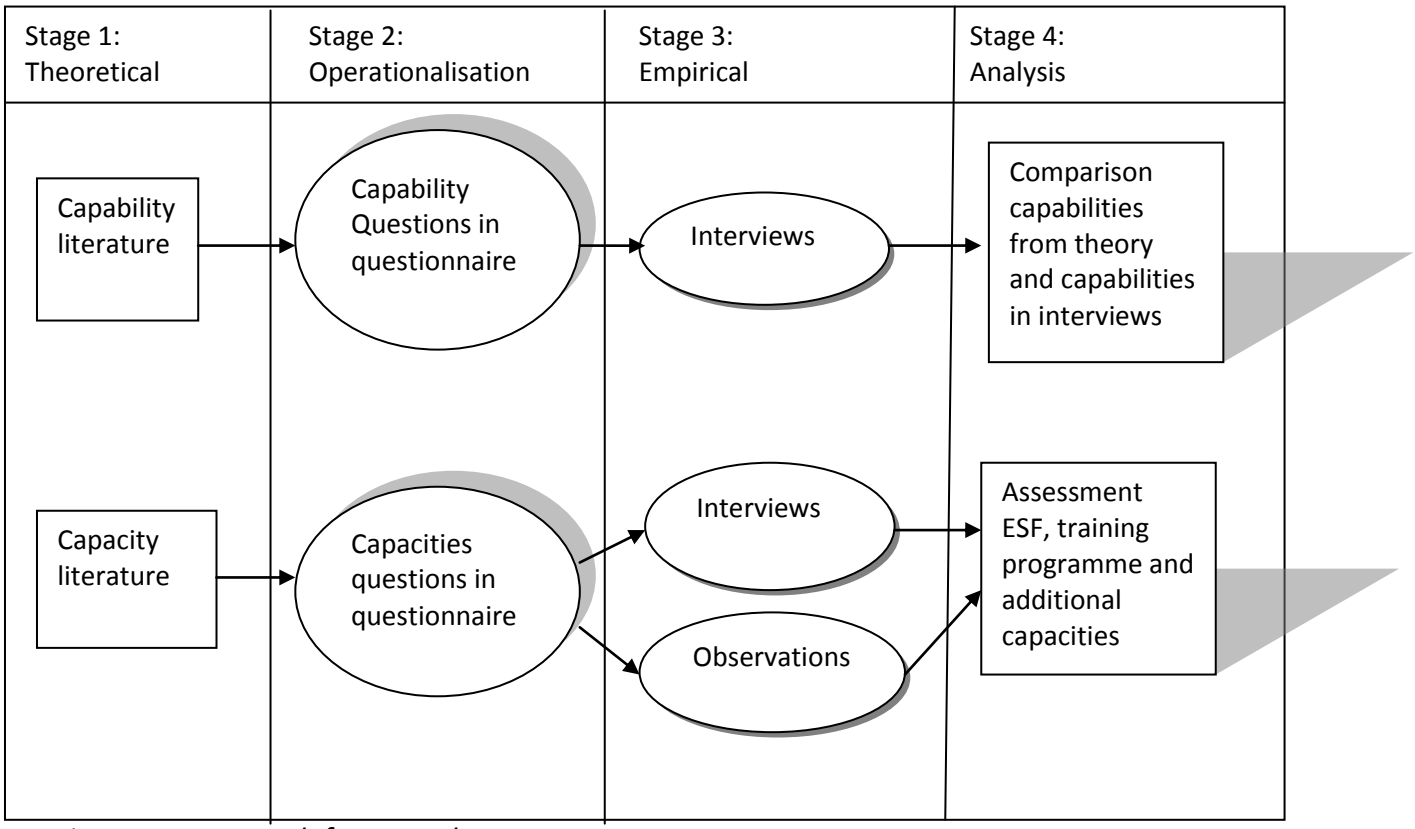

Figure 1.1. Research framework.

The capability and capacity literature lead to several questions that are included in the questionnaires. These form the basis for the interviews and additionally the observation scheme. The interviews will be analysed and it is considered whether the capabilities from the theory and the capabilities defined in the interviews overlap. Additionally it is evaluated whether the training programme is successful and if capacities are developed to increase the amount of implementation of projects. It is, moreover, assessed what the state of several additional capacities is.

1.5. Research methods

1.5.1. ESF: a case study

It has been decided to conduct a case study as this will provide with in-depth insights which are discovered when a case is intensively studied (see e.g. Bryman, 2004: 52). Although some problems with replicability can occur - since conclusions from case studies are hard to generalize - the information that is found will have a reliable and rich character. It is, thereby, not claimed that valid insights on capacity building in ecosan across the state borders of the state of India are given. Also, this research will not be valid for organisations that have different capacity development strategies then the provisioning of training courses.

The choice has been made to research one organisation called the Ecosan Services Foundation (ESF) based in Pune, India. This organisation is chosen as they are a big actor in the field of capacity development and sanitation and with their training programme they have already trained 500 till 600 people (Satish, 2011, personal communication). The organisation is involved in a broad network of several NGOs and has good contacts with (local) governmental officials, making them an interesting research case. Besides, the Ecosan Service Foundation is one of the two only organisations India, member of the international the sustainable sanitation alliance (www.susana.org) that focuses solely on ecological sanitation. As the research is directed towards ecological sanitation, ESF, by having a more specific focus on this topic, was therefore selected for further research.

Since the NGO ESF, as an actor within the sanitation field, claims to develop capacities for ecosan implementation, this thesis will analyse if capacities are actually developed in the training. The training programme will be assessed, based on theoretical foundations that give a guideline in assessing training programmes and it has been researched if the training has led to action in the field.

Another organisation, besides ESF, is involved in this research as well. This is the Swiss consultancy company Seecon which has founded ESF. At the moment they are in a state of independent partners. Seecon and ESF developed an online tool which forms the basis of the training programme, which is in the end carried out by ESF in different parts of India. This training programme, which aims at developing capacities, is usually followed by employees from NGOs, students, governmental officials or members of other organisations that are working in the field, with the main goal of creating a wider base of experts in the field. These experts, further on, will be an enabling factor when launching projects on grassroots level, which normally takes place in collaboration with local initiators. When these local initiators have success, ecological sanitation services will be available for the local population. The actors that are part of active research will be ESF, Seecon and the course participants who form the structural basis on which grassroots projects depend. Within this structure, capacities are tried to be developed by ESF by educating the course participants which, further on need to translate their gained knowledge into practice themselves, or in further developing capacities of local initiators and organisations. The question is now if this training and online tool are developing capacities and if it changes the mindset of the course

participants, as it claims to do. If it does develop capacities, the course participants will be able to develop a successful ecological sanitation project.

A staff member of Seecon explains the main focus of ESF: "*They are mainly active in the area of (…) advocacy, on training, on raising the awareness of the issue*" (Kropac, 2011: personal communication). This vision is confirmed by an employee of ESF, stating that the bottom line of the organisation is training. To have a successful training programme, however, a respondent explains that the support of 'ground realities' is desired. He explains that: "*To make the training more realistic you have to go and make your hands dirty*" (Kumar, 2011: personal communication). A part of the tasks in ESF is hence the development of pilot projects, mainly funded by the German GIZ and the European Union. In order to get the participants for the training programme, ESF is using a network of organisations and other interested and promotes by the sending of emails and an announcement on the website. The organisation offers several trainings, of which 'Basics in ecosan', 'Ecosan expert course', 'sustainable water and wastewater management course' and 'training of the trainers' are the main examples. Course participants, afterwards, are not financially supported when starting up their own projects. Also, participating at the training is only possible when a financial contribution is paid (Patange, 2011: personal communication). The training course is supported by an internet platform on which ESF and Seecon tried to integrate all concepts and technologies used in sustainable sanitation and waste water management (www.sswm.info). The training in the end will in the end lead to on ground implementation by former course participants.

A new wing within the tasks of ESF is focusing on consulting. The goal of this project is to discover if sanitation can a topic for a business platform where profits can be made (Kumar, 2011: personal communication). The organisation declares to work a on the intermediary level, meaning that they are not working on a grassroots level or at the high governmental level (Satish, 2011: personal communication). Instead of lobbying, an employee calls the activities of ESF more on the level of advocacy building (Kumar, 2011, personal communication). All different wings within ESF have one head who are responsible for the own branch. The heads are supported by a small support team and have a few assistants.

1.5.2. Qualitative framework

This research is build upon assumptions that can often be found in qualitative research. At this stage, research on ecological sanitation is still in its preliminary phase. Especially research of ecological sanitation that looks beyond the technical aspects of the concept is still in its infancy. Therefore a more quantitative framework is considered as undesired, while the research field is not fully defined yet and main assumptions are hard to distil and can therefore not be used as a basis for theory testing. This research will have a more exploratory inductive (on induction and deduction, see Bryman, 2004: 8-11) character so that unexpected factors influencing the process of implementing ecosan services can still be found. This does however not mean that the research is fully inductive, as the strategy used to answer the main questions in this research is semi-structured interviews instead of unstructured interviews. Since the research clearly focuses on ecological sanitation and the findings of Enssle (2010), Messmer (2011), Lienert (2011) and Küng (2008) form the basis for the interviews, fully unstructured interviews seemed to be a less successful strategy. Full

induction is also more likely to be useful in a situation where for example broad topics such as culture is researched and a lot of time and resources are available. Therefore this research opts for an in between solution, where openness is saved, but also a certain direction is given. This combination is the basis of semi-structured interviews, which will therefore be the main tool used in this thesis. Observations, moreover, will in addition give insights that are not always provided by interviews. This because information given by respondents is not always consistent with their actual behaviour. In the next sections is explained who is exactly interviewed, and what the main purpose of these interviews is.

1.5.3. Conduction of interviews

- Two interviews were performed at Seecon. One with an expert in engineering land and water management which helped in gaining insights into different ecosan techniques. The other respondent was involved in the knowledge transfer and the training programme and provided a broad picture of Seecon, ecosan and the Indian context.
- In total, eight interviews have been conducted with the staff of ESF which has given a very inclusive picture of the organisation and the training and gave a good insights about ecological sanitation as an technique and its implementation practices. However, some validity issues are present in the case of ESF and Seecon, as the staff is not very likely to take in a critical position against the own organisation.
- Twelve interviews have been conducted and one focus group with eight participants has been taken place. The participants have been interviewed in different parts of India and gave insights about the training, ecological sanitation and project implementation.

Since one of the main tasks is the assessment of the ESF training programme, the organisation is automatically they part of closer scrutiny and interviews with employees are carried out to find out what the strategy of ESF is and how their training and goals of the training looks like and if these are inclusive. Furthermore, an attempt is made to find out what the organisational strengths and weaknesses of ESF are, which can be linked to capacity development. All will later on be compared with findings from interviews with training participants. In addition, the interviews with the staff gave insights in the ecosan techniques and the cultural and institutional Indian context. Taken that Seecon is the founder of ESF and both organisations are still collaborating on a partner basis, it is considered necessary to conduct some semi-structured interviews with employees of Seecon. Seecon also contributed to the online tool which forms the basis for the training programme of ESF (see E:http://www.sswm.info/).

Interviews are conducted with training participants in order to see if capacities are really developed and to find out what these participants have learned from the training course and if this knowledge included several capabilities. It is, furthermore, assessed if this gained knowledge is transferred into action that contributes to sound ecological sanitation projects. A file with contact details of about 35 people was provided by the staff of ESF. Therefore, a random selection method could not be preformed. Because many of these contact details were not up to date, the former course participants that did respond were the ones that were often interviewed. Unfortunately the course participants could, due to time and

planning reasons, not be interviewed before and after the training programme, a common used tool in training evaluation (see Foxon & Lybrand, 1989). Therefore, some validity problems can occur since interviews did only take place within different time frames after the training programme.

Most of the interviews have been recorded. Due to some recording problems, 2 face to face interviews have been written out and worked out the same day. The 2 phone interviews are documented similarly as they were written out during the interview. All interviews have afterwards been analysed with the qualitative data analysis software of Atlas Ti. An overview of all the respondents is given in the table 1.1 in the appendix.

1.5.4. Survey

In order to test the findings coming from the course participants and the staff of ESF and Seecon in the several interviews, a survey has been set up and has been send to course participants which were listed in different databases present in the archive of ESF. Unfortunately, the databases have been very incomplete and incorrect, so that only a few course participants where reached. In the end, ten people have filled in the survey, which does, due to the small number, not give enough scientific basis for any conclusions. The answers given in the survey will therefore only play a minor role in this thesis.

1.5.5. Observations

During the research period, the researcher has been present in the office of ESF and has followed a training course. Here a logbook for observation has been used. These participant observations have provided this research with additional data. Data that gives a more inclusive picture of a situation, since the interviews are taking place in a constructed setting. When observing, data can be found in the natural course of things and can therefore sometimes give very valuable information (see e.g. Bryman, 2004: 214-215).

1.6. Outline

After the introduction that has given insights in the need for ecological sanitation in India and deliberated on some of the technologies that can be used for implementation, the second chapter will examine several theories about capabilities and give a definition of the most important ones in relation to ecological sanitation. In this chapter it will become evident what a successful sanitation project is by the defined ecosan capabilities. These capabilities provide a reference to discuss the inclusiveness of the training programme. The third chapter will discuss theories of capacities and provide an answer to the question “Which capacities contribute to a sustainable practice?” This chapter will provide of capacities within which the case study will be discussed and will show how to assess one of the capacity development tools: the training programme in this case. In this chapter, also some barriers that need to be overcome by capacity development, are examined in this chapter. The following chapter, chapter 4, will integrate both capabilities and capacities as a theoretical direction. In chapter 5, accordingly, the different capabilities within the training, the several capacities in ESF and the broader environment, and the training programme will

be assessed. In the discussion, located in chapter 6, the results will be discussed and solutions will be provided. Everything will be discussed and concluded in chapter 7.

2. What is a successful sanitation project? *Improving sustainability and capabilities*

2.1. Introduction: relevance of capabilities for ecological sanitation

Ecological sanitation is often promoted as an idea that is environmentally sound and improves the health situation of the end users (Lienert, 2011: 17). This did, however, not always prove to be the most successful way of promoting ecosan, since these rational arguments do not automatically lead to the wide embracement and maintenance of ecosan projects (Lienert, 2011: 16-17). Enssle shows that the idea of quality of life, to be assessed within the capability tradition, needs to be incorporated in order to successfully promote ecosan (Enssle, 2010). Only when quality of life is guaranteed and promoted as such, ecological sanitation will be actively embraced and accordingly be socially sustainable. It is therefore stated that a successful ecosan projects is meeting those relevant capabilities of people. The picture that Enssle gives is supported by the findings of Pattanayek et al, who state that *"Attitudes surrounding the importance of privacy and dignity played a key role in influencing household demand for latrines"* (2009: 585). In their study in India they found out that more than 90% of the interviewed were aware that open defecation was a cause of diarrhea, which did not automatically lead to the use or implementation of sanitation, thereby showing the need for different campaigning techniques that involve more social factors. Success of the promotion and implementation of ecosan projects is thereby closely related to the improved capabilities that are associated with social sustainable projects. The question: "What is a successful sanitation project?" can therefore be answered by looking at which relevant capabilities are there when discussing the sustainable solution of ecosan. To understand the important dimensions of quality of life in relation to ecological sanitation, the choice has been made to discuss the capabilities approach, given that it is believed to be the most relevant theory when discussing equality and quality of life. In this chapter the theory, coming from philosopher Sen, will be explained and be placed within the broader philosophical discussion in which the capabilities theory has occurred. A debate that is related to the question: 'equality of what?'. Subsequently, the relevance of the theory for ecosan will be analysed. In the end a capabilities list will be developed which will form a reference to assess the inclusiveness of the training. If the training is inclusive it has to be including most of the capabilities described in this chapter, to give the participants a complete overview of the benefits of the technique and whow them on which aspects they need to stress during the promotion of the technique.

2.2. Developing the capabilities theory

After half a century of developmental approaches Sen developed his own alternative: the capabilities approach. Enssle explains the origins of the capability approach: *"When Sen started to develop the approach in the late 70´s, he found that the GNP per capita of Brazil and Mexico are more than seven times the GNP per capita of India, Sri Lanka and China, the performance in terms of life expectancy, infant mortality and child death were, however, more favourable in Sri Lanka, China and India compared to Brazil and Mexico"* (2010: 24). Differences between countries that did not appear in the old welfare measurements. According to Sen, therefore, GDP cannot be considered as an adequate tool for the

measurement of well-being. His capabilities theory was about to develop a new version on welfare.

But besides promoting the idea of capabilities approach as a more adequate measurement tool, Sen developed his theory in the tradition of the broader philosophical debate considering the 'equality of what?' question. That a certain degree of equality is inextricably connected to sustainable development is described by the Brundtland report, which states that: *"A world in which poverty and inequity are endemic will always be prone to ecological and other crises"* (WCED, 1987: part 4). Environmental degradation is inevitable when poverty leaves people with no alternatives then exploiting the environment (see e.g. WCED, 1987, part 16). What equality should exactly entail is part of a broad discussion. Some authors argue for equality of resources (see Dworkin, 1981), equal opportunity for welfare (see Arneson, 1998), equal access to advantage (see Cohen, 1989) or equality of primary goods (Rawls, 1982). This chapter will only go into some detail with the theory of Rawls, since his theory of primary goods has served as the starting point from which Sen developed his critical answer. Sen, moreover, developed his alternative against the idea of utilitarianism. Utilitarianism can be described in the words of one of the founding fathers Bentham as: "*that property in any object, whereby it tends to produce benefit, advantage, pleasure, good, or happiness (…)or (…) to prevent the happening of mischief, pain, evil, or unhappiness"* (Bentham, 1789: chapter 1). The main objective of utilitarianism is to maximize the sum-total of utility (Sen, 1979: 198) which in other words can be explained as the highest sum of preference satisfaction. The equality concept is incorporated in utilitarianism as each and everyone's interest is treated equally (Sen, 1979: 198). However, the problem is that not every human being has a similar utility function, which leaves space for the unequal treatment of people which are less efficient in converting for example income into utility. According to Sen, the problem of utilitarianism is that it leaves space for providing the cripple man with less income than the healthy man, as the healthy will be more sufficiently transferring the received income in utility. Utilitarianism, hence, neglects the differences between human beings and can therefore not be considered as a sufficient moral theory in a society full with variation (Sen, 1979).

The capabilities approach, moreover, criticised the theory of primary goods from Rawls. Rawls' idea of equality is based upon the right of all people living in a state to own a list of basic primary goods, which he broadly defines as political goods and socio-economic goods (Rawls, 1982). Pure equality on political goods would be the outcome of the process in the original position[1]. A subject of political goods is for example the freedom of association and the freedom to choose one's occupation. On the contrary, when discussing social economic goods, differentiation between people will only be allowed as it serves the society as a whole – the so called difference principle (Rawls, 1982). In other words, differences are only

[1] The original position is the sphere in which the principles of justice are chosen. In this original position, people do not have any knowledge about their personal characteristics so they are free of making a rational choice of justice for the whole society, without the ability of benefitting only the self. Rawls explains the original position as following: *"no one knows his place in society, his class position or social status, nor does anyone know his fortune in the distribution of natural assets and abilities, his intelligence, strength, and the like. I shall even assume that the parties do not know their conceptions of the good or their special psychological propensities. The principles of justice are chosen behind a veil of ignorance"* (1971: 11).

acceptable when they increase the total amount of the pie.[2] This list of primary good is not specified and therefore leaves space for differences in interpretation. Although Rawls presented an interesting theory which meets the idea of a liberal form of equality, Sen criticises Rawls in a similar fashion as he did with utilitarianism. Sen states that the idea of primary goods is not sufficiently addressing the differences between people either. The handicapped, again, will not be served while he needs more social economic goods, in the form of income, to have a similar living standard. Moreover, Sen argues that Rawls focuses too much on goods: "being concerned with goods, and even though the list of goods is specified in a broad and inclusive way, encompassing rights, liberties, opportunities, income, wealth, and the social basis of self-respect, it is still concerned with good things rather than with what these good things do to human beings" (Sen, 1979: 218). According to Sen, we should not focus on the mental reaction to goods since some people might not get a high satisfaction out of some primary goods due to for example religious reasons (Sen, 1979: 218). The focus should therefore be on capabilities, the opportunity for a person to fulfil certain functions he or she highly values. Justice will be reached if all people have access to several basic capabilities which would improve their scope of action (Lienert, 2011: 26). Which kind of functionings a person finally decides to fulfil is a free and personal choice, an idea that makes the capability theory highly individual applicable. It is important to notice the word freedom, since an improved capabilities set can be seen as an improvement in personal freedom (see Sen, 1999). Development should therefore, according to Sen, expand the real freedoms that people enjoy (Sen, 1999: e.g. p. 3).

The capabilities that people have, can be used to reach different functionings. A functioning "*is what a person actually does and experiences, the beings and doings"* (Enssle, 2010: 25). As an example, offering education which contributes in forming people's basic reasoning can be considered a capability. People can use their education or reasoning, however, for different purposes. Maybe they will not use their learned capacities at all, but they have received the possibility to use the knowledge derived in education to give this a personal meaning in their real life functioning. Sen does not provide a list with main capabilities, while he believes this has to be formulated in a deliberative democratic process. *"Sen affirms that theorists cannot "freeze" a list of capabilities valuable for all societies for all time to come without any general social discussion or public reasoning"* (Enssle, 2010: 27).

Although Sen believes that specific capabilities need to be formulated in a public debate, he does give some direction with his so called instrumental freedoms that "*tend to contribute to the general capability of a person to live more freely*" (Sen, 1999: 38). Sen presents five instrumental freedoms: political freedom, economic facilities, social opportunities, transparency guarantees and protective security. Political freedom broadly refers to the freedom of people to determine who should govern them and under which principles. It also leaves space for people to critical assess their governments (Sen, 1999: 38). While economic facilities are explained as the opportunity for people to use their economic resources for the sake of consumption, production or exchange, social opportunities refer to the arrangements in a society for health care, education and likewise facilities. These social opportunities can increase the possibilities for participation in economic and political life (Sen, 1999: 38-39) while for example, a healthy person will be able to be present at his job.

[2] The difference principle would as well be a rational outcome of agents in the original position, as they would not know their position in the real world yet and this would secure them from the highest standard of living.

Transparency guarantees, moreover, deals with the openness an individual can expect from one another. The presumption of transparency is a basis of trust for a society (Sen, 1999: 39). Finally, protective security is explained as a social security net, in the form of jobs or income, that is needed for those destitute groups or minorities in society (Sen, 1999: 39-40). These instrumental freedoms are the means to reach the position of development as human freedom. Besides the instrumental freedoms, Sen refers to substantive freedoms that need to be protected or promoted. These substantive freedoms refer to some elementary capabilities such as being able to avoid starvation, premature mortality, and other main deprivations. They only serve as an end and can as such simply be enlarged (Sen, 1999: 36-39).

With his instrumental and substantive freedoms – although Sen does not state clear categories for the substantive freedoms – Sen somehow gives a direction in which spheres the most crucial capabilities can be found. The main capabilities need to meet some basic human needs (meeting the idea of substantive freedoms) and they should be enabling in the political, economic, social & protective sphere, combined with a level of transparency or trust in society. Although Sen refers to instrumental freedoms, he actually loosely defines some basic capabilities. Mainly also by considering that capabilities are instrumental themselves, since they are presented to individual and can be committed by them to reach several functionings, instrumental freedoms can be seen as synonyms of capabilities. These added by a capabilities that refer to the elementary human needs (such as being able to avoid undernourishment, or being able to read, Sen, 1999: 36) could form a basic list of capabilities. Sen, however, would probably not agree by the claim that he gave a start signal on the definition of main capabilities. His claim is to have developed an open approach which can only be operationalized within the boundaries of a public debate that should be held in different societal contexts (Sen, 2004). As Robeyns and van der Veen state, Sen did not aim to give a specified assessment of quality of life, but he provided *"a general framework that can be used for the conceptualisation of social justice, inequality measurement, the measurement of poverty, development policies, and so forth"* (Robeyns & van der Veen, 2007: 48).

2.3. Operationalizing Sen

There have been attempts to operationalize Sen's capability theory. The United Nations (UN) serves as an example, given that its Human Development Index (HDI) is inspired by the capabilities theory and was developed in collaboration with Sen, who helped setting up the measurement tools (Fukuda-Parr, 2003). With the HDI, the current state of development of countries is assessed by their current state of development by measuring their income, education and life expectancy. Here, income, education and life expectancy somehow represent basic 'capabilities'. Besides the measurement and comparing tools of the UN, a philosophical answer to the operationalization issue is developed by Nussbaum (2003). She created a list with the ten main capabilities, which for example keeps the capabilities of bodily integrity, play (being able to laugh, to play, to enjoy recreational activities) and control over one's environment (in a political and material fashion) (Nussbaum, 2003: 41-

42).[3] Albeit she also claims neutrality despite what she calls the moral character of the list, this thesis claims that she takes up a position and proposes an idea of the good life by defining the most central capabilities for human beings. She defines what is fundamental and takes up a moral position in this tradition. She shows, without her own intention, that Sen is only useful when taking a position in what are the main important capabilities. This does however not mean that Sen, or operationalized by Nussbaum, does not provide freedoms. Every individual still has the possibility of refusing to make a functioning out of his or her capability. In this case freedom to refuse is desirable. However, the state, or the other actors within ideas of environmental governance are not neutral facilitators, since they do need to make a moral choice which capabilities to provide. They have to take a position in order to prevent the undesired practices of for example female circumcision since they believe freedom on these topics is undesirable. A state could choose to use Nussbaum's basic capabilities list, a useful start from which policies can be developed. Moving away from the idea of a facilitator of capabilities, the capability approach, as a theory itself, needs to show the direction in which spheres to look at when researching issues concerning quality of life. This is also the case for ecological sanitation services. When one wants to research the improved capabilities by sanitation projects, one first needs to define what these central capabilities related to ecosan are. This can be accomplished by participation approaches. Claiming full neutrality, when defining these capabilities within such an approach, would however not be appropriate. This while ecosan is already considered as a desired practice which needs to be promoted under people. The next section will show how Enssle (2010) developed an ecosan-related capabilities list, within this idea that operationalisation is desired.

2.4. Operationalizing capabilities for ecosan

The capabilities approach traditionally never really focussed on sustainability issues. Nussbaum does refer to nature in her list of capabilities where one capability is framed as 'Other species'. She explains: *"Being able to live with concern for and in relation to animals, plants, and the world of nature"* (Nussbaum, 2000: 78-80). This statement is, however, not a complete idea of sustainability while it does not refer to sustainable constraints. Even if Nussbaum would expand the list with for example the capability of appreciation for the environment, or an expansion which includes non-human beings, these constraints will still not be included. This because capabilities as a theory comes from a moral point of view and leaves descriptive parts as environmental constrains (although these are either not completely free of moral considerations) out of concern. However, to be functional in reality, one need to bridge these moral ideas with the more descriptive parts of the environment and the society. As Enssle states in her thesis*: "Capabilities and sustainability cannot be*

[3] The full list of basic capabilities consists out of:

1. *Life.*
2. *Bodily Health.*
3. *Bodily Integrity.*
4. *Senses, Imagination, and Thought.*
5. *Emotions.*
6. *Practical Reason.*
7. *Affiliation*
8. *Other species*
9. *Play*
10. *Control over one's environment*

considered independently, since life quality and according valuable functionings strongly depend on the availability of natural resources, even more in the context of developing countries" (2010: 33). Capabilities should, therefore, take the environmental boundaries into consideration, while valuable conditions for human beings are dependent on them. On the other hand, the capabilities approach can answer the question: "what to be sustained" by stating that any generation or present existing human being should be able to fulfil his basic capabilities. Within these arguments, ecological sanitation can provide an interesting case where both capabilities are improved and also environmental constraints are integrated. A task accomplished by Ensssle (2010) & Messmer (2011).

Enssle (2010), after research in Tamil Nadu, the south of India, came up with and extensive lists of functionings and capabilities of which some are more related to the overall concept of sanitation, while others are specifically applicable to ecological sanitation. They are displayed in table 2.1.

Motivating Drive → Valuable Functioning	Capabilities
• Being healthy • Having hygienic sanitation conditions	To be able to use a hygienic toilet To be able not to be disgusted while defecating (bad odor)
• Feeling clean	Being able to wash oneself after defecating (anal cleansing and hand washing)
• Having freedom of mind (not to be under pressure, no need to plan when to defecate, not to be afraid)	To be able to defecate at any time To be able to use a toilet immediately when necessary To be able to plan daily life independent from defecation To be able not to have to keep the body under control To be able to be without fear when defecating To be able to be without fear when going to defecate To be able not to consider defecating as a burden To be able to be without psychological pressure when defecating
• Protecting family health • Being secure o Being secure when becoming pubescent o Having security as a woman	To be able to protect the health of own children (educate them early to use a toilet -> hygiene advantages) To be able to be secure when becoming adolescent (men do not see young girls defecating) To be able to be secure as a women To be able to be secure when defecating To be able to be secure when going to defecate
• Bodily integrity • Having dignity	To be able to have private sphere To be able to deal with and not to hide puberty To be able to keep female pride (men do not see women defecating) To be able to keep dignity To be able to go without shame
• Having visual & social privacy	To be able to have a private sphere
• Having (more) convenience & comfort in the daily life	To be able to use a toilet at any time To be able to use a toilet close-by To be able to be covered when there is need to Not to be disgusted daily while defecating (open defecation sites) To be able not to consider defecating as a burden
• Having more time available for oneself	To be able not to waste time with defecation act
• Women having equal rights as men	To be able as a woman to have the same possibilities as men to satisfy human needs
• Being a good housewife • Having more convenience in daily female life	To be able to stay at home to fulfill a housewives' duties To be able to plan daily life independent from defecation
• Having social pride & status • Affiliation to modern society • Not belonging to the `poor´ • Having social progress • Expressing a new lifestyle • Improving civilization • Social independence	To be able to belong to or affiliate oneself with a subjective "higher social class" To be able to make social advancements To be able to "elevate" up from poverty To be able to go "with the time" To be able to improve civilization To be able to be independent from neighbors
• Being infrastructurally independent from others (sewage firms, state) • Being self-determinated	To be able to maintain and run the toilet on her/ his own -> self-determination To be able to have a household toilet without being connected to a household water tap or a drainage system

• Having financial independence in the long run (no expenses for water, sewage firm, maintenance, no financial help from NGOs) • Less fertilizer expenses	To be able to *have* a toilet with one investment To be able to *use* a toilet without any further investments in the long run To be able to produce own fertilizer
• Living in a clean environment • Being and feeling responsible for the environment • Being healthy	To be able to live in a clean environment To be able not to get sick from the environment To be able to influence the state of the environment (no sludge but compost, little water use, no groundwater contamination)
• Saving water • Saving time	To be able to preserve the environment To be able to use little water for sanitation purposes To be able to spend less time on collecting water

Table 2.1., Drivers (derived by possible functionings) and capabilities for ecosan (Enssle, 2010: 57-58)

Basis for her reasoning is that the main functionings (what people in real life can actually do or achieve) are a main driver of the desire of people to have access to ecosan. Messmer, who preformed a similar research in Nepal, added two categories. "*These drivers are "to be able not to worry/ having peace in mind" or "to be able to protect oneself from external influences" because people no longer need to defecate in the jungle where they are exposed to rain and animals.* (…). Moreover "*to be able to live together more peacefully"* could be identified as someone stated that since the village is open defecation free there are no longer quarrels about open defecation" (Messmer, 2011: 52). Drivers are used as a synonym of a functioning. Messmer found that the environmental drivers or functionings where less important in the case study she visited. When the environment was discussed it was more considered as the environment of the house instead of the more broad concepts used in sustainability science. She states that this can be assigned to the fact that during the awareness raising in the Nepalese village, no attention has been paid to environmental awareness, while the villagers where considered 'uneducated' (Messmer, 2011: 57).

Messmer and Enssle's list on capabilities, form a solid basis by presenting the main capabilities in relation to (ecological) sanitation. These capabilities can also, later on, be the basis for the evaluation of project success, while a successful sanitation project will address the full capability list. A main lesson learned from the capabilities approach is that it shows how ecosan can improve quality of life and how the practice should be promoted in this tradition. When developing capacities it is therefore important that most of these issues will be addressed in the training given by ESF so that they teach how to set up environmentally and socially sustainable projects, which address all aspects of quality of life. This will also contribute to the promotion of the techniques to the local population, since, as said before, health and environmental issues solely do not automatically lead to the embracement of the technique.

2.5. Conclusion

In this chapter the question: "what is a successful sanitation project?" has been answered. A successful sanitation project is meeting the relevant capabilities, as defined by Enssle (2010) and Messmer (2011). These capabilities, the opportunity for a person to fulfil certain functions he or she highly values, are highly relevant to reach levels of equality serving sustainable development. Within these defined capabilities there are many that are referring

to environmental issues, ensuring environmental concern, as well as to social and economic factors. While these capabilities are leading to improved quality of life for people, they need to be ensured when starting sanitation projects. Taking this a step further, they are necessary for project success, as ecological sanitation will only be fully socially accepted and thereby maintained once people understand the benefits of sanitation that are related to all these different factors. The single focus on health, which is nowadays often the occasion, will not lead to successful sanitation projects, but a broader picture needs to be drafted for the final end users. In the training programme of ESF, these several capabilities, will therefore need to be addressed.

3. Which capacities contribute to a sustainable practice? *Defining the crucial capacities*

3.1. Introduction

In the former parts the capabilities approach has been explained and the focus has been on the useful contribution the theory has in showing the impact of ecological sanitation on the lives of individuals. Thereby integrating environmental constraints within the capabilities approach. One issue, however, is still present. This is the operationalisation of the practice, so that all these aspects of quality of life can truly be developed. Although the capability theory provides a good basis for a theory of justice, it does not speak about the social cultural environment within which these capabilities should be developed. A solution is to integrate ideas of capacity with those of capabilities. In this chapter it will be analysed which capacities are necessary for a flourishing sustainable practice, in this case ecological sanitation, and how these capacities can be developed. To perform this task, the relevant scientific literature is explored.

3.2. Institutional focus

A first example of operationalisation of the capabilities theory comes from Lienert (2011) who developed his approach of structural capabilities. These structural capabilities are the ones he believes to actively influence the implementation process of ecosan. Although the term structural capability is not embraced in this thesis, it is however agreed that social and institutional circumstances greatly influence the development of capabilities and Lienert gave an interesting view on these. He developed a list of influencing factors in the process which is displayed in table 2.2.

Criteria	*Subcriteria*
Actors and Roles	Clearly defined roles
	Clearly defined responsibilities
	→ Monitoring on the lowest level
	→ Troubleshooting on the lowest level
Devolution of Power	Decentralisation
	Institutional capacity building
	Arrangement of sufficient means
Interplay and scale	Multi-level interaction →Providing linkages between cross-level and inter-scale stakeholders
	Responsiveness to other actors
	Open communication channels
	Bridging organisations
Social Learning	Activation of non-state actors
	Empowerment
	'Holistic' development
Knowledge	Awareness
	Capacity development
	Knowledge generation

Table 3.1. Structural aspects influencing ecosan practices (Lienert, 2011: 90)

Lienert has developed some interesting categories within one can see which factors influence a process of implementing ecological sanitation. He based his categories on theories of governance. The focus of this thesis will move in a more specific direction and will focus on the ideas of capacity development, which is defined broader than the definition of Lienert who mainly relates capacity development to knowledge development. This is a choice made, while it is believed that capacity development is a theoretical foundation that leaves more space for knowledge about the active development of capacities of people and organisations. Theories of governance are seen to be sometimes more broad and static and thereby less focussed on the active development in relation to a sustainability topic.

3.3. Defining capacity development

Capacity development is a nowadays a broadly used term in development research and by several developmental agencies (Lusthaus et al. 1999; Sagar 2000; Potter & Brough 2004). The concept shifted from the idea of capacity building to capacity development, since the former suggested a process coming from a status quo where capacities were absent, followed by the stage to stage development of a newly implemented capacity structure. With this static idea of development, the implemented practices did often not meet the social reality in the country of implementation. The concept of development provides a

broader focus where empowerment can take place within the specific cultural context (Van Loon et al. 2010, 101-102).

When defining capacity development, many difficulties are encountered. These are issues that are related to the broad and diverse definitions of the concept given in the scientific and semi-scientific literature. The differences in definition are related to the main focus of the used development practice, which can be divided in four directions: the organisational approach, the institutional approach, the system approach and the participatory approach (for a full explanation see Lusthaus et al. 1999: 10). Consensus, however, seems to exist about the main aim of those involved in research on the field of capacity development: trying to understand and predict change (Lusthaus et al. 1999: 10). In the end, development practices try to involve into the status quo and subsequently aim to change certain practices. Agreement, moreover, can be found in many definitions which show that *"capacity development involves long term and contributes to sustainable, social and economic development and is demand driven*" (Lusthaus et al. 1999: 5).

A strict division of the approaches used above can be considered unnecessary, since change can occur on different integrating levels (organisational, institutional or system) and can be participatory at the same time. For a development practice to be fully successful, all different societal layers need to be addressed. Something that can be visualised in the schematic overview of Potter & Brough (2004: 340) in figure 3.1. Different levels in the figure need to be addressed when developing capacities. The more deeper layers in the figure, consisting out of cultural characteristics and societal structures, are harder to change and implementation of changes on this level are taking more time. The arrows show that the lower conditions influence the higher ones, reflecting the enabling of an effective change from the lower to the upper condition. On the other hand, the upper conditions, require the lower ones: for instance, tools require skills. This schedule does not present any hierarchy of importance and gives no advice about the need to prioritise certain factors. Instead, the figure gives a reflexion on the complexity of capacity development, that needs to take place on all different levels.

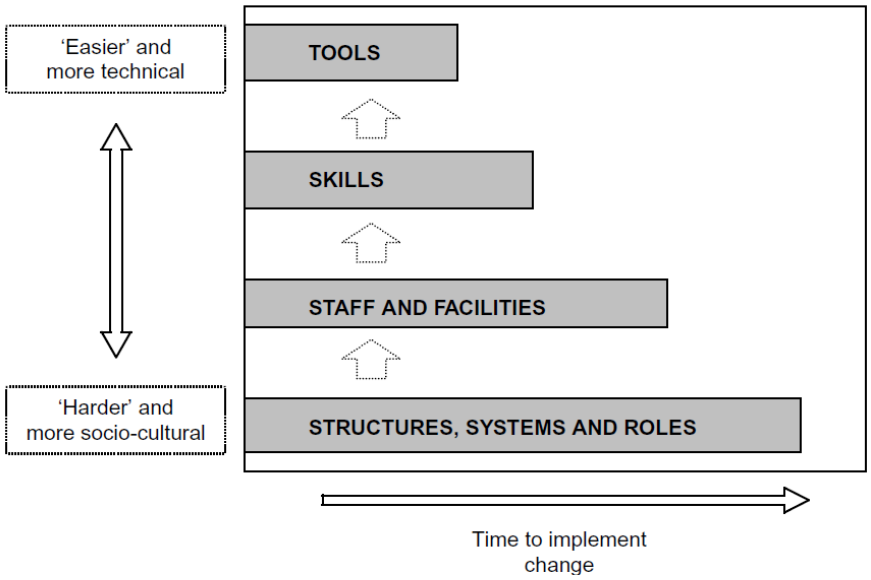

Figure 3.2. Layers to be addressed when developing capacities (Potter & Brough, 2004: 340)

Although Potter & Brough are officially addressing systematic capacity building, they give a good overview on how capacities need to be seen in relation to different layers in social reality. This broader definition of capacities can be found in Miranda as well, as she refers to capacity building as a way to "*to create an organisational, procedural, and moral framework that allows the parties to move forward on issues of sustainability"* (Miranda, 2003: 30). One should, nevertheless, be able to describe when capacity development takes place and when not, to make the broad concept of any use. Further on in this section I will therefore discuss the operationalization of the concept. Miranda, moreover, refers to a publication by the Organisation for Economic Co-operation and Development (OECD) which states that new challenges, broadly supported by a society, have been growing faster than the institutional capacities to solve them (OECD, 1994: 11). Although the OECD definition is more of the institutional approach, it is interesting to notice that capacities are considered necessary when speaking about solving problems. Something that seems to be under consensus. Further, increased capacity are often described as desirable in order to completely tackle a specific problem.

Capacity development is often seen as an umbrella concept for development work. For example, sustainable development and integrated rural development are considered as part of the broader idea of capacity development (Lusthaus et al. 1999: 2). This can be useful for this thesis, as it aims to show how ecological sanitation as an environmentally sustainable practice can be performed by the improving of capacities. Capacity development does not have to be limited to environmental topics, as explained by Jänicke, although he does state that environmental policy is most prominent in the debate on the limits of governmental interference (Luhmann 1990 in Jänicke 1997: 1).

Since the industrial countries have a stronger tradition in effective governance (including a stronger NGO-structure) it seems that they could serve as a model developing countries can learn from. This is, however, a false appearance since the topics which request a restriction in markets and relevant societal routines, often related to environmental issues, are not resolved in the Western countries (see Jänicke, 1997: 2). Likewise, developing countries are

facing different environmental problems. For these reasons, capacity criteria for ecological sanitation need to be researched in the specific developmental context of a country, in this case of India.

Overall, in this thesis the position taken is that capacities are developed when a desired change is reached successfully and the new implementation is economically, socially and environmentally sustainable. The desired change can be formulated as an enrichment of capabilities that are under broad consensus. The definition lies close to that of the United Nations Development Programme where capacity is defined as: *"… the ability of individuals, institutions and societies to perform functions, solve problems, and set and achieve objectives in a sustainable manner"* (UNDP, 2007: 3). To understand when and how capacities are developed, the concept will have to be broken down in several sub categories, so that capacity development can be tackled and loses its vague character. Some categories have already been touched upon in figure 3.1, but a more specific approach comes from van Loon et al. (2010), who developed their method upon categories that where originally set up by Kirchoff (2006, 8-9). Van Loon et al. & Kirchoff divided the overall capacity concept in institutional capacity, organisational capacity, human capacity, scientific capacity, technical capacity, and resource capacity. These capacities will be put under closer scrutiny. While the definition of institutional capacity will somehow differ, cultural capacity will be added as an additional category. As will show in the following sections, the division should not be considered as too strict, while overlap exists between the different categories. For example, technical capacity can only be present when a certain degree of organisational capacity is demonstrated. Figure 3.1 should for these reasons be taken as a guideline: moving from the broader categories to a more specific level. This movement does however not imply that the more specific levels are independent from the more general layers: all layers are interrelated.

Alternative approaches are present as well, such as used by Koens (2003) & Olson (2007) who borrowed three framework conditions from Jännicke to make use of the broad concept of capacity. These three are the political-institutional, cognitive-informational and economic technical conditions. Although these conditions can provide insights in several factors causing certain policy outcomes, it is believed that the definition provided by van Loon et al. (2010) and Kirchoff (2006) gives better insights in factors related to capacity development while the framework conditions as used by Jännicke (1997) are used to understand policy outcomes (which have a governmental character), not to see where specific gaps in the several layers of capacities are. However, these and other framework conditions can be integrated while defining the different sub-capacities. Olson, moreover, by basing his capacity framework upon Jännicke (1997) found in his thesis no correlation between institutional capacities and project success. Therefore this framework will not be adapted. The absence of correlation is a surprising outcome, considering the used prognosis that capacity development causes an increase in the likelihood of changing an undesired situation. Coming from this assumption, the assessment criteria used in this thesis will have a different character then the one in the research of Olson and chooses to follow the categories provided by van Loon (2010).

3.4. Institutional capacity

In figure 3.1, institutional capacity is placed at the lower part of the illustration. Before going into defining institutional capacity, a clear explanation of institutions is necessary. Institutions are therefore in this thesis defined as organisations with a value-driven orientation that highly influence human behaviour. They have, moreover, a historical continuity and have a great power of expression (see Duyvendak & Otto for a more extensive explanation on institutions, 2007: 13-16). In this definition an institution is always embodied by an organisation. However, not all organisations are institutions: only when they are value driven and have a great influence on human behaviour. This is a different definition, coming from the sociological tradition, that differs from the more common definitions that are based on the economist North, who states that: "*institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape interaction"* (1990: 3). In the definition that this thesis uses, these constraints that shape human interaction as defined by North do not refer to institutions but to societal structures. Institutions are not a synonym for these societal structures (which refers to a certain societal order upon which people are depended) but institutions are on the one hand a reflection of societal structures in an organisational embodiment, while on the other hand institutions too are actively shaping structures (related to the idea of structuration, see Giddens: 1986). This in order to make effective use of the concept, as the institutions in the definition of North represent everything but the individual human agency.

In this thesis, institutional capacity development refers to increasing the position of several institutions in order to improve the situation of ecological sanitation in India. Institutions in this case refers to for example, governmental agencies, legal bodies, economic institutions and other organisations that are highly value driven and have a great impact on human behaviour. These institutions, moreover, have a constraining or enabling influence on individual agents (see e.g. Hodgson, 2006: 7). Therefore, to come to a successful ecological sanitation project, the institutional sphere needs to have an enabling character and should preferably even promote the use of ecological sanitation and implement these.

Additionally, a reference can be made to the concept of good governance in order to see how the institutional sphere can create an enabling environment. Harman states that *"good governance requires that decisions are made and implemented using a clear and legitimate process, to achieve consistent and effective policies"* (2005: 5). While governance in this case refers to the process of decision making and implementation of these (www.unescap.org), this process should be in such a way that it provides the way for effective ecological sanitation practices. Decision making processes on national level are often carried out by (governmental) institutions, with sometimes involvement of broader communities (see Harman, 2005). For this section the broader communities, besides a participatory character of decision making, are not part of consideration. It is claimed here that effective institutional decision making and implementation has to meet some conditions. Good governance has the following eight characteristics: "*It is participatory, consensus oriented, accountable, transparent, responsive, effective and efficient, equitable and inclusive and follows the rule of law"* (www.unescap.org). As participation and equity and inclusiveness are quite similar, they will be putted under one header. The conditions are adapted in the assessment framework in table 3.1, which displays the conditions, followed by the

explanation of the most preferable situation. When certain aspects from the table are absent in reality, a capacity gap can be visualised which, moreover, preferably needs to be developed when forming a barrier for ecological sanitation.

It is important to notice that the assessment framework in the different tables are considered as a broad guideline and will not be used for quantitative assessment.

Capacity sphere		**Category**	**Explanation**
Wider institutional framework	1.1	Enabling environment	Institutions need to enable ecological sanitation projects and support the use of the sanitation services.
Effective Decision-making processes	1.2	Participatory	Can take place through direct participation or through intermediate institutions or representatives. It at least needs to be organised in an informed way and should serve the more vulnerable groups of society as well.
	1.3	Consensus oriented	A mediation of different interests in society is needed in policy-making and the long run perspective should be a main focus.
	1.4	Accountability	In general an organisation or an institution is accountable to those who will be affected by its decisions or actions.
	1.5	Transparency	Decisions are taken in a way that follows rules and regulations. Also information is freely available and easily accessible.
	1.6	Responsiveness	Policy has to be developed within a reasonable timeframe.
	1.7	Effectiveness and efficiency	Good governance means that processes and institutions produce results that meet the needs of society while making the best use of resources at their disposal.
	1.8.	Rule of law	Good governance requires that institutions operate within a fair legal framework that is enforced impartially.

Table 3.1, Institutional capacity, From 1.2 onwards source: www.unescap.org

3.5. Cultural capacity

Since institutional capacity is defined in a more narrow tradition in this thesis, some space is left at the bottom of the illustration in figure 3.2. This is the space for social structures that were shortly discussed in the last section. While the term structure stays vague and can therefore lead to ambiguities, a shift will be made to the term culture, which is a term that is easier to grasp. In the sociological literature there is an ongoing debate on the difference of meaning between social structure and culture (for an overview, see e.g. Smith, 2008). It is complex to give a complete overview (also since sometimes social structure and culture are used as synonyms), but one can state that social structure refers to the organisation of a society as a whole (social, economic, cultural) while culture has a more narrow definition (Smith, 2008). Although definitions of culture are broadly spread, a useful one which is under broader agreement comes from Smith: *"culture is seen as the realm of the ideal, the spiritual, and the non-material. It is understood as patterned spheres and beliefs, values, symbols, signs and discourses"* (2008: 4). Culture is what makes our societies collectivities in an unique fashion. It is what human beings share outside the economic realm.

In the case of ecological sanitation these different values, beliefs and discourses can be beneficial or form a barrier for acceptance or even demand of the practice. For ecosan to be successful, the techniques needs to be part of the daily discourse of people, and the technique should be valued similarly as the broad acceptance of conventional the flushing systems. It will only be then that the sanitation services are used and maintained and will not be outdated when, for example, welfare increases. Research has showed that the UDDT technique in India is often considered as a toilet for the poor while the Western style flush toilet was seen as part of modern life by Indian inhabitants (Enssle, 2010: 67). Cultural capacity is therefore needed to make the technique socially sustainable. The Indian culture, moreover, influences the functioning of people in an organisation. Where sanitation processes can be successful in several countries, this will not mean that projects can be identically copied. Projects need to take the cultural context into consideration so the organisation can function in its most successful manner (see: Shanks et al. 2000; Thanansankit & Corbitt, 2002).

Capacity sphere		**Category**	**Explanation**
Broader cultural environment	2.1	Adaptation to ecosan discourse	The technique of ecosan needs to be embraced in order to have a social sustainable project.
Link with organisational level	2.2	Cultural influence on organisation	NGOs working on ecosan projects need to have an Indian character instead of being identical copies of Western organisation structures.

Table 3.2, Cultural capacity

3.6. Organisational capacity

In section 3.2, an institution is defined as an organisation with some specific characteristics. In this section an explanation of an organisation will be given. Firstly, however, it is pointed

that the organisation can be found at the bottom of the illustration in figure 3.2. A still relevant definition of an organisation is derived from Selznick, who states that an *"Organisation is the arrangement of personnel for facilitating the accomplishment of some agreed purpose through the allocation of functions and responsibilities"* (1947: 25, for a related definition, see van Loon et al. 2010: 102). While North (1990) defines different political, social, economic and educational bodies as organisations, the definition used here would call these institutions. Pure organisations with no institutional functions are considered to have less social value and legitimacy then institutional organs. This does not mean however, that social value is absent in the case of an organisation. It is, however, the scale and the power to influence public opinion that differentiates the institution from the organisation, together with the explanation given in section 3.4. To give an example, an NGO specialized in developmental issues is considered an organisation, while the ministry of development is defined as an institution.

Selznick moves on with his statement by explaining that an organisation cannot be seen as solely rational mechanism which purely achieves initially set goals, while individuals do not only act in coalition with their formal goals on the one side and on the other side, the organisation is under pressure by the institutional environment. Goal attainment, therefore, is a main functioning, but not always the main outcome of an organisation. Selznick moreover refers to the importance of analysing informal structures: a formal organisation is conceived as a cooperative system, where different individuals work together with diverse friendship ties, class loyalty, power cliques, and external commitment (1947:27). In order to analyse capacity development, the internal structure of the organisation is therefore of great importance. Besides the internal structure, the external relations with other organisations or institutions, or a certain level of being embedded in a network, are of main importance in researching the organisation and its impact (van Loon et al. 2010: 102).

Van Loon et al. define organisational capacity in two categories, which are: *"mission, vision, values and strategies, as well as leadership, management and culture"* (2010: 102). Organisational capacity for ecological sanitation is developed when the organisation has a clear direction (mission, vision and value) and on the other side possesses a degree of power (by e.g. effective leadership) (see: Chanrith, 2002: 239) to motivate employees and have influence on external organisations and people. The organisation can, moreover, increase its likelihood of project success by networking with other NGOs and organisations and maintain relations with institutions (e.g. large donor agencies, governmental organisations) and specific stakeholders. These contacts can increase the knowledge of the organisation and expand the organisations' influence (see Chanrith, 2002: 239). In addition, there is a need of competence from the staff, stimulated by management, to stay on the right path of the intended direction. On an individual level, leadership and management are not necessarily separated, since good leaders are the ones that posses many management qualities to empower and motivate the staff of an organisation (Chanrith, 2002: 238-239). In order to see if there are no discrepancies between the original plans and the outcomes of projects, a monitoring organ within an organisation is desired (van Loon, 2008: 25).

Furthermore, the internal culture of an organisation needs to be enabling to follow the chosen path. The ideals of internal organisational culture or organisational development are displayed by Jaeger who states that power distance should be low, uncertainty avoidance is

preferably low, masculinity should be low and individualism should preferable be medium (1986: 182). A low or medium power distance is often necessary for employees of organisations in order to interact openly, causing problems to be solved (Jaeger, 1986: 182). A similar remark counts for low uncertainty avoidance, decreasing the barriers to discuss problems. Low masculinity, in addition, leaves space for discussing feelings, while "organisational problems are often associated with behaviour driven by the feelings of organisation members" (Jaeger, 1986: 182). When considering individualism, a medium level is most appreciated while high levels of individualism would be inconsistent with collaboration and a low level of individualism can cause disrespect for individual differences and therefore blocks personal input (Jaeger, 1986: 182). It has to be noticed, however, that differences in broader cultural habits (as described in the section before) that influence the organisational culture, can cause a different organisational culture then ideally described here, but which is still somehow effective. In certain cultures, for example, a low level of power distance is been thought of as too soft (see van Loon, 2008: 27). All these different factors contribute into making an organisation a strong player within the ecological sanitation field.

Capacity sphere		**Category**	**Explanation**
Mission, vision, values, and strategy	3.1	Formulation of mission, vision and values	Clear, meaningful, and realistic.
	3.2	Level of recentness and dynamics	Formulation of strategy and mission is updated periodically, and in a multi-stakeholder setting.
	3.3	Formulation of objectives and targets	Clear, meaningful, and realistic, and correlating with the mission, vision and values .
	3.4	Monitoring of progress towards objective and targets and initial mission	Use of transparent methods, or measurable indicators.
Leadership, management and culture	3.5	Leadership: level of trust by staff	High level of trust and acceptance by staff.
	3.6	Leadership: level of stimulation	Sufficient efforts are made to provide incentives.
	3.7	Leadership: power balance between staff and leader(s)	Empowerment of staff, but only under the umbrella of leadership.
	3.8	Competence of staff by management	Stay on the right track of original goals by sufficient management which motivates and satisfies staff.
	3.9	Organisational culture: Power distance internal organisation	Preferably low. However, in the cultural context, there should remain respect for leadership which needs to be enabling. Satisfaction of staff is of high importance.
	3.10	Organisational culture: Uncertainty avoidance	Preferably low to increase problem-solving capacity.
	3.11	Organisational culture: level of masculinity	Preferably low to increase openness and decrease conflict.

	3.12	Organisational culture: level of individuality	Preferably medium to maintain cooperation and personal input.
Influence on external parties and people	3.13	Degree of power	The organisation should have a considerable degree of power in order to have influence and alter undesired problems.
	3.14	Involvement in broader network (of NGOs and stakeholders).	Other organisations and NGOs increase the likelihood of project success while knowledge can be shared and influence can be exerted. Involvement of other stakeholders makes success more likely.

Table 3.3, organisational capacity, 3.1-3.8, source: van Loon (2008: 27)

3.7. Human capacity

When describing human capacity, the focus shifts more to the individual level. A short link is already made in the last section, when speaking of the internal structure of an organisation where collaborating individuals are an important aspect for organisational capacity. Here, however, the focus will be on these individuals themselves, who possess certain characteristics that can be beneficial for the capacity of the organisation or institution or sometimes more on project basis. Human capacity is of a high quality when individuals have beneficial attitudes, motivations and competences. These capacities can be developed by providing the right incentives (van Loon et al. 2010: 103 & Chanrith, 2002). When attitudes, motivations and competences are beneficial, human capacity for ecological sanitation can be developed. Human capacity can be placed on the second level on the illustration in figure 3.1, seen from bottom up. Chanrith defines the more specific necessary competences that should be possessed by employees in NGOs to increase project success. These are: "*technical skills, human resources management, administration, strategic planning, financial planning and management, fundraising ability, project design and planning, project monitoring and evaluation, research capability, marketing skills, communication skills/language proficiency, and networking*" (2002: 238). One person does most probably not own all competences, but they at least should be present divided by several staff-members. What can be added as an important skill for a staff member of an organisation or institution, or a project leader, is the amount of experience in the field one works in (UNDP, 2008: 6).

Another list of competences contributing to organisational capacity is coming from research on desired competences of employees in the field of human resources by Blancero et al. (1996). They made a division in three clusters. The first cluster involves with personal integrity and includes ethics, standards of quality and good judgment. Ethics in this case refers to the possession of fidelity to fundamental values which can be translated in respect for the individual and its property, responsibility of purpose, honesty, fairness and reliability. Standards of quality indicate that the employee has high performance expectations for him or herself and others, while good judgments denotes that the staff is able to make rational and realistic decisions based on knowledge. The second cluster refers to team skills, including teamwork, relationship building, communication and listening. Staff members need to be able to communicate clear and understandable, interpret and use information by listening and understand how to collaborate and foster collaboration of others in teamwork. They should moreover be able to build and maintain relationships across a broad range of

people and groups. The third and last cluster of competences is actually not only a competence but is better defined as a motivation. It is labelled as ambition and drive and exists out of result orientation, enthusiasm, initiative and self-confidence (Blancero et al. 1996: 389-390). Loyalty can be added to this cluster too (van Loon, 2008: 28).

To make all these competences and motivations part of an organisation culture, enough skilled personnel is needed. This can be reached by educating personnel (van Loon, 2008: 28) or selection on proper education before hiring personnel. Furthermore, incentives can help to keep motivation high; although influence by management on loyalty is sometimes limited (van Loon, 2008: 28). Finally, it is important to notice that, according to van Loon: *"The number of staff must cover the mandate of the organisation"* (2008: 28). Human capacity cannot be fully developed when there is a lack of personnel. These categories seem restricted to the staff of a more formal organisation or institution. However, many competences can be related to a more grassroots organisations as well.

Capacity sphere		**Categories**	**Explanation**
Personal competen-ces	4.1	Personal integrity	To show respect to other members in the organisation and act conscientious.
	4.2	Team Skills	To be able to function in a team.
Beneficial competen-ces for NGOs	4.3	Technical skills	In the case of ecosan: to have knowledge about the technique.
	4.4	Human resource management	In the case of ecosan: to have knowledge about water treatment systems.
	4.5	Administration	To have personnel that can manage the administrational part of the organisation.
	4.6	Strategic planning	To be able to look ahead and adapt to new situations. Problems can be solved when planning strategically.
	4.7	Financial planning and management	Some personal should be able to manage and plan finances to keep the NGO financially healthy.
	4.8	Fundraising ability	In NGOs, fundraising is important to secure the financial income of the organisation.
	4.9	Project design and planning	In order to develop successful projects, skills related to how to design and plan projects are needed.
	4.10	Project monitoring and evaluation	Some personnel needs to keep a close eye on the progress of projects and the efficiency of the organisation.
	4.11	Marketing skills	To 'sell' projects to the population and financial donors competences related to marketing are required.
	4.12	Research capability	Research by personnel on the several techniques and on project success can in the end increase the likelihood of project success in the own organisation.
	4.13	Networking	In order to have any influence outside the own organisation and to benefit from other's

			knowledge, the personnel should be able to network with other organisations/institutions.
	4.14	Language proficiency	In the NGO business it is beneficial to have some personnel speaking different languages, especially for networking and fundraising purposes
	4.15	Level of experience	Ideally, some personal should have some experience in the field the NGO is working in.
Facilitating human capacities	4.15	Educate personnel	To increase the above listed competences.
	4.16	Providing incentives	To keep the personnel motivated. This can be done financially or with the use of other incentives.
	4.17	Number of personnel	The number of personnel should be in line with the task of the organisations.

Table 3.4. Organisational capacity

3.8. Scientific capacity

The fourth capacity can be found on the third level of the illustration, seen from bottom up. Although it might be considered less appropriate to organise scientific capacity under the term skills (as seen in the illustration), the two terms are considered to be connected to each other[4], as knowledge is in the English language often defined as one of the main conditions of having a skill (see e.g. definition from www.dictionary.com) and skills moreover influence the process of performances of individuals in organisations. In this case, research is needed to understand different sanitation techniques which helps improving existing practices. More knowledge, obtained by scientific capacity, can lead to develop a best practice of sanitation services. Also, societal issues need to be fully understood to successfully implement sanitation services. Research on both sanitation techniques and societal issues is, therefore, required. Scientific research will benefit when being part of a wider knowledge network, so scientist can learn from each other and their publication can be complementary or building op upon each other (see van Loon, 2008: 30-31). The knowledge, furthermore, needs to be accessible and applicable by organisations, institutions and individuals in order to help improve policy and the skills or competences from human capacity (see van Loon, 2008: 31).

	Categories	**Explanation**
5.1	Availability of science for organisations, institutions and individuals	Scientific publication are accessible (for free and easy to find), in the relevant language (English and native language) and recent.
5.2	Scientific network: sharing and cooperation	Existence of a scientific infrastructure between different scientists and knowledge institute. Science is

[4] van Loon et al. (2010: 102) replaced the word skill for knowledge, Here it is believed that they can exist next to each other, although it is admitted that the concept of skills somehow overlap with human capacities.

		complementary or build up upon each other.
5.3	Applied knowledge in policy: Usefulness for ecosan	Applied scientific research is present and established in a data bases.

Table 3.5, Scientific capacity, source: van Loon (2008: 31)

3.9. Technical capacity

According to van Loon et al. (2010: 103) technical processes are too often taken for granted or underestimated. This causes failures in understanding capacity processes, while they have a great influence on the daily activities of human beings. Failures of technical capacity can appear in different processes. Firstly, when there is a donor present, technical failures can occur during the deliverer of a certain technology. Deficiencies in managing of techniques, moreover, can cause a lack in technical capacity. Thirdly, the lack of an effective market for the technique can cause its failure. Also, an unfavourable work setting in which a technique can operate is unbeneficial for its operation (Berg, 1993). In the case of ecological sanitation the technique itself is considered of great importance. It is therefore stated that a good functioning sanitation technique, related to good maintenance by a well functioning organisation or by well organised individuals, is one of the main keys for a successful sanitation project. Technical capacity can be placed on the top of the illustration in figure 3.2. Other techniques that are important in organisations are the communication and information infrastructures (van Loon 2010: 31-32). In order to make use of an organisations full potency, email and telephone are useful for internal and external communication. Internet, moreover, can provide information and keeps organisations up to date (see van Loon, 2010: 31-232).

Capacity sphere		**Category**	**Explanation**
Communication and information	6.1	Communication structure	The availability of telephones, email and other techniques for internal and external communication.
	6.2	Information structure	Techniques such as internet or other data-sets that provides necessary information are available.
Technical capacity in relation to ecosan	6.3	Delivering of the technique	When ecosan is not necessary an Indian technique, it should be delivered in the right way.
	6.4	Management of technique	The ecosan service should be managed and maintained successfully by the local population.
	6.5	Market of technique	Preferably there is already a wide market for the ecosan technique, providing cheap solutions.
	6.6	Work setting of technique	The ecosan technique should

			be operated with the dedication of several people.

Table 3.6. Technical capacity

3.10. Resource capacity

Resource capacity, which is placed on the top of the illustration in figure 3.1, can be divided by two sub categories: monetary and non-monetary resources (Van Loon et al. 2010: 103). Non-monetary resources refer for example to facilities of organisations such as an office, desks, computers, etc. They are needed for a basic infrastructure of any organisation. Moreover, projects will turn out unsuccessfully when economic needs are not met (see e.g. Chanrith, 2002: 238). A monetary basis is therefore required. Especially in the case of NGOs, external financial resources are required since their projects are normally not profitable. A strong budged base improves the capacity of an NGO (Chanrith, 2002: 238). Income needs to be stable for an NGO to come to a successful ecosan project.

Capacity Sphere		**Category**	**Explanation**
Monetary resources	7.1	Budget of organisations/institutions working on ecosan	The budget needs to cover the costs.
Non-monetary resources	7.2	Office resources	Each staff member has a desk, computer, and phone when present at the office and access to books and education material .

Table 3.7, Resource capacity, 7.2 source: van Loon (2008: 33)

In these last sections it has been explained which capacities there are and how they can be divided in subdivisions on different levels. When some of the sub capacities are not met, failure of an intervention is quite likely. When capacity gaps are visualised a capacity development plan can be developed. What is therefore still missing, is a systematically approach which explains how to step by step develop and assess a project of developing capacities. In the next section a useful approach from the UNDP will be discussed.

3.11. The process of capacity development

The UNDP (2008) illustrates the process of capacity development in figure 3.2.

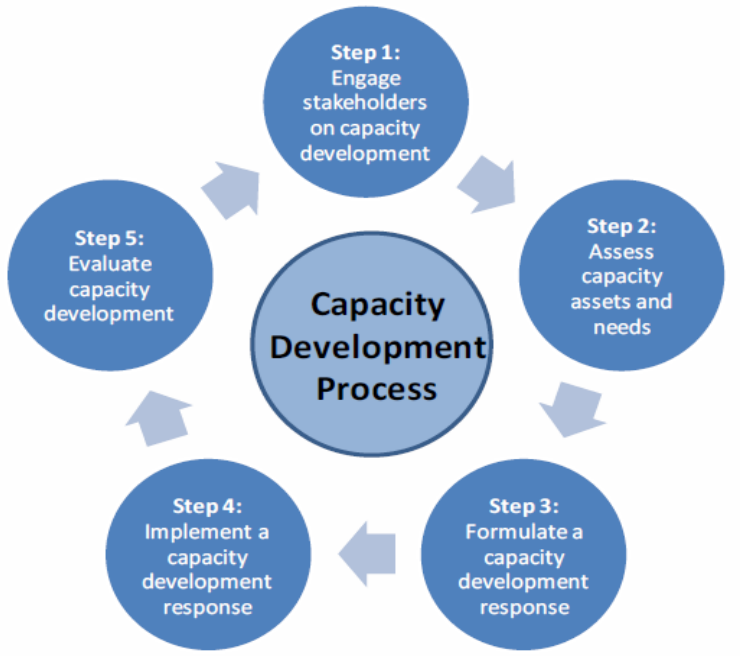

Figure 3.2: The capacity development process, UNDP 2008:9

With figure 3.2. the UNDP developed a model which is applicable in multiple cases. The different stages will be shortly described.

1. As a start, engaging stakeholders on capacity development is considered important while the effectiveness of the process would increase when political commitment and the sponsoring of important stakeholders is facilitated (UNDP, 2008: 10). When broadening the definition of a stakeholder by also including the ones that are being affected, although powerless themselves (Freeman, 2010; Bryson, 2004), one can increase the sense of ownership people have (see e.g. Lord et al. 1998 & Maguire 2003). Once they are involved early in the process they will be feeling owners of a problem and will better maintain the projects they are involved in. The stakeholder process is located as stage 1, but stays important during the whole process (UNDP, 2008: 10).
2. In this phase, where there is an assessment of needs and capacities, it is important to determine which capacity investment to prioritise. Therefore, questions such as: "why capacity?", "capacity for whom?" and "capacity for what?" need to be answered. The results should, moreover, be assessed from time to time and discussed with the stakeholders to monitor if the process is still on the right track (UNDP, 2008: 10-12).
3. In the third phase, a capacity development response is formulated in relation to what is recognized as important in the second phase. The response is formulated by the stakeholders and the capacity assessment team. Often used strategies are displayed in table 3.7.

Core Issue		Capacity Development Strategy
Institutional Arrangements	→	Institutional Reform and Incentive Mechanisms
Leadership	→	Leadership Development
Knowledge	→	Education, Training and Learning
Accountability	→	Accountability and Voice Mechanisms

Table 3.7, UNDP 2008: 13

The core issues in the table are strongly related to the capacity development categories in the sections before. In this phase indicators to measure capacity development responses need to be developed as well (UNDP, 2008: 13-15).

4. The fourth step contains the implementation and management of a capacity development response. Emphasis is putted on the use of existing systems rather than create parallel ones, to increase the ownership of the project by the relevant stakeholders. When implementation takes place, the implementer should carefully act in consideration with political dynamics and have a sufficient monitoring organ. The available budget should, moreover, be related to the implementation of certain plans and be used efficiently (UNDP, 2008: 15). While ESF is using training as their capacity development response, in the next chapter the evaluation of training will be central.
5. In the last phase an evaluation takes place to examine if the core values are addressed and capacities are really developed. If capacities are developed can be evaluated by looking at changes in performances before the capacity development took place until the new situation. While evaluating, the results but also the process needs to be considered (UNDP, 2008: 16).

Overall the process criteria that are enabling capacity development will be considered as a new capacity, the so-called process capacity. This can be added to the listed capacities before. It is important for analysing capacity development projects and see if they meet the core criteria as described in this chapter.

After explaining the relevant levels of capacity development and the process under which an ideal form of capacity development takes place, an assessment scheme can be developed. The UNDP created a schedule which uses some different dimensions then the ones used in this thesis. It is included as figure 3.3, while it shows that the UNDP, although they formulated different dimensions, are handling the same criteria as this thesis will.

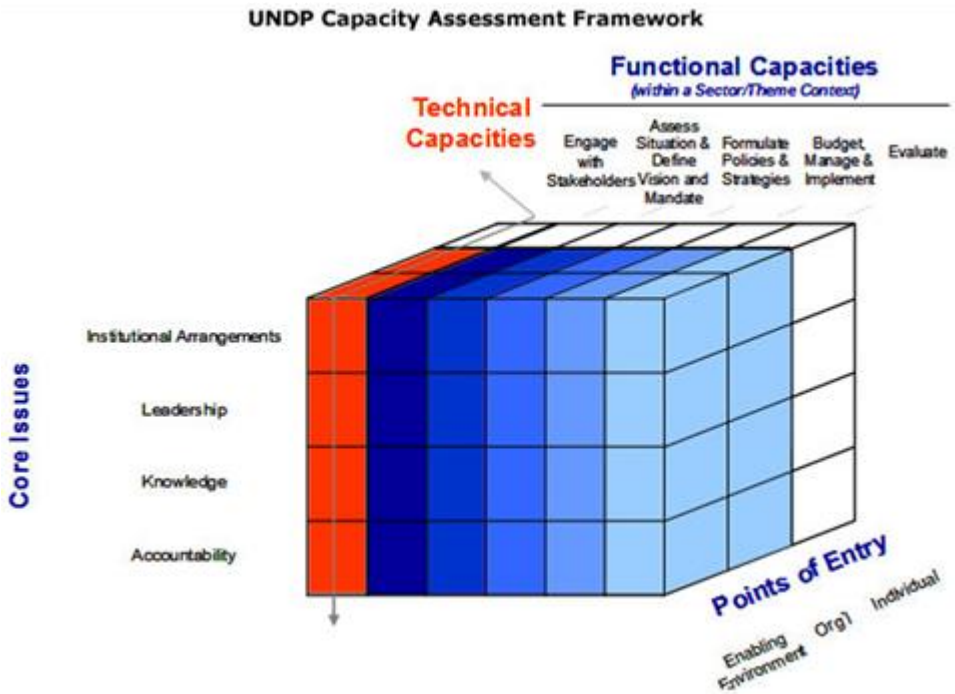

Figure 3.3, UNDP Capacity assessment framework, source: www.undp.org

While the UNDP classifies institutional arrangements, leadership, knowledge and accountability as core issues and distinguishes three different points of entry, in this thesis the core issues and the points of entry are seen as capacities themselves, or at least an integral part of other capacities. Furthermore, the functional capacities are here defined as process capacity. Technical capacities are already integrated in a similar fashion as that of the UNDP.

Capacity sphere		Category	Explanation
Process capacity steps	8.1	Step 1	Engage relevant stakeholders
	8.2	Step 2	Assess capacity assets and needs
	8.3	Step 3	Formulate a capacity development response
	8.4	Step 4	Implement the plan
	8.5	Step 5	Evaluate capacity development
	8.6	Order of steps	See if the process is carried out in a logical and right order

Table 3.8. Process capacity

The overall list of capacities ready for assessment contains: institutional capacity, cultural capacity, organisational capacity, human capacity, scientific capacity, technical capacity, resource capacity and process capacity. The tables will form the basis for semi-structured interview questions. It is, however, not the aim of this thesis to come up with a list of capacities that will be tested in the empirical case studies to find out of capacity development has taken place. The thesis has a qualitative character and leaves space for a more inductive vision on the field study. Also the local context can cause finding new conditions that were not included in the literature reviewed.

3.12. Training as a capacity development response

As explained in section 3.11, several capacity development responses can be developed. The Ecosan Service Foundation chooses to do this by the development of a training programme as a response to a lack of experts in the field of ecological sanitation. This can be considered as a gap in human capacity. For this research it is therefore necessary to assess this capacity development strategy by looking at several criteria. Different theories will be discussed which speak of training evaluation.

3.12.1 Evaluation measures

As a start, Edens & Bell provide a method that can be used for evaluation. According to their research on several evaluation measures, a common answer given to the question 'Effective in terms of what?' is 'effectiveness in terms of one of the four categories: reactions, learning, behaviour or results', a method that comes from Kirpatrick (quote and explanation model in Edens & Bell, 2003: 235). These categories will be used to assess the success of the training of ESF. When using reactions as an evaluation method, an assessment is made by researching the value the course participants have given to the training. Although this is a common used evaluation method and also the only one used by ESF, it seems to be a rather useless criterion since there is little support that there is a relation between reactions of

participants, evaluated after the course, and effective learning, behaviour and or results (Edens & Bell, 2003: 235). Kraiger et al. do however claim that affective outcomes are of importance for the learning outcomes of a training programme, as positive reactions would lead to an improved attitude towards the training and increases the motivation of participants, making positive learning outcomes more likely (Kraiger et al. 1993: e.g. 312). Therefore, this criterion will not be fully rejected and could be seen as a moderating variable.

When looking at the learning processes, it is evaluated if learning has taken place as an outcome of the training programme. Since no psychological tests will be conducted, the learning criteria will not be further explored in this chapter. This criterion will only be used to see if the language of ecosan has been adopted by the course participants in chapter 6. In this chapter it is broadly assessed if the former course patricipants were familiar with certain concepts and were able to explain this in the interviews. Behavioural criteria serve, moreover, to measure the effects of a training on actual work performance. A gap between learning patrons and behavioural change can occur while the environment after the training may not always support the application of newly learned knowledge or skills. The results criteria, finally, serves as an overall evaluation of the training course. Organisations, for example, measure their effectiveness by looking at gained value of the organisation displayed in currency (Edens & Bell, 2003: 235) or the increased quantity or quality of output (Alvarez et al. 2004: 397). Other evaluation styles are possible, but as this is the one most cited, it will serve as a basis for this research (Edens & Bell, 2003; Alvarez et al. 2004). The different evaluation models all show similarities with that of Edens and Bell. While it is decided to use Edens and Bells evolution method the differences between these models are therefore not discussed in this chapter.

3.12.2. Knowledge transfers

The effective transfer of knowledge, stimulated by training efforts, is depended upon several factors. It is related to the kind of training that is given, but also on the personal cognitive or learning styles of people (see e.g. Chou, 2001). Chou differentiates between two ways of training models which are related to computer self-efficacy. These models are the more traditional approach of the instruction-based method and the later on developed behaviour modelling method. While the instruction-based method focuses on lectures given by teachers that proceed their explanation from general rules to specific examples, behaviour modelling is using a visual observation of the performance of a task which subsequently needs to be imitated by the learners. During the whole process within the behaviour model training, some freedom for experimentation is left for the participants (Chou, 2001: 13-14). Chou discovered that the ones following a behaviour modelling training, had a higher level of learning performances and self-efficacy, although differences in gender and personal learning styles gave some variety in this picture. Self-efficacy is defined as "*the beliefs about one's ability to perform a particular behaviour*" (Chou, 2001: 12). Literature related to training and ecosan analysis was absent.

3.12.3. Factors influencing training effectiveness

Besides the above given training strategies, different training effectiveness models define those factors that are important for a successful training (Alvarez et al. 2004). Alvarez et al. concluded, after analysis on scientific literature regarding training evaluation and effectiveness, that these factors can be subdivided in three categories. Firstly, the individual characteristics that trainees bring to the situation are considered as an important factor. These consists out of their personal characteristics such as personality treats attitudes, abilities, demographics, experience and expectations. Also more characteristics that are related to the training, like self-efficacy, goal orientation and motivation are relevant. The second factor that is considered as necessary for an efficient training is a profitable climate in the organisation or in the situational context. An enabling climate for learning, history, policies, trainee selection technique and trainee notification process can be included in this category. The third factor is related to training characteristics, including instructional style, practice and feedback (Alvarez et al. 2004: 389). There is some discussion on the exact influence which the different variables have and if they are in some occasions of a more indirect character in relation to learning and behavioural processes. It is, however, not doubted that these variables have a certain influence and are therefore of importance (Alvarez et al. 2004: 398-391). Edens & Bell, additionally, focus on the importance that a need assessment is made by the organizer in order to first see why an organisation wants a training, what needs to be taught at the training and which specific people need training (2010:235).

Since no psychological tests will be conducted the scope of this analysis is somehow limited and the different factors will not be putted under closer scrutiny. These factors will however be included into an observation schedule and in the semi-qualitative interviews that will be conducted with participants of the training provided by ESF. The different factors influence the success of the training programme.

3.13. Capacities to overcome ecosan barriers

All these different capacities and capacity development strategies serve to overcome the several barriers that are causing problems for coming to successful ecological sanitation practices. This will shortly be discussed in this section. In table 3.9 the different barriers as encountered by Enssle are displayed.

Ecosan-Constraints	Sanitation Constraints in general
Missing knowledge about the existence of ecosan	Missing sanitation education
Missing financial resources for investments in ecosan	Missing financial resources for investments in sanitation
Social attitudes	Sanitation has the last priority for investments
Missing knowledge about ecosan-functioning	Missing awareness
Bad reputation according to construction failures	Missing own legal property
Missing construction knowledge of masons (Experts)	Missing incentives for sanitation facilities
Missing sophisticated ecosan-model (Experts)	
Missing awareness of environmental implications from sanitation failures (Experts)	

Table 3.9. Overview of constraints for implementing ecosan toilets and sanitation facilities in general, (Enssle, 2010: 66)

Messmer (2010) found many related constraints in relation to ecological sanitation projects. She explained the problems in social attitudes by shop owners who did not like to buy vegetables that were fertilized with urine (Messmer, 2010: 59). Moreover, she refers to the boundaries that social attitudes can have, caused by the lack of knowledge (and the absence of pro-ecosan opinions) and communication with each other in the village. The cultural context, additionally, causes the Nepalese inhabitants to be incapable to explain why they exactly did not like ecosan and they were falling automatically back into older traditions (Messmer, 2010: 90-92). Other constraints derived from Messmer are overlapping with the ones displayed in table 3.9 and are therefore not further discussed. When speaking about capacity development, it is therefore important to not only think of the improvement of people's capabilities but also to keep these barriers to a successful sanitation practice in mind.

3.14. Conclusion

In this chapter it has been examined which capacities are influential in the development of a sustainable practice. Several capacities have shown their relevance. These are: cultural capacity, institutional capacity, organisational capacity, human capacity, scientific capacity, technical capacity, resource capacity and process capacity. When the different capacities meet most of the points displayed in the several paragraphs, they will be enabling when implementing ecosan projects. When gaps are present, they will need to be developed to increase the likelihood of a sustainable outcome of ecosan project implementation. A capacity development response can be the development of a training in order to stimulate increased project implementation. If this response is successful can be assessed by looking at the response, knowledge and change of behaviour by the course participants, or looking at the final result of the training programme.

4. Integrating approaches

4.1. Integrating capabilities and capacities

In the last two chapters, two different theoretical approaches, the capabilities theory and the capacities approach, have been considered. It is claimed that both are necessary when discussing the development of successful ecosan projects.

First it has been claimed that the focus on capabilities is necessary in order to successfully promote, implement and maintain ecosan projects. However, how to actually develop these capabilities within an institutional context into is not explained by the capabilities approach. Therefore, the capacity development approach has been introduced in order to provide a solid basis which can be used to actively develop the capabilities of people. On contrary, when solely focusing on capacities, the goals for which these capacities are to be developed might get out of sight. Hence, the capabilities approach provides a basis for answering the question: 'developing capacities for what?' Capacities need to be developed to overcome several barriers and to establish and improve the relevant capabilities.

The UNDP provides an useful approach where capabilities and capacities are integrated. It states in fact that: *"The Human development approach- with its focus on the expansion and use of human capabilities- provides the basis for UNDP's commitment to capacity development. Defined as the process of enlarging the range of people's choices, it does not equate development to an increase in people's income but focuses on improving in their overall well-being, (…) Whether such exist, and whether people are able to use them to improve their well-being, depends on the existence of adequate capacities of individuals, organisations and the enabling environment"* (2008: 24). In order to improve people's individual capabilities, capacities of individuals need to be improved, or those capacities of organisations and institutions who can contribute to this improvement. The UNDP makes it as their core strategy to bring sustainable development to people: "*Capacity development is, therefore, one of the most effective ways of fostering sustainable human development. By strengthening the capabilities of individuals and organisations and the capacities within the enabling environment, it helps lay the foundation for meaningful participation in national and local development processes and thereby sustainable development results. Vice versa, improved human development (e.g. functional literacy, being healthy) is conducive to capacity development"* (UNDP, 2008: 24). The UNDP shows that ideas of capacity development provide a foundation from which to reach a state of sustainable development where human capabilities are improved. Hence, the two theories are a good basis for a research on a sustainability issue, which is strongly related to quality of life, which is the case in this study.

All different approaches are used as a basis for the questionnaires which have been applied to interview the staff of Seecon and ESF and the former course participants. The question on capabilities have a more open character, while it was the aim of this research to disclose the capabilities that the participants themselves defined. Several question have been asked in order to find out if the training course discussed the relevant capabilities and if these were taken up by the course participants. The question about capacities were formulated more directly and the different capacities categories have been discussed with all course

participants. There has, however, always been left space for the respondents to formulate their own capacity categories. Then, some questions discussed the training evaluation which varied from directive, to more broadly formulated questions upon project implementation. The questions in Appendix 2, moreover, have been served as a guideline. Sometimes the questions were asked in different orders or were already discussed by respondents themselve. In some interviews the questionnaires had to be shortened due to time reasons. Two of the questionnaires are displayed in appendix 2 and 3. With colours it is indicated which of the theoretical approaches are at the basis for which question.s

4.2. Conceptual model

The research can, moreover, be conceptualised in the following figure:

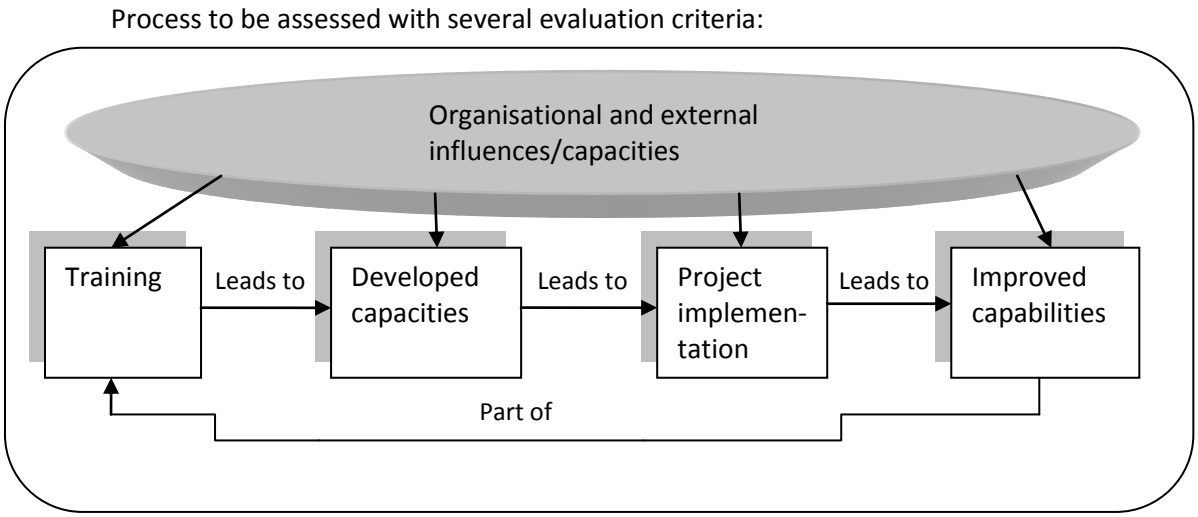

Figure 1.2. Visualisation of relation research questions

The assumption of the Ecosan Services Foundation is that their training is leading to developed capacities which additionally leads to project implementation. If this project is successful this will lead to improved capabilities for people. While in this research it has been impossible to analyse if capabilities have been improved by the projects implemented, it is researched if the capabilities have been adapted in the training programme. Besides analysing this process, it is been researched what is the state of several capacities for ecosan which are forming the so-called framework conditions in which this whole process takes place. These are the organisational and several external capacities that create the field in which ecosan has to be implemented by the former course participants. If the training programme is successful will, moreover, be assessed with the different criteria that are given for training evaluation in chapter 3. The next chapter will analyse all these aspects.

5. What is the state of capacities in relation to ecosan in India and how successful is ESF in developing these? *An assessment of ESF and its training programme within the broad institutional and cultural context*

5.1. Introduction

In this chapter ESF, its training programme and the broader capacity field will be assessed in order to figure out if the training programme can be called a success and what the state is of the most crucial capacities. The first section will analyse if the defined capabilities are considered in the training and are learned by the course participants. From there, the focus will shift to the capacity sphere, where an assessment of the several capacities, as explained in chapter 3, will be conducted. Subsequently, the training programme will be assessed. Difficulties in starting up projects will be analysed here as well. The assessment is based upon the interviews conducted in India and Switzerland and are supplemented by some observations.

5.2. Capabilities defined in the interviews

When trying to uncover the different capabilities, as defined by the course participants and the staff of ESF and Seecon, the respondents were asked to give the advantages of ecological sanitation. In most interviews, the question "how do you think ecological sanitation improves quality of life" was addressed. While the advantages directly influence people's capabilities, it is decided to ask this relatively simple question and to not refer to the concept of capabilities. A variety of answers were given by the respondents and the employees of Seecon and ESF. An overview of all the answers, combined in several categories is given in table 5.1. The answers are compared to the list from Enssle (2010) and the additional categories of Messmer (2011), displayed in chapter 2, in order to see if there is overlap between the two lists and to discover if categories might be missing in the interviews with the respondents. When categories are missing, some knowledge is absent in the training course.

Capability	**Advantages defined by course participants and staff**
1. To be able to live in a clean and sustainable environment	Closed loop thinking, environmentally soundness and the sustainability of ecosan, the combat against the linear thinking of flush and forget systems.
2. To be able to make efficient use of the available resources	Using less energy when having ecosan systems and the recycling of faeces, urine and water.
3. To be able to live a healthy life	Living free of diseases, such as diarrhoea.
3. To be able to live in a nice and smell free town	Gives the opportunity to live in a beautiful town which is smell free.
4. To be able to have feelings of dignity	The increase of dignity when not forced to go for open defecation.

5. To be independent of central systems	Easy maintenance of small scale systems.
6. To be able to live free of harassment	Women being scared of harassment, women being shy.
7. To be able to coordinate the own time	Walking far and in the dark for open defecation (especially women) and water when no connection to water tap.
8. To be able to save money and having access to sanitation	Maintenance of ecosan techniques is cheaper.
9. To be able to earn money with resources	Selling surplus of fertilizers and biogas on the market.
10. To be able to have more opportunity in life for women	Having the opportunity to go to school.

Table 5.1. Capabilities as defined by respondents

The capabilities that were not discussed in the interviews and which were absent after integrating several overlapping categories of Enssle and Messmer are displayed in table 5.2.

Capability	**Explanation**
To be able to wash oneself after defecating	Having the feeling of being clean.
To be able to have private sphere	Bodily integrity and having visual and social privacy.
Not to be disgusted daily when defecating on open defecation sites	Having more convenience and comfort in daily life.
To be able as a women to have the same possibilities as men to satisfy human needs	Women having equal rights as men.
To be able to stay at home and fulfil housewives' duties	Being a good housewife.
To be able to belon to or afiliate oneself with a subjective "hihger social class" & To be able to to elevate up from poverty	The increase of social status by adopting a more 'modern' lifestyle that was less associated with poverty.
To be able not to worry/ having peace in mind" & to be able to protect oneself from external influences	Because people no longer need to defecate in the jungle where they are exposed to rain and animals.
To be able to live together more peacefully	The decrease of quarrels related to open defecation.

Table 5.2. Capabilities defined by Enssle (2009) and Messmer (2011) that remained absent in

In the interviews with the staff of ESF and Seecon the most cited advantages where related to the environment. Holistic explanations referring to closed loop thinking, environmentally soundness and the sustainability of ecological sanitation and the combat against the linear thinking of flush and forget systems are alternated with the more practical implications of ecosan which are: the less energy demand of ecosan systems, recycling of faeces, urine and water and the reduction of water use and waste. Especially the recycling aspect was discussed in many interviews. In total, all these different categories are summarised under the capability: "to be able to live in a clean and sustainable environment" and "to be able to make efficient use of the available resources".

When shifting to the advantages that are more human specific, in all but one of the interviews with the staff of ESF and Seecon, the health aspect emerged as an important improvement of quality of life for people when having access to ecosan. Also, a reference to dignity is made in two of the interviews with the staff members, claiming that dignity of people will increase when they no longer have to go for open defecation. In some interviews, additionally, a reference is made to the solutions that sanitation offers, especially in the life of women. Since they are more shy and afraid of harassment by men, they are planning their days often around sanitation activities. "*They have to go in the early morning or they have to go at night*" (respondent 6). Although women are in many cases responsible of getting the water in areas where supply is not regulated, they are in many situations still not able to *"raise their voice*" (respondent 6) when deciding upon which sanitation technique to install. Another advantage of ecosan, related to time planning, is the so called easy maintenance of the technology, which can be done after following a short training. Also, the owners of an ecosan system leaves them independent from central systems, making them able to make their own decisions. All these different options can be summarised in four capabilities. The first one is "to be able to live a healthy life", followed by "to be able to have feelings of dignity". Since in many interviews it was explained that open defecation is still a common and accepted practice, the access to a toilet is not seen as having an inseparable relation with dignity. But, when speaking of the concept of capabilities, the focus is always on possibilities and freedom instead of speaking of obligations human beings have. The third capability is defined as: "to be independent of central systems". The fourth and the fifth category are especially related to women, although men are not excluded. These are: "to be able to live free of harassment" and "to be able to coordinate the own time".

One of the Seecon staff members, additionally, speaks about the low maintenance costs of the system. Especially when compared to the expensive centralised treatment systems, ecosan is relatively cheap. Another employee of ESF, moreover, speaks about the possibility to earn money when for example biogas is generated or fertilizers are created. The surplus of these resources can possibly be sold on the market. A problem, however, comes up since the government of India highly subsidises fertilizers. When this market distortion could be decreased, the income generated from resources will increase. This both leads to the following capabilities: "to be able to save money and having access to sanitation" and "to be able to earn money with resources".

The course participants show a similar patron as the staff members of the two organisations when describing several capability related advantages of ecosan. In the interviews with the participants, environmental advantages were also the ones most cited. Again some more holistic approaches are explained, but also on a more practical level several advantages are discussed. When taking a closer look, it appeared that four of the course participants made a more explicit link between the environmental soundness of the technique and the cleanness of the town, including the absence of smell. As the capability "to be able to live in a clean and a sustainable environment" is a bit too broad to incorporate this aspect the capability: "to be able to live in a nice and smell free town" is added to the capabilities list.

When asked how quality of life was increased by ecosan, the course participants referred most often to health related issues. Similar to the interviews with the staff members, there

was only one interview with a course participant were health issues have not been discussed. Also, issues of dignity and the harassment and time planning of women have been discussed in several interviews. One respondent even explained that sanitation could increase the chance that the girls go to school, while girls often prefer to not go to school without sanitation access, since they are most likely to get harassed when seen by men. This capability will be added as: "to be able to have more opportunity in life for women".

From the two different groups both employees of Seecon and ESF and the course participants seemed to have the same patron when defining the advantages, which are further on translated in capabilities, of ecological sanitation. Therefore, the assumption is made that the course participants have, in most of the cases at least, remembered a great part of what has been thought about the advantages of ecosan during the training course. A patron which shows that the training, when speaking of knowledge transfer, turned out to be quite successful.

When comparing the capabilities derived from the interviews with the ones found by Enssle (2009) and Messmer (2011) it immediately stands out that the list in table 5.1. is less extensive. This does not automatically mean that the list found is incomplete and the advantages were not well understood by the staff and the course participants. When looking more specific at the list of Enssle, it can be seen that she decided to formulate very precise categories that could also be summarised under some more umbrella concepts which were used in table 5.1. There are capabilities, however, that seemed to have a different character and were indeed not part of the categories found in this research. These are: feeling clean (to be able to wash oneself after defecating), bodily integrity and having visual and social privacy (to be able to have private sphere), having more convenience and comfort in daily life (not to be disgusted daily when defecating on open defecation sites), women having equal rights as men (to be able as a women to have the same possibilities as men to satisfy human needs), being a good housewife (to be able to stay at home and fulfil housewives' duties) and finally the capabilities that are related to the increase of social status by adopting a more 'modern' lifestyle that was less associated with poverty (Enssle, 2009: 57-58). The two additional capabilities, defined by Messmer, were also not discovered in the interviews. The first two capabilities are: "*to be able not to worry/ having peace in mind" or "to be able to protect oneself from external influences" because people no longer need to defecate in the jungle where they are exposed to rain and animals.* (…). Additionally, Messmer refers to the capability: the decrease of quarrels related to open defecation (to be able to live together more peacefully) (Messmer, 2011: 52).

According to Ennsle, these categories need to be part of a social marketing strategy to increase the demand of ecosan (2009). When comparing the two lists it is possible to state that the staff of ESF and Seecon are aware of many of the advantages (which are here linked to capabilities) of ecosan, although they are focusing most on the health and environmental aspects. These advantages and capabilities came back in the interviews with the course participants, implying that they also learned these concepts in the training course. Many of the course participants were not so familiar with ecosan before entering the training course, and when they did, their knowledge was often mainly technical. So often they increased their knowledge about several capabilities in the training. Some capabilities, however, which were defined by Enssle (2009) and Messmer (2011) have not been mentioned in the

interviews. Therefore, it is very likely that the training course gives a quite complete overview of improvements of quality of life, related to ecosan, but can be more encompassing by including these few additional aspects. These capabilities, such as the improved comfort in daily life, might look self-evident, but can still help to contribute to the promotion of ecological sanitation to a broader community as it gives good insights about the advantages that can be achieved by improving sanitation services. Besides the promotion of ecosan by including its capabilities to a promotion strategy, the capabilities are also that aspects that needs to be taken care of when implementing a project. This so that all the advantages are present and have a beneficial effects on the end-users. This will help to create projects that are sustainable in a social, ecological but also and partly economical (as one of the capabilities is also monetary related) way.

5.3. State of capacities

To understand the field of capacities in which the capacity development intervention of ESF takes place, the interviews will be used as a basis for assessment. Likewise, several observations provided additional data to research the framework capacities. Most of the capacity gaps have shown a relation to the barriers that are explained in chapter 3. The only one that could not be confirmed with the found data is the constraint that was found in the research from Messmer. She explains the problems in social attitudes by shop owners who did not like to buy vegetables that were fertilized with urine (Messmer, 2010: 59). This category did not show up in this research. In the following sections several capacities, and their enabling factors and gaps are first visualised in a table and subsequently explained.

5.3.1 Cultural capacity

Definition of capacity	**Enabling capacity factors**	**Capacity gaps**
1. Cultural and awareness capacity	1. Idea can be traced back to old Indian society. 2.(Ecological) sanitation became a less sensitive topic.	1. Reusing of faecal material and urine is culturally sensitive, also in relation to the former caste system. 2. Part of Indian population is not familiar with toilet usage. 3. People prefer flush toilets. 4. Many Indians have no awareness about the benefits of (ecological) sanitation. 5. The right channels of communication and information are not always available. 6. When having awareness, people do not automatically change their behaviour. 7. Sanitation is not always a priority.

Table 5.3. Cultural capacity: enabling factors and capacity gaps

Although many of the experts on ecosan explained that the basic idea of reuse within ecological sanitation can be traced back to ancient Asian society, within contemporary Indian society the reuse of faecal material and other practices of ecosan are often culturally sensitive. While older generations in farmer families used to use human waste as a fertilizer, this habit is lost in modern times. Besides cultural sensitivity in this paragraph, several issues on priorities and awareness are explained.

In 15 of the total 22 interviews, cultural barriers emerged after discussing the difficulties related to ecosan. A staff member of Seecon explains that *"If you talk about ecosan (…) I think it is the mindset basically that people are not always ready to accept that this is not waste but a resource. This takes a long time"* (respondent 1). The idea of ecological sanitation, with its reuse concept of faecal material and urine, is hard to accept and is often considered as dirty by great parts of the population. Especially in Muslim communities, the reuse concept is taboo (respondent 7). The attitude towards human faeces is contradictory to the relation people express toward animal faeces, as explained in the training and by respondent 2. Especially faecal material of cows, which have a holy character for the greatest religious majority in India, the Hindu religion (80.5% of the population is Hindu, source: Office of the Registrar General, 2001). Cow faeces have a ceremonial function in different Hindu religious practices. Respondent 2 expresses this cumbersome in relation to different faecal material as following: "*There is no issue of re-using biogas from cattle or any other animal, but as soon as we are talking about biogas generating from human waste there is still a big issue. Even though it is chemically the same"*. Respondent 1 explains that the taboo is also rooted in the caste system, which is, although abolished for years now, still present in daily social life. According to old habits, the lowest castes were the ones obligated to take care of the faecal material by for example cleaning the toilets and taking the human waste out of town. It is still highly rooted in Indian cultural society that only the lowest castes are the ones working with faecal material. Additionally, a respondent working for several NGOs, explains that the sensitivity surrounding human sanitary practices is displayed in the Indian design of the house: *"When you go to the Indians, now it is changing, but you won't find toilets in the house. It's all outside the house"* (respondent 17).

Other issues that appear in the interviews are related to the toilet usage. A great part of the Indian population is not familiar with using a toilet since they never owned one. Especially in rural areas, where there is sufficient open space, open defecation is still used as an easy alternative for the toilet, as it requires less investment and maintenance costs (respondent 20). Likewise, there are many communities were open defecation is not only a common practice, but also broadly accepted. A respondent from a rural area explains that open defecation is accepted as people are growing up with it, causing normalisation of the practice: *"Open defecation is an accepted concept. Supposed you see a person in open defecation, you don't see it to your mind. Almost you accept it. Because since you are born you are watching people defecating outside. Actually in them mindset it says yes"* (respondent 23). Respondent 23 explains that not only the people can be blamed for this, but that there is also a lack of legislation and control: *"It is a very populated country (…) And we are not accountable to a government. (…) You can always escape here (…) Too many people, nobody has the power over anybody. (…) Suppose somebody will shits in the open, why he shits? Because he knows nobody will harm him."*

Although some people themselves are not so familiar with the use of a toilet, they are often familiar with the concept of a flush toilet, seen on for example television. In relation to this, people that do have a toilet are used to the concept of washing, instead of the more European practice of wiping. Respondent 7 states that: "*All our systems are mostly water centred systems and the Indian population, we are all washers. We use water for sanitation and cleaning and all. So if water is a problem then (…) they go for open defecation and that is all about it*". Although washing is not impossible with dry techniques such as the UDDT, the UDDT is not always the technique most desired. As respondent 2 explains: "*Most better off want to have the western one. They see it on the TV they see it in commercials, so they want to go for a flush system*". This attitude towards the UDDT is, according to respondent 3, also caused by the promoters of the technology. He explains that the last 15 years the UDDT has been promoted as the first step on the sanitation ladder. When thereafter the economic situation of people improved, they dismantled their UDDT and installed a flush toilet. Both respondent 2 and 3 also believe it is not a problem that the people prefer a flush toilet, when implemented in accordance with ideas of informed choice. People decide themselves, in the right situation, which technique to implement. Especially when there is no central water connection, the UDDT will remain as an attractive solution.

Related to the Indian cultural sphere are issues of awareness of several concepts related to sanitation and especially ecological forms of it. In 19 interviews, this problem is listed or the practice awareness raising was given as an overall solution to the sanitation problem. While it is not exactly the same as cultural capacity, since being more on the level of knowledge, and also not directly related to human capacity, since awareness has a broader scope and does not deal with expertise, awareness can be added as a new form of capacity or the concept of cultural capacity can be adjusted by naming it 'cultural and awareness' capacity.

The lack of awareness can be divided in two directions: a lack of awareness of ecological sanitation and the lack of awareness of the usefulness of sanitation overall. Firstly, the different ecological sanitation technologies and the usefulness of the reuse of the materials are not always well understood, while, secondly, the relation between getting diseases and the lack of sanitation is not always recognized by a great part of the Indian population. The knowledge gap that many people in India still have on this issue is described by respondent 3. He explains that even when some awareness is present, knowledge is often incomplete: "*When a small child defecates they use their hands to clean it and throw it out. And they have absolutely no ill feeling about this. Yes they know that diarrhoea is caused by faecal contamination. But still there is a very clear mind gap. Sanitation is not just your faeces. It is the whole thing, it is hygiene, it is washing your own hands. It is much more than just going somewhere and defecating, but that is missing here. For instance, when the mother cleans, she may just wash it with water not even with a soap. And then when she cooks or eats something with the same hands other children might get diarrhoea, and she might not even understand how this happened. But for her, her child's faecal is actually nice, absolutely holy, whatever. That is a gap. Or people might say that diarrhoea is caused by contaminated water but they don't actually link it to sanitation."* Simultaneously, many respondents explain that there are not always the right channels of communication which are necessary to propagate the concept to a broad spectrum of society.

In addition, awareness and the acceptance of the problems related to conventional sanitation systems do not automatically lead to behavioural changes. An interesting quote comes from respondent 21 who explains that the adaptation of a sanitation form based on ecological principles is not only related to awareness raising: "*It is mainly the thought process that needs to change and then ecosan will be more acceptable maybe. If you look at principle on which ecosan is based you cannot debate these principles. They are very fundamental principles on which most human beings would agree to. It is based on carrying for the things (…) and so on. (…) But it is how you live these principles. We all agree that we shouldn't lie and we shouldn't think bad but sometimes we find ourselves doing these things. So it is just again something that happens without us thinking too much about it"* (respondent 21). Awareness raising is not always a sufficient solution, while people are not always acting upon their knowledge and they are often convenience based, something that will be explained in the next paragraph.

Related to the whole awareness issue is the question which priority people give to sanitation. In 15 of the interviews the question: "do you think sanitation is a priority for the Indian people?" was asked. Some respondent stated that they themselves thought it was a priority, but when asking further this was often not the case for the whole Indian population. 5 respondents believed it was not a priority for the Indian people, and 6 believed it depended on the situation, 2 believed it was no top priority and 1 believed the priority of people for toilets increased. 1 respondent believed it was a priority, but it is questioned if he understood the question correctly. Respondent 5 believes the priority of Indian man is not always toilet access: "*Of course there is a demand for sanitation but I think the demand for mobile phones or for a nice motorbike is still higher unfortunately, then for sanitation. At least for men, women are a different story."* The respondents that believed it was depended on the situation stated that the demand was often higher in highly dense settlements. Or when water was not available, water supply schemes are most desired making sanitation a second priority. Respondent 7 explains that in schools toilets are often not present, as school teachers have their priority in education and the arrangements in which education takes place are being overshadowed. One respondent brings the different respondents together: the ones who believe that sanitation is not a priority, the ones saying it is no top priority and the ones that believe that it depends on the situation: "*It is convenience based I think. It is not about toilets and it is not about mobile phones. Anything you would even find convenient yourself is what you would find yourself doing. So if I am a guy in a village and I can just go shit outside it is convenient for me. It is not that I really care about what is really happening in the larger picture. So just to increase my convenience I need a mobile phone, so I'll use that. So everything is convenient based, so until unless people find something more convenient they keep at it*" (respondent 21).

Although most of the respondents explained several cultural barriers and expressed a lack of awareness and priority from the Indian population, a few references are made to an observed change since the government had its extensive total sanitation campaign, which will be further explained in the next section, and due to the combined effort of several NGO's and big donor organisations in the country. Some people claim that the taboo on faeces and urine is decreasing. As respondent 3 explains: "*People used to chase you away with stones and sticks when you came to talk about a toilet. Today no, they say yes, let's see what we can do."* Things are changing on the cultural level, although it is hard to break the

persistent taboo which is connected with the sanitation topic. Cultural issues that have influence on the situation in ESF will be discussed in the section on internal capacity.

5.3.2. Institutional capacity

Definition of capacity	**Enabling capacity factors**	**Capacity gaps**
2. Institutional capacity	1. Big donor agencies have formulated sanitation goals. 2. The ministries of urban and rural development actively propagate sanitation goals. 3. Higher stakeholders are involved in cities, in villages village meetings often take place. 4. Ideas of ecological sanitation are slowly incorporated in government policy.	1. No involvement of the ministry of agriculture. 2. The government falls behind when speaking about ecological sanitation. 3. The success of government projects is very variable, caused by a one sided focus on implementation and the lack of awareness raising. 4. Government is not transparent. 5. Not enough lower stakeholder involvement in cities. 6. A bigger effort is needed to meet the great sanitation problems in India.

Table 5.4. Institutional capacity: enabling factors and capacity gaps

As already explained in the last section, some changes recently appeared within the sanitation field. Big development agencies, such as the United Nations and UNICEF, adopted sanitation in their anti poverty goals (B: www.un.org & www.unicef.org). Also one of the biggest donor agencies, the Bill and Melinda Gates foundation, started to invest money in sanitation projects (www.gatesfoundation.org). Besides the big and smaller NGO's working on the field, the special attention in this section will go to the government of India. Such attention is motivated by the strong influence the Indian government has on sanitation policy all over the country. The attitude of the government is analysed and subsequently transparency issues and the level of stakeholder involvement is discussed. The analysis of the interviews resulted in a very diverse picture. This can partly be explained by the diverse background of the respondents: 7 of them are (semi-) governmental employees and the rest is working for NGO's or for Seecon or ESF. Some of the respondents believed that the government is actively changing its attitude by developing sanitation goals and promoted examples of the big governmental total sanitation plan (which has no specific focus on ecological sanitation) or more small scale ecological sanitation projects and policies. This opinion came up in 8 interviews, from which 5 are, maybe surprisingly, working for ESF and Seecon while only 3 of the 7 (semi-) governmental employees shared this opinion. 2 of these 3 governmental employees, moreover, state accordingly that the government is working actively on sanitation, but that the topic of ecological sanitation still lacks behind. The other respondents believe that the government is changing its attitude, but that change is going slowly. Within the focus group, the general opinion was that the government is not actively involved in sanitation issues. This opinion could depend on the rural character the respondents were living in, with a maybe unwilling local government. The respondents of the focus group, moreover, all belonged to the lowest caste, which might cause the dissatisfaction with government institutions as they are the ones living in most harsh circumstances.

When asking if the government is actively enhancing ecological sanitation, in 7 of the interviews the willingness of the government is addressed, but the changes in relation to sanitation, imposed by governmental projects and policies are often seen as not too big, or as sometimes going slowly, decreasing the policies' effectiveness. This is explained by respondent 1: "*The central government sanitation policies have included ecosan. I was at the conference in Delhi and Prime Minister Manmohan Singh was talking about recycling and reuse of human wastes. Some state governments even have special subsidies for ecological sanitation. (…) If you look at the problems of the whole country, ecosan is not that topic that is the foremost on the agenda of the politicians and the people. They do it to a certain extend. To that extend they think it is important."* The commitment towards ecological sanitation and the implementation is, according to the same respondent, also depended on the federal state and cannot always be generalised. A critique given in 4 of the interviews is that the government does adapt standards on ecological sanitation, but that real implementation is not occurring. The commitment is restricted to paper but has not yet lead to action in the field.

On one of the websites of the government of India, an explanation of the total sanitation campaign is given. The objective of the campaign is to "*eradicate the practice of open defecation in 2010*" (http://ddws.nic.in). A goal of which the deadline has already expired and has definitely not been achieved. The statement does, however, say something about the magnitude of the project. To achieve the goal some subsidies (although often projects are not completely subsidized) and awards serve as an incentive for local authorities to start up sanitation projects. The ministry of urban development, likewise, has formulated ambitious sanitation goals for the urban areas of India and is developing several policies, hands out subsidies, develops a ranking list upon which the sanitation situation of the city will be displayed, develops an awareness programme and hands out grants and prices (www.urbanindia.nic.in). So both urban and rural development ministry are actively taking action in the sanitation field, which trickles down to lower governments too. A policy from the municipality of Pune, for example, is a new law which makes it compulsory for housing societies above a certain square meter to take care of the complete waste management of the plot, including some recycling components (respondent 12). In the Pune and other municipalities there are also initiatives on rainwater harvesting (respondent 8) and green buildings (respondent 11). The absentee in this list is the ministry of agriculture. This ministry has a great potential in for example the abolishment of subsidizing artificial fertilizer and reinstalling the chances for faecal fertilizers. They are however not involved in any form of sanitation policy (respondent 4).

Another critical comment, made by some of the respondents is that the government of India focused too long on the implementation of toilets, but did not pay enough attention to awareness programmes, causing failure on the long run as many toilets were maintained poorly and hence abandoned or used for different purposes. In some interviews, the success of government projects is for this and other reasons called very variable, and in one interview the success rate of the government was considered very low. Another respondent complains that the government subsidies do not reach the grassroots level.

When discussing transparency issues in some of the interviews, the several answers given between the respondent had a contradicting character. Some respondents did also not

answer the question “do you think the government of India is transparent” or talked around it. Possibly the question was not well understood or had a sensitive character. One respondent clearly calls the Indian government corrupt, while another respondent believes it depends on the situation and again another one believes the Indian government is totally transparent. When looking at external resources, many issues with transparency and corruption appear. Wax, a journalist writing for the Washington Post, states for example that “*nearly a fourth of the 540 Parliament members face criminal charges, including human trafficking, immigration rackets, embezzlement, rape and even murder*” (2008). Likewise, on the 2010 shortlist of transparency international, India scores a 3.3 on a scale from 0 till 10, where 0 stands for highly corrupt (www.transparency.org). In addition, 2011 is a year full of protests against corruptive practices in India, leaded by the social rights activist Anna Hazare and his supporters (see e.g. http://articles.timesofindia.indiatimes.com & www.nos.nl). From these sources it can be concluded that corruption in the Indian government is still a great issue and the Indian government cannot be called transparent.

Another aspect part of investigation in this research was the involvement of stakeholders in several governmental processes and policies. India is, despite issues related to transparency, a democratic country which leaves space for indirect participation. Due to the scope of this thesis, the functioning of this democracy is not further analysed. The answers of the respondents given to the question “are stakeholders involved in sanitation decisions” showed again a diverse picture. On some policies public consultation takes place (respondent 3 & 6) and the government sometimes organises conferences on which experts that are working in the field are invited (respondent 4). Some respondents, moreover, refer to the common practice of small villages to organise town meetings where new policies are explained and discussed. On the contrary, a respondent states that the local municipality of Pune claims to have public consultation, but that in the end not that much happens. Again another respondents explains his worries about the involvement of the ‘lowest’ stakeholder. This NGO-worker claims that the ones that are without power are often not heard or properly represented (respondent 21).

From all these different opinions it can be derived that the government does pay attention to (conventional) sanitation systems, but the implementation of ecological sanitation falls behind, even though awareness about ecological sanitation increased on the government side. The overall project success of government projects is very variable and the government is often criticised for being slow and hence ineffective. Public participation on the topic is sometimes possible, although participatory processes do not always really occur and especially the ones without power are not always considered. Also, transparency is not guaranteed, making the government a difficult partner to work with on the sanitation topic. In conclusion, besides the great commitment the government showed towards sanitation, when considering the magnitude of the problem, a greater effort from government side is required.

5.3.3. Internal capacity

Definition of capacity	Enabling capacity factors	Capacity gaps
3. Internal capacity	1. ESF sets objectives and goals. 2. High level of respect for the higher staff. 3. ESF is involved in a broad network with several NGOs and has influence within the sanitation field. 4. ESF has good contacts with donor agencies, securing its monetary income. 5. The staff of ESF has a high level of human capacity and experience to make ESF an efficient organisation. 6. Good scientific basis of the training and the website. 7. Good information and communication structure within the organisation.	1. Some objectives and goals remain unclear. 2. Lack of evaluation of objectives, goals and the success of trainings. 3. Potential conflicts of time and interest by the higher staff. 4. High level of hierarchy within the organisation. 5. Lack of defining all the capabilities by ESF staff. 6. Absence of lowest caste personnel in ESF. 7. No person in ESF is performing evaluation work, likewise evaluation is hard by incomplete archiving of relevant data. 8. Some personnel in ESF seems superfluous. 9. Not enough training of the personnel in ESF.

Table 5.5. Internal capacity: enabling factors and capacity gaps

Within the internal capacity, all aspects described in chapter 3 that are related to ESF are included. These are organisational capacity, resource capacity, scientific capacity, technical capacity and human capacity. In this section the vision and objectives, the leadership, hierarchy, skills and scientific and technical capacity of ESF are discussed.

The vision of ESF is as following*: "The ESF aims to transform into a sustainable key resource centre as a leading knowledge hub in sustainable sanitation and water management."* (www.ecosanservices.org). This vision is considered as clear and realistic.

In addition, the overall vision of the organisation is supplemented by five objectives:

"1. Developing sustainable organisational structure and processes.
2. Strengthening our position in capacity development through training, piloting and demonstration, awareness raising, R & D and coaching in new enterprises.
3. Strengthen our networking platform with national and international experts in the sector.
4. Open dissemination of knowledge through face-to face as well as IT enabled services for institutions and individuals.
5. Quality Management and organisational learning to highlight best practices in the sector" (www.ecosanservices.org)

Some of these goals are quite clear and related to the overall vision of the organisation. It is, however, not completely understood what is meant, on a more practical level, by 'sustainable organisational structure' and 'processes and quality management'. These concepts are rather meaningless if not further explained and specified. While this research focussed more specifically on the training programme, the staff of ESF and Seecon has been asked what the objective of the training is. All staff members that where asked about the objective of the training gave an answer that was related to awareness raising, the changing of mindset, the giving of inside knowledge and or the building capacities of training participants. Most of these respondents refer specifically to the goal of the (expert) training and answered that the participants should, after the training, be able to implement ecological sanitation projects on the ground. These ideas are illustrated by the respondent 1: "*The main objective of the training itself is to strengthen capacity of people attending the courses in sustainable sanitation water management and help them to facilitate project implementation at the local level.*"

While the ideas about capacity development, or capacity building which was the term more often heard in the interviews, could differ from the extended view in chapter 3 of this research, the respondents referring to capacity building or development were asked to explain this concept. In all explanations the main focus is on the development of knowledge, instead of referring to a broader conception of capacity. Only in one interview a broader concept about capacity development is given. After first defining capacity development as 'building knowledge' further on in the interview the respondent implicitly states capacity development is also related to the provisioning of opportunities: *"Well you need to train them, very clear. You give them opportunities where they can go and experiment, they learn from the failures and getting different things implemented. That is a way of capacity building.* (respondent 3). So besides this one statement, the definition of capacity development is formulated very narrow by the respondents as they are referring to intellectual capacity in the form of knowledge sharing. That this will lead to some problematic outcomes within the training, will be explained in section 5.4.

Besides these points, no measurement or evaluation of the organisation and the training's goal and objectives has been observed. Especially on the level of training it was clearly visible that evaluation was lacking. This is supported by one of the staff members. He states that *"I think one of the major aspects for the future point of interest will be exactly this evaluation or monitoring of the impact. Because there is a lot of money involved in this courses and the donors for sure want to see, and also us, what is exactly the impact. Does it really help people to set up their own business?"* (respondent 2). Some direct evaluation did appear after the training, while course participants were asked to fill in some forms and to give feedback by a 'mood- measurer', but this information was not processed in any report. Also, this kind of evaluation was only about the satisfaction level of the course participants and did for example not check how many ecosan projects were set up after the training. Something that has earlier been defined as a desired outcome of the training. The absence of this form of evaluation can be considered as a clear gap in organisational capacity.

It is, after the short research period within ESF, not possible to give a full assessment of the leadership within the organisation. What can be said is that the director of ESF and the CEO both had side functions in other waste water management company and were often days

not present at the office. Having an important function in two different companies working in the same field can cause potential conflicts of interest. This is, however, never actively observed and can therefore not be confirmed. What has been observed is the absence of the higher staff of the organisation on daily basis within ESF, as the management staff often had obligations for other organisations. If this is problematic for the daily business of the organisation can not be confirmed either. When speaking about the director and the CEO, the staff was always very respectful and they praised their capacities, which implies that they were satisfied with their leadership.

The hierarchy within ESF is, after internal observations, considered as high. The organisation contains a clear hierarchy, of which the assistants were the lowest and were directly reporting back to their heads. They did not receive much responsibility by their heads, but directly executed what was told to them. While they were not expected preform anything besides executing for the higher staff, they did not get the chance to develop their personal skills and competences. Personal input from them seemed not appreciated. Also, the hierarchy appeared in some cases conflicting with the most efficient policy. Sometimes specific work was not being executed by the staff member with the most appropriate skills, but, occasionally after some internal struggle, by a staff member that was higher in hierarchy and had a better status. These observations can be considered as a gap in internal organisational capacity, as it forms a barrier for the development of skills of the lower staff and for the most efficient policy.

The Ecosan Services Foundation is involved in a broad network of NGO's that are working in the field of water and sanitation. The organisation has also good contacts with donor agencies, such as the German GIZ and local governmental officials. The staff claims that with the joint efforts of all NGO's in the field, awareness increased and the general opinion about ecological sanitation has become more positive. This suggest that the organisation has visible external influence and therefore has a certain degree of power in the field. Furthermore, while having good contacts with some big funding agencies, ESF is in possession of sufficient monetary resources for the coming years. Also, office resources where of good quality.

The staff of ESF is high educated and the right skills seem to be present to make the organisation functioning efficiently. Besides, most of the staff are experienced and have complete knowledge about ecological sanitation. The only knowledge issue is that of some of the capabilities, which were defined by Enssle and Messmer and were not discussed by the staff of ESF and Seecon. This is something which can be improved. Further on, most of the categories in human capacity as described in chapter 4, seemed to be present. Despite this, a few other capacity gaps have been discovered. A characteristic that is for example missing in the organisation is the absence of lower caste people. Some of the course participants where critical on this point while they believed that ESF people did not understand their situation properly. They also had critique on the fact that the staff did not have an UDDT themselves, making them inappropriate for the promotion of the toilet. Another issue that appeared is the absence of somebody who is doing a proper evaluation to possibly detect discrepancies between the original plans and the outcomes of the organisation's policy. Related to this was the inadequate administration of former course participants, making evaluation a difficult task. Additionally, a critical remark could be made

about the number of staff in the organisation, while some of the office assistants seemed superfluous. When discussing the level of training the personnel received, some contradictions came up in the answers given by different staff members. One of the respondents stated that there was a six monthly internal training course while three other respondents said that such a regular training was not the case. Another respondent stated that they sometimes visited other training courses, but that this was very rare. In order to keep up to date on the field, this is a capacity gap that should be filled.

The scientific level of the information within the training of ESF and their policy was very high. Except the office assistances, all staff members studied at universities and were able to deal with complex information. Also, the organisation has developed the online tool (E: www.sswm.org) were scientific based information about sustainable sanitation and water management is freely available.

When discussing the technical capacity within the organisation, in the form of a communication and information structure, no issues appeared. Moreover, while having a high level of knowledge about the different techniques falling under the term ecological sanitation, the explanation and delivery of the technique was no problem for the organisation staff.

5.3.4. Scientific capacity

Definition of capacity	**Enabling capacity factors**	**Capacity gaps**
4. Scientific capacity	1. Some scientific publications, especially on the field of civil engineering, are present.	1. Lack of social research. 2. Lack of Indian case specific research.

Table 5.6. Scientific capacity: enabling facors and capacity gaps

While research is not solely related to the internal organisation, a few words will be added in this section. Some respondents claim that there is not been enough research available on the topic yet. An employee of ESF explains that: "*There needs to be done a proper study of all the ecological sanitation projects which are implemented in India. So we have given one recommendation on one of the conferences which was organised jointly with the municipal from the government of India, that they should do the proper survey and they should provide some document which provides the overview of other people and shows the benefits. (…) Assessment of the projects and their results and a combination of all the data, different technologies. That is not there"* (Respondent 4). Similar responses have been given in two other interviews. Although there is a small scientific community doing research on ecological sanitation, there is a gap visual that is also adopted in the description in the section about the scientific contribution of this research. Social research and inclusive assessment schemes still lack behind, a clear capacity gap. Something that ESF with its online tool is trying to solve as well.

5.3.5 Human capacity

Definition of capacity	Enabling capacity factors	Capacity gaps
5. Human capacity	1. ESF tries to alter the situation. 2. Change is occurring at for example the university of Pune.	1. Lack of experts. 2. Lack of architects.

Table 5.7. Human capacity: enabling factors and capacity gaps

The human capacity gap, the lack of experts, is one of the main foundations for ESF to start up the activities they perform, especially in relation to their training programme. Other respondents were complaining about the lack of good architects during the implementation process. Ecological sanitation is often not part of the curriculum of technical universities (respondent 6), causing a lack of experts in the field. ESF did gave the example of a collaborative project with the university of Pune, that made the sustainable sanitation and wastewater management an obligatory part of the engineering bachelor, thereby showing a sign of change within the universities.

5.3.6 Technical capacity

Definition of capacity	Enabling capacity factors	Capacity gaps
6. Technical capacity	1. High market potential for ESF.	1. Land is not always available. 2. Some minor issues occurred during the design and implementation of some ecosan projects. 4. Often no proper maintenance of technique. 5. Companies offering their services for ecological sanitation are small in number. 6. Copy paste of Western technologies. 7. Not enough volunteers in ecosan. 8. Ecosan is not a sexy topic for investment.

Table 5.8. Technical capacity: enabling factors and capacity gaps

The techniques used under the name ecosan have a good scientific basis. Nevertheless sometimes issues still occur, which will be discussed in this paragraph. These problems can be related to the technology itself, but also implementations and maintenance issues and the market of the technology are of importance. To begin with, one respondents states that there are simply not enough good examples visual in the country, making it hard to start implementing the technologies for governments and NGOs. Likewise, according to some respondents, there are not enough experts or architects in the field that can actually implement projects. Another barrier for implementation of the technology is the availability of land needed when realising sanitation and wastewater technologies.

When discussing with the several course participants who, sometimes in collaboration with ESF, have started up an ecological sanitation projects, some speak of a few minor technical issues during the implementation stage. One respondents speaks about problems with the design of the decentralised treatment systems while another one explains that the hard strata required additional costs for the toilet implementation. Other issues raised by some of the respondents were the lack of appropriate architects, the lack of space and the poor availability of pans used to cover the faecal material chamber in the UDDT.

The proper management of ecological sanitation techniques was in some of the projects observed as problematic. In one of the projects, the respondent declared that 80% of the implemented toilets were not used anymore. Another respondent explains that 30% of the implemented toilets faced problems. The not using or maintaining of the toilets, according to the respondents, is caused by a lack of awareness or acceptance by the users (and the lack of funding to provide new awareness programmes), a lack of demand from the user side, or the lack of individual responsibility to maintain the toilets.

Although the market for ecological sanitation can be seen as one with a great potential, there are still very few companies involved in ecosan. One of the staff members states that only about 15 to 20 companies are working actively with ecological sanitation, which is a very low number considering the country size. Then, respondent 8 states that the Indian economic growth, causes India to look at solutions from the West, instead of developing solutions better which are better within the Indian geographic context. Related to this is the attitude of several large companies, that can make profit out of this conventional system: *"For the constructors companies there is less money to earn from ecosan, especially for the big international companies, its made by the local people, it can be locally made by trained people*" (Respondent 2). Besides the market sector, one respondents claims that there are not always enough volunteers to make ecosan a flourishing practice in India and that it is, related to the cultural capacities, not a sexy topic, and therefore not a priority for investment.

5.3.7 Process capacity

Definition of capacity	**Enabling capacity factors**	**Capacity gaps**
7. Process capacity	1. Clear ideas of capacity gaps and development. 2. Clear formulation of response to the defined capacity gap.	1. No stakeholder identification and involvement due to monetary reasons. 2. ESF did not evaluate if the capacity gap has been filled. 3. Goal of response not met.

Table 5.9. process capacity: enabling factors and capacity gaps

As described in chapter 3, the first step of process capacity is the identification of the involved stakeholders. The training participants were however not identified as stakeholders, but recruited by the promotion activities of ESF. This can be seen as a capacity gap: when an organisation is trying to develop capacities to reach a sustainable development practice it is indispensible to identify the stakeholders that are powerful in, or affected by a certain practice. In ESF there is no real target audience, everybody who pays the fees is welcome to participate. Problematic for ESF is that they are also dependent upon these

course participants. Since there are not always enough participants that are willing to pay the course fees, they adopted a sort of 'take what you can get' policy. This policy could only be changed when the course would be provided for free. In this case, ESF would be able to invite the relevant stakeholders, who would be more likely willing to participate in the training.

In the second phase, the definition and the goal of capacity development needs to be formulated. ESF seems to have a quite clear picture on this. Capacity is desired according to many of the staff members, since they discovered a lack of experts in the field. Therefore experts, often originated from (semi-) governmental organisations or NGO's, are 'created'. This so they can implement projects on the ground. While there are no stakeholders defined, the assessment of needs and capacities is done without involvement of external parties.

The response to the so called lack of experts is the development of a training programme and the set up of some pilot projects in order to get the right knowledge basis for this training. This response is performed successfully and 30 training courses have been given over the last few years in which the human capacities of new experts are tried to be developed. The training also appears to fit the Indian cultural and political situation as the staff is aware of sensitivities and good in avoiding conflict situations during the training course. Although a broad training programme, though lacking certain capability categories, has been set up and is preformed quite successfully, the training in the end does not lead to the right development of capacities, while many respondents did not start up any ecosan project after following the training. It can therefore be wondered if training is the right tool to reach the goal of project implementation. This will, moreover, be discussed in detail in the following section when assessing the success of the training programme. The organisation has enough budget for their functioning, although a stakeholder involvement is not included. Budgetary statements are, nevertheless, hard to make while for this research there has not been a complete insight in the monetary choices made by ESF.

In the last phase of process capacity, evaluation takes place, in order to see if the capacity development practice turned out to be successful. In other sections it has been explained that ESF is not evaluating its policy, a clear capacity gap. In section 5.4 the evaluation of the training is central.

5.3.8. Financial capacity

Definition of capacity	**Enabling capacity factors**	**Capacity gaps**
8. Financial capacity/resource capacity	1. Increased amount of money invested in sanitation over the past years.	1. Poverty. 2. Unauthorised settlements. 3. Increased amount of money necessary, invested by government and rich people.

Table 5.10. Financial capacity: enabling factors and capacity gaps

Besides the budgetary statements about ESF that, which were hard to make, and the increasing amount of money that is invested by the government in (eco)sanitation, the category resource capacity, as described in chapter 3, is not seen as fully appropriate in

relation to the answers given by the respondents. While resource capacity clearly refers to the resources available within organisations and institutions, the answers given by the respondents were often not related to specific institutions or organisations, but focussed more on the overall amount of money that was invested in ecosan and the problems relating to poverty. Some respondents explained that poverty is causing barriers when implementing sanitation technologies on a large scale, by the fact that poor people have no money to invest in sanitation services. Especially in slum areas it is, due to space and poverty reasons, a big challenge to implement toilets. In these areas people often decide to use their little space for different purposes, for example by having a little shop (respondent 3.). As slums are already unauthorised settlement, the rule of law will not provide an answer. The financial resources invested in the technologies by different parties, although increased over the years, were not enough to meet the magnitude of the problem. With financial capacity, a new capacity can be added to the list as described in chapter 3.

5.4. Evaluation of a training programme

5.4.1. Categories influencing the success of the training

In chapter 3, several categories influencing the success of a training are explained. One of these is the personal characteristics that were brought to the training by the participants. These characteristics are hard, although not impossible, to influence. The training is, according to the staff of ESF, tailor made and adapted to the participants (respondent 6), although there is not always sufficient time to fully adapt the training every time and a learning needs assessment is therefore not fully executed (respondent 6, 8). While there is no real target audience, thereby, ESF restricts it's influence on the personal characteristics.

The second characteristic that is contributing to the success of a training is the so called profitable climate in the organisation and the institutional context. Since almost all the course participants where very much satisfied with the training, it is believed that the climate was good and the participants enjoyed participating. An issue that does appear is the high hierarchy and status difference of the staff members in ESF. This influences the quality of the lectures, as the ones that are the best teachers are not always the ones giving the lectures. Also personal issues were not always set aside to serve the effectiveness of the training.

The third category, influencing the success of a training, is related to the training characteristics. The ESF training programme contains several tools, serving different kind of people. While classical lectures are given, related to the so called instruction-based method, there is also attention to several group works, which is correlated to the behavioural model. By combining several training techniques, different interests are served. The training, furthermore, contains a programme in which many aspects of ecological sanitation are treated: from more technical aspects, to environmental issues and from social aspects to implementation techniques. The subjects discussed are dependent upon the course participants and on the duration of the training. Besides several capabilities that stay untreated, as described in the first section of this chapter, the programme has a quite complete character. Another comment that can be made is that ESF could give a better explanation on how a project can be implemented within the institutional context. So, for

example, how can one try to involve governmental organisations or how can one apply for funding in great donor agencies? Besides these two points, the content of the training is very satisfactory. Only a few issues within the training appear which will probably not form a barrier for full learning.

On a more practical level, certain aspects could be improved too. To start with, within the training some of the lectures showed some overlap with each other. A problem which is easily solved by, for example, a briefing or review in advance. Some of the lecturers, in addition, could improve their contact with the public and adapt their lecture and lecturing style accordingly. In relation to this, the knowledge of the course participants always needs to be the starting point of a class, else the attention of the course participants will most probably decline due to difficulties in understanding. Some slides, supplementary, contained too much text or mixed colours that did not contribute to their readability. One ESF staff member stated, in addition, that it was not always possible to bring governmental officials to the course to have a session with the participants, something she highly values. Or, another employee explains that the side visits were not always meaningful while there were not always good projects in the close surrounding of the training location. It could be decided to give the training only in appropriate locations, although this might not always be possible. Additionally, an important aspect is that the objective of the training course, the development of capacity in order to make the course participants start up projects on their own, should be the focus of the whole content of the training programme. It is therefore believed that the time spend on ceremonial services can be reduced, without of course being absent fully, in order to serve this objective.

5.4.2. Evaluation of the success of the training

When having described the success factors that are influencing a training, it is now important to analyse if the training was actually successful in the end. In chapter 3 it has been shown that this can be analysed in terms of reactions, learning, behaviour and or results of the training. Starting off with the reactions, 11 of the course participants were very positive about the training against 2 participants which gave a more modest but still satisfied opinion about the programme. So the overall feedback of the participants can be seen as positive, making the training on the reaction level successful.

In chapter 3 it has already been explained that a full assessment of the learned knowledge is not within the scope of this thesis, as this would require psychological tests in different stages of time. For now, it can be said that most of the participants were able to give a quite extensive explanation of the concept of ecological sanitation and its advantages. Only one former course participants was not able to perform this task. But in the other interviews the respondents were clearly up to date about some ecological sanitation techniques, their advantages, some of the deficiencies and other difficulties related to the subject. On the level of knowledge transfer as part of improved human capacity, the course can therefore too be considered as a success. An advantage of the training is, according to one of the respondents, that it can be a good tool to “sit back and think”. An option that is not always present in daily life.

When moving on to the category behaviour, more research difficulties are to be faced, as this criterion is hard to measure as the course participants have not been followed after the training programme. Statements can therefore not be made about the real behavioural change after the training. Most of the course participants claim that the training changed their attitude towards ecological sanitation, and the ones who claim that they only changed a little were the ones that were already very much familiar with the concept. This criterion, however, is interesting when combined with the results criterion. When evaluation is carried out on the results and success has been monitored afterwards, this implies that behavioural change took place as well. While the desired outcome of the training is to have on ground project implementation this is the number which needs to be researched.

Unfortunately, by having interviewed 13 respondents on a total of 500 to 600 participants, a valid percentage of the ones implementing projects cannot be given. In the pool interviewed, 5 of the respondents did not start up any project. 2 respondents, working for the same governmental organisation, started up a project with the local municipality (although it was not clear if the initiative was theirs), 2 started up a project independently, of which both already had plans to implement before the course, and 6 started up a project with help from ESF. It is, however, suspected, that these numbers cannot be generalised to the whole training pool, while the ones starting up a project are the ones most likely to keep contact with ESF, especially when they were starting up a joint project. Due to being depended on the contacts provided by the ESF staff, which were often incomplete and contained wrong data, no random selection could take place, making valid generalisation of the presented numbers impossible. Also, a broader survey did, due to incomplete date and therefore high non response, not provide a trustable answer. What can be said at this point is that it is suspected that a great amount of the respondents did not start up a project. How high this percentage is cannot be said, but fact is that there is a gap visualised between the learned knowledge within the training and the afterwards implementation of a project by the former course participants. A gap that decreases the success of the training.

5.4.3. Barriers for project implementation

While a gap can be observed between training participation and project implementation the question arises what are the barriers for these course participants to start up a project? Especially, since almost all respondents claim to have changed attitudes and in the interviews they described a great number of advantages of the different technologies. Many obstacles, preventing them to implement, came up after discussing this in the interviews with the course participants. Personal barriers explain why some participants believed they were not implementing a project. When these barriers prevents actors from starting a sustainability project, even though this is desired by them, capacities are not fully developed. The gaps are summarised in table 5.11.

Personal barriers in starting up a programme
1. Being only an individual without good external linkages.
2. Not enough time.
3. Being a Dalit.
4. Having no influence or not the right position in an organisation to implement.
5. High implementation costs.

6. Not enough motivation.
7. No skills to receive funding.

Table 5.11. Personal and general barriers

As a start, some of the respondents stated that they were only individuals with no external linkages that could help them to set up ecological sanitation projects. One of the respondents explains: *"Unfortunately for someone like me it is difficult to implement that unless you are either some kind of attached to an organisation that is working on that or an organisations that is willing to experiment, then they can do that"* (respondent 17). Time has also been called a barrier, when not being associated with an organisation that is already working with sanitation. A respondent explains to not have enough time to fully devote him or herself tot het topic. It is interesting that one of the staff members of ESF actually does state that a place where people go and experiment is desirable: *"Well you need to train them, very clear. You give them opportunities where they can go and experiment, they learn from the failures and getting different things implemented"* (respondent 3). Although this was stated, ESF clearly solely focus on training and does not provide a programme like this. In the focus group, the respondents explained that being a Dalit, the lowest caste in India, was a problem. Even though the caste system is abolished in India, they felt ignored by being a Dalit and they claimed that being a member of this caste created a barrier for them in having the right connections.

Even when working in an organisation, the person visiting the training is not always the one in position to start implementing ecological sanitation. This because they will have to deal with different organs and bureaucracy within an organisation on which they might have few influence. Furthermore, there is sometimes a gap between the objective of the training participants and ESF itself. One of the staff members declared that *"They only come because they just get 2 weeks off, and they don't have any plans to implement anything"* (respondent 8). When the motivation is not there, implementation will not take place. Moreover, some references were made to the high implementation costs, making people unwilling to implement themselves. Often stated was also that respondents did not always were familiar in how to get funding, so there was no monetary foundation for starting up a project. All these different barriers are making project implementation of the former course participants a quite unlikely event.

5.5. Conclusion

In this chapter, many different factors have been discussed. The tables provided an overview of these factors. To research the current state of all the capacities, which are accordingly influencing the capacity development process by ESF, the capacities were divided in several spheres. These different categories were: cultural and awareness, institutional, (internal) organisational, human, technical, process and financial capacity. The capacity categories consists out of enabling capacity factors and capacity gaps. All these capacity enabling factors contribute to successful project implementation and if they are enabling they contribute into making ecosan a flourishing practice in the Indian context. The many barriers do, however, show that much works has to be done before this will be the case.

Then there is the capacity development response tool of ESF in the form of the training programme. The training programme discussed a wide range of topics, although several capabilities could be stressed to reach full inclusiveness. The training was successful when evaluating the reactions of the course participants and they also showed to have learned a lot from the training. Behavioural changes could not be fully researched, but it became clear that several personal barriers, which are described in table 5.11, prevent the course participants from implementing sanitation project. This makes the final outcome of the training quite unsuccessful.

In the next chapter several solutions to these capacity gaps and the lack of project implementation after the training, are provided.

6. Discussion

6.1. Introduction

In this chapter two issues will be part of reflection. One is the knowledge gained from the course participants that did implement a project and which defined several categories that are contributing to the sustainability of the project and those categories that are causing a barrier to success. There has not been an automatic link between following the training course and project implementation visualised so it can be stated that the training did not lead to successful project implementation. Lessons can, however, be learned from projects that did got implemented. Knowledge about those factors that contribute to the sustainability of a project is useful for project improvement and can form a start for further research. Additionally, several advices are given which are often defined by the course participants. These advices concern the several capacity gaps, which creates a field that is not always enabling for project implementation, and are related to ESF and its training programme.

6.2. Project implementation: Success factors and barriers to success

Although there is a great amount of course participants that did not implement any project, decreasing the success of the training programme, there is also a group that did start up a project. In these cases the outcome of a training is that that behaviour did change and lead to project implementation. A full sustainability assessment is not part of the scope of this thesis, but as the success of a training programme is also related to the sustainability of these projects it is interesting to shortly comment on these. Of the projects discussed and visited, 3 claim to be sustainable. One respondent explains that most project he arranged are sustainable, besides one school sanitation project. Then there where the respondents in Tamil Nadu that had only a success rate of 20 % with their projects and the respondent from Gujerat who stated that 70% could be called sustainable.

Image 6.1. UDDT used as storage room

In some of these more successful cases, ESF did provide the right basis for successful projects. In cases where the projects can be called less sustainable, the toilets were often used as a storage room or left abandoned. An example of this failure is given in image 6.1. These differences in sustainability were assigned to different factors. The Tamil Nadu team expressed that they had financial issues causing them to have problems with continuing the awareness projects. The ESF staff members, however, claimed that they did not involve the end users sufficiently. Unfortunately, it has not been possible to see which party is right in this issue. In table 6.1 the success factors and the barriers to success are summarised.

Success factors	Barriers to success
1. Related to capacity factors, see table 6.2.	1. Lack of maintenance.
2. Demand from the end users.	2. Not the right resources for maintenance.
3. Financial contribution by end users.	3. Wrong mentality.
4. Education of the end users.	4. Lack of sense of ownership by free toilet provisioning.
5. End users can actively use the resources.	5. Maintenance cost.
6. High price of artificial subsidies.	6. Lack of knowledge on how to use a toilet.
7. Decreasing acceptance about pesticides on the world market.	7. Incomplete projects, only focusing on implementation.
8. Users already familiar with sanitation.	8. Top down implementation.
9. Owner earns a minimum income.	9. Copy paste behaviour of architects and engineers.
10. Paying for maintenance.	
11. Ecosan being a settled technique.	
12. High water and nutrient scarcity	

Table 6.1. Success factors and barriers to success during implementation processes

What makes a project successfully implemented and maintained is related to multiple factors. It depends on funding, awareness and organisational issues, which were already defined in the capacities section and will not be explained here. As a start, the project is more successful when there is already demand, although sometimes after informing the end-users about the technologies. Demand can be higher in rural areas, where the reuse aspect can play a big role, but also in dense settlements, where people are in higher need of a toilet. To see if people really have demand and to create a sense of ownership, it can therefore be a good idea to let the end users pay a part of the price of a toilet or waste water system. The education level of the end users is, moreover, often contributing to the success of a project. The higher educated farmers will be more aware of the benefits of the used fertilizers, and might be better able to see the relation between different processes. Likewise, when a farmer himself can actively use the resources from ecosan and see the benefits of this, the project will moreover increase the chance on success. It would therefore be beneficial to decrease the subsidies for fertilizers, most possibly increasing the demand for ecosan. Also the increasing non acceptance of pesticides on the world market makes ecosan an attractive alternative *"India is coming forward towards grape fruits for making wine. Those kind of areas probably, will look for ecosan, because most of this people are educated and are willing to experiment. They want to produce for the European market and foreign markets. (…) They don't accept when the percentage of pesticide is more than the accepted percentage. So naturally now people in these areas start to think of the alternatives, cause at the end of the day they have to send their goods right?"* (Respondent 17). In addition, people that are already using a form of sanitation access can increase the chance of project success, as these are the ones already more familiar with the concept. Moving further, when the toilet owner has a minimum income, this is beneficial for project success, as this leaves the opportunity to invest some money for installation and maintenance. Related to this, when discussing community toilets, some money should be paid by the toilet users in order to better organise the maintenance and making the project

more sustainable in the long run. Additionally, there is also an opportunity for companies to make profits. Once ecosan is a more settled technology, companies could start making profits with their investments, which will increase the number of initiative that will come up. Also, the demand and market for these technologies will increase once water scarcity becomes an expanded problem and nutrients become scarce.

As well as there are different success factors there are also different factors causing a barrier to success. One of the biggest factors causing problems in the projects visited for this research is the lack of maintenance. In 7 interviews this criterion came up. One respondent says this is related to the mentality of the people, while another one believes that material for good maintenance are not always present. A third respondent believes that the maintenance problems are often due to a lack of feeling of ownership, caused by the provisioning of free toilets. Likewise, in 3 interviews the maintenance costs are brought up as problematic. Also, knowing how to use the toilet is very important. When discussing the UDDT, for example, water and faecal material should not be mixed, a problem that occurred in some of the projects. The end-users should therefore be taught how to visit the toilet. Then, another issue preventing projects from being successful is incomplete implementation. As in some occasions the focus has only been on constructing the techniques, sometimes the focus was only on awareness raising. Both, however, need to be combined in order to make for a successful project. Similarly, projects should not only be implemented in a top down fashion. Community involvement is crucial for the users to have full knowledge about the technique and the profits and to keep them maintaining the toilet.

A barrier for success, furthermore, is the copy-paste strategy that some engineers and architects have. A one solution fits all is insufficient in the various geographical and social contexts that India has.

6.3. Solutions to the capacity gaps

Many of the respondents have provided solutions in order to improve the ecological sanitation situation in India which is referring back to the capacity gaps that where defined in chapter 5. The internal capacities will be treated in a separate section. In table 6.2. only the conditions that are directed towards the broader environment have been displayed. In the next section the specific advices for ESF and its capacity development training programme will be given.

Capacity sphere	**Solutions by respondents**
Cultural & Awareness	1. Awareness raising projects. 2. When raising awareness, focus on positive aspects. 3. Show people the benefits of the technology. 4. Promotion by famous people. 5. Improve communication and information. 6. Explain people the holistic approach. 7. Give successful examples. 9. Provide the opportunity for informed choice. 10. Teach in Schools. 11. Legally forbid open defecation.
Institutional	1. More extensive government involvement.

	2. More extensive involvement of ministry of agriculture, abolish subsidies for fertilizers. 3. Collaboration with local authorities. 4. Implement bottom up processes. 5. Law enforcement. 6. Start using the technologies at a higher level. 7. Give subsidies and grants for stimulation.
Research capacity	1. Develop more studies.
Organisational capacity	1. Collaboration of different organisations.
Human capacity	1. More experts need to be educated. 2. Teach in schools. 3. Give training programmes. 4. Awareness can contribute to people's motivation too. 5. Improve communication and information.
Technical	1. Make small modifications to the technology. 2. Increase company initiatives. 3. Ecosan needs to become a business. 4. Large scale projects need to be implemented. 5. Set up maintenance programmes. 6. Match the right technology with the right people.
Process	1. Greater involvement stakeholders is required. 2. Constant follow up. 3. Mix hardware solutions with software solutions.
Financial (resource) capacity	1. Financial assistance by rich people/donors is required. 2. Decrease the slums in a city. 3. Large scale projects need to be implemented.
Personal	1. Involve your neighbours. 2. Spread the word.

Table 6.2. Solutions to capacity gaps as explained by the respondents

Most solutions that were given by the respondents could be subdivided within the categories that were defined in chapter 3. Some answers by the respondents where hard to strictly place within one of the categories and have therefore been included twice. One category was added, since some respondents explained what they themselves could contribute or were contributing in order to make ecological sanitation a flourishing practice in India. Furthermore, the category 'resource capacity' was not considered as fully appropriate, as explained before, and is changed in financial capacity. The respondents believed that higher investment of money from governmental side was needed but also that rich people and donor agencies had to contribute. Besides, they stated that there should simply be more implementation of sanitation and more money invested overall since India is facing such large sanitation problems.

To change the capacity gaps within cultural and awareness sphere, 15 respondent named awareness raising as a solution to the problems in knowledge and acceptance. Respondent 21 adds that awareness raising programme should be done in a positive way: *"I am very scared by ideas such as walk of shame and things like this. I can scare you into doing something. I mean I can do it, but I think it is the wrong way to do it. If I punish you for not doing something, I am giving you the wrong message. If I help you to do something because*

you want to do it, I think that is a better way of doing it. You cannot always punish with shame, people into doing something." This statement stands in contradiction to some other respondents, claiming that punishment is the way to change the attitudes of people towards sanitation: "*There is no law that punishes people who are shitting on the open ground. That should be tightened (…) Like public smoking is now banned. Like that, open defecation should be banned by law*" (Respondent 23). Moreover, some respondents believed that awareness raising could be done by hiring famous people or they referred to several forms of media in which improved communication and information could take place. In addition, 6 of the respondents believed that successful examples need to be shown to the people, and the benefits of the concept had to be made clear to them. In 3 of the interviews the respondents, additionally stated that awareness should be raised and the benefits should be explained but that the choice should be left to the end-users itself. These end-users should be able to make their own informed choice. A way of internalising the ideas from a young age onwards could be reached by teaching the practice in schools, as explained by some of the respondents. Furthermore, 3 respondents stated that ecosan should not be promoted as isolated concept, but a more holistic approach should be advocated. Respondent 17 explains: "*The strategy we have to work out is basically to convince people the holistic approach which is not really communicated so effectively. That it is not only like ecosan but also like increasing the water availability for the crops and for the animals. In the rural areas where we talk about, they first think of their cattle then the human beings, that's what poor people. And that is the way it has to be promoted.*"

When analysing the institutional field, 6 respondents believe that the government should be involved more intensively and one respondents claims that more initiative from the ministry of agriculture would increase the flourishing ecosan practice in India, especially when they would abolish the practice of heavily subsidising artificial fertilisers. Likewise, the government should, according to one respondent, be an example and implement the technology on great scale in several areas. Moreover, the state government could increase collaboration on the topic with local governments and stimulate it for them to implement by handing out subsidies and grants for successful projects. 6 respondents, moreover, believe that the government should work more from a bottom up vision and increasingly involve the end-users into sanitation project.

In order to improve the technology used in ecosan practices, some respondents believe that more studies are needed. Furthermore, when discussing organisational capacity, which is in this case not directed towards ESF, one respondent suggest the collaboration of several organisations with each other. He explains that organisations working in for example slum areas could adopt the technology and implement it in their working field.

In the table it has been displayed that human capacity is closely related to some of the cultural and awareness aspects. In order to increase the amount of experts in the field, one can teach scholars in detail about the technology and training programmes can be given. Awareness and improvement of information and communication can contribute to increase the amount of people that are interested to develop their skills in this field.

To improve the technology, some small modifications within existing technologies are desirable according to two respondents. Likewise, it is necessary to match the right technologies with the right people in their geographical circumstances in order for programmes to become successful. Furthermore, company initiatives are desirable and

ecosan should become a business to increase on ground project. This is explained by respondent 1: "*The most important thing is that ecological sanitation needs to become a business. I think so far many projects were on a pilot base, they happened because donor money was available for example so the real impact of ecological sanitation will only happen when it becomes a business. And when people can earn money with it then things will go better by itself basically (…) A good example is the waterless urinal, which is a urinal that you don't flush. You don't need water for flushing, you just urinate and there is a sort of pee trap that prevents the smell coming out of the urine. A very simple technology. This became a business in Europe.*" In order to secure maintenance of the techniques, maintenance trainings and programmes need to be set up. When speaking of community solutions, one respondent believes that the person who cleans and maintains the toilet needs to receive an income for this.

Simultaneously, when starting up a programme, stakeholders need to be involved from the beginning on and projects need a constant follow up to make it sustainable in the long term. Also, hardware solutions need to be supplemented with software solutions and visas versa. Simply implementing toilets without involving the stakeholders or the provisioning of trainings will cause unsustainable outcomes.

Finally, the respondents believed that they themselves could increase the success of ecosan in the field as well by spreading the word and involve the neighbours in several projects.

6.4. Solutions to ESF and their training programme

The respondents and the author have given recommendations that can help ESF in improving their internal organisational structure and to adapt their capacity programme in order to overcome the gap between the increased knowledge of the training participants but the absence of great project implementations. In table 6.3. an overview is given.

Sphere	**Solutions by respondents**	**Solutions by author**
1. Internal capacity	1. Improve allocation of resources. 2. Train the personnel more often.	1. Formulate clearer objectives and goals. 2. Evaluate the objectives and goals of the organisation and the training programme. 3. Decrease hierarchy in the organisation. 4. Increase the opportunities given to the younger staff. 5. Hire low caste people. 6. Hire personal doing evaluations and organising data. 8. Decrease superfluous personnel. 9. Improve knowledge about human capabilities.
2. Training programme	1. Before starting a training, do a learning needs analysis. 2. Give participants an exam.	1. Keep a briefing in advance to prevent overlap between lecturers.

	3. Frequently repeat the training of locals. 4. Target audience by stakeholder analysis. 5. Develop more technical courses. 6. Teach in local language too. 7. Solve infrastructural problems by choosing another location for trainings.	2. Train lecturers in order to improve their training skills. 3. Review the presentations before demonstration. 4. Reduce time spend on ceremonial services.
3. Projects	1. Do a constant follow up. 2. Study the projects for a longer time period. 3. Use chances once they are there. 4. Start implementing more actively.	
4. General solutions to improve number of projects implemented	1. Develop a long term programme. 2. Develop a link with funding agencies. 3. Provide internships. 4. Provide different opportunities for interested individuals.	1. Software solutions need to be supplemented with hardware solutions.

Table 6.3. Solutions for ESF and their capacity development approach

Internal capacity is the starting point from which the capacity development response is created. It is therefore useful to adapt certain practices in order to make the organisation more effective. One respondent, for example, stated that within ESF money could be allocated to different purposes. By not letting people fly in from Switzerland, they could spend their budget on different activities. Some of the staff members, moreover, believe that extra training would be beneficial for their skills and this would keep them up to date in the sanitation field. The employees could therefore frequently been send to trainings from different organisations. Then, additional advice has been given by the author. In order to have a more clear vision on the direction of the organisation, the goals and objectives can be formulated more clearly. When discussing the objectives with the course participants, they gave somewhat different answers when compared to the mission statement on the website, something that could be changed. Evaluation of the objectives and goals and the moving toward these is, secondly, highly necessary and it is advised to hire somebody who has evaluation as one of its core tasks, in relation to the organising the data present in ESF. This person could also maintain the contact with former course participants and help them when facing difficulties. Furthermore, it would be beneficiary to decrease the level of hierarchy in the organisation and increase the opportunities for the younger staff so they increase their skills. Another point is, when recruiting new staff, to consider hiring somebody from the lowest caste, as this person would more easily understand the problems Dalit face and could improve the contact with course participants from this caste. In addition, some of the office

assistants seemed superfluous and their number could therefore be decreased. Finally, the knowledge about certain human capabilities could be improved and adopted in the training programme.

The respondents gave, furthermore, several advices to increase the success of a training programme. One of the staff members explains that a learning need analysis needs to be done before starting a training course in order to have more effective learning experiences by the respondent. She continues by stating that the participants should do an exam after following the training, which was the case in the first few trainings. In this the 'experts' could be distinguished from the participants which learned little from the training. Similarly, the audience should be targeted. Now everybody who is able to pay the course fee is welcome. When having the goal of project implementation, the organisation should focus on course participants that are willing and able to implement projects. Another two respondents state that the training should be repeated more frequently, as this would increase the likelihood of success when people that are confronted with new technologies are being taught more several times. Respondent 23 explains: *"So what we need is besides training, that 2, days, 3 days training will not help for a person to get into a development community. We should work on it for a long term. (…) Give them training. Suppose you say, you are not good in communications skills, so that kind of skills should be developed*". A fifth point is from one respondent who believes that when creating new experts, some technical courses are required as well. This in order to increase the knowledge of engineers and architects. In relation to the Indian context, two respondents believe the training should be given in the local language of that area as well, resulting in a wider reach of the training. Another two respondents believe that infrastructural problems should be solved by choosing a different location for the training. While site visits are very useful, the location should be adapted to them. Some of the solutions by the author are: briefing in advance to prevent overlap between lecturers, reduce the time spend on ceremonial services in the training and collaboratively review the presentations before presenting to increase their quality. As has been explained before, the lecturers could, moreover, be given the opportunity to improve their training skills by additional training and the visiting of trainings at other organisations.

When discussing the project branch of ESF with the respondents, more follow up is desired according to several respondents and the organisation should actively check if maintenance is preformed or not. Similarly, a respondent explains that the projects that ESF implements should be studied for a longer term period. Additionally, one respondent believes that ESF should seize opportunities more, once they are there and again another respondent believes that ESF should start implement more actively. He explains: "*Maybe, because it is not good enough to just train the people. You also have to do things yourself and you also have to demonstrate and you have to… So maybe your time gets spend in conferences and in workshops and in writing papers and research and so on, but you also need to do things. Because you cannot just keep talking about sanitation you also have to implement"* (respondent 21). With this statement, a first step towards the general solutions is made.

One of the most important barriers to success in ecosan is the lack of combining hardware and software solutions. Although ESF is involved with some project implementations, many of the course participants are only involved within the software training projects. Thereby ESF is contradicting its own statements. A staff member of ESF for example states that:

"*Many times it happens that you carry out awareness programmes, you don't complement that with actual hardware systems. So people are aware now, because of all the awareness programme and that they need or should have a toilet. But they actually don't provide the means and ways to have toilets. I am aware but I don't know where to do it, how to do it. So all the awareness programmes should be complemented with the hardware"(*respondent 3). Although ESF is not exactly involving in awareness programmes but in training, it is still possible to state that the knowledge given is not supplemented with the possibilities to develop hardware. Thereby, the organisation should develop a long term planning, including all these several aspects. As most course participants do not have the skills to provide themselves and their organisation with funding, linkages between them and large funding organisations need to be developed by ESF. Moreover, one respondent puts the idea forward to provide different opportunities for interested individuals in for example the form of internships. He states that: *"Maybe the organisation can provide some internships or maybe they can see who is interested, maybe not for the longer term but I think that will help. Learning theoretically to implement is one thing but then practically it is totally different. Because when you implement on the field there are actors and many factors, like for instance if you implement any sanitation or water purification systems you need to have knowledge about the local climate, the local soil, all this. So unless you do something on the ground, by internships where one can really participate, I think this would be useful. But that is my suggestions."* (respondent 17).

6.5. Conclusion

In this chapter many solutions have been provided to all capacity gaps and more specifically to ESF and their training programme. This advice has been summarised in table 6.2. and 6.3. Although some of the changes are not fully within the reach of ESF, there are many points which provide reasons for reflection on the current policy. Additionally this section has shown which are success factors and barriers for success during the project implementation process. These different factors are summarised in table 6.1. and could be tested in further research.

7. Conclusion

7.1. Conclusion

Central in this thesis has been the research question: *Which capacities are present in India and how successfully is ESF in developing these with their training programme to increase the amount of successfully implemented projects?* has been central. One of the main assumptions in this research is that capacities are necessary in order to improve human capabilities in relation to the ecological sanitation practice. Capacities thereby contribute to the quality of life of the Indians, as their freedoms to act are increasing when having improved access to several capabilities. The capabilities that have been discovered in this research are: to be able to live free of harassment, to be able to live a healthy life, to be able to coordinate the own time, to be able to save money and having access to sanitation, to be able to earn money with resources, to be able to have more opportunity in life as a women, to be independent of central systems, to be able to live in a clean and sustainable environment, to be able to make efficient use of the available resources, to be able to live in a nice and smell free town and to be able to have feelings of dignity. When these capabilities are present, the implemented ecosan projects have a greater chance of success as a result of the focus on a broad range of aspects, in addition to the often used practices where the main attention is given to health issues. This broad scope is also necessary during the promotion of ecosan practices, as demand increases when additional aspects are highlighted as well. In order to develop a project where capabilities are present, several capacities need to be developed. Capacities can be subdivided into several categories. These are: cultural and awareness, institutional, (internal) organisational, human, technical, process and financial capacity. In many fields progress is made and these capacities are thereby enabling project implementation. The list of capacity gaps, forming a barrier to project implementation, is however extensive and many improvements can be made in order to increase the likelihood of successful project outcomes. The tables 5.3 until 5.10 give an overview of all these enabling factors and capacity gaps.

The Ecosan Service Foundation focused on one specific capacity gap, which is the absence of ecosan experts, causing a barrier to project implementation in the Indian context. To fill this gap, they have developed a capacity development response through their training programme, focusing on the transfer of knowledge. The success of this training has been analysed with several evaluation criteria. Additionally, the capabilities that came back in the interviews have been compared with the capabilities that were present in research from Messmer (2011) and Enssle (2010). This in order to determine whether the knowledge present and taught by ESF gives a complete picture.

It has been noticed that ESF is especially successful in satisfying the course participants and in transferring knowledge to the course participants. Many of them gave a positive feedback, making ESF successful at the response level. Additionally, with several techniques, they have set up a quite complete training programme, using several tools to meet the different learning patrons of the course participants. Nevertheless, some extra attention could be given to some of the capabilities defined by Messmer (2011) and Enssle (2010) which were now not adapted in the training, although the training already gives a broad and inclusive picture of ecosan practices. The following capacities did not come back in the training

programme: to be able to wash oneself after defecating, to be able to have private sphere, to be not disgusted daily when defecating on open defecation sites, to be able as a women to have the same possibilities as men to satisfy human needs, to be able to stay at home and fulfil housewives' duties, the capabilities that are related to the increase of social status by adopting a more 'modern' lifestyle that was less associated with poverty (Enssle, 2009: 57-58), to be able not to worry/ having peace in mind, to be able to protect oneself from external influences and to be able to live together more peacefully (Messmer, 2011: 52). When these capabilities would be included in the training programme, it will provide a better and more inclusive picture and the training programme can be called more successful.

The capacity development response seems less successful in the creation of a link between the increased knowledge and project implementation, one of the main training objectives. There were a few cases in which the training did lead to successful, sustainable projects, although they were few in number. It is claimed that this is due to the limited understanding of capacities by the organisation, since they have solely focused on capacity development by means of building up intellectual capacity about ecosan reached by knowledge sharing. The focus on knowledge creates a limited vision on human capacities, while additional categories, such as having fundraising abilities or marketing skills are also part of human capacity. These additional parts also contribute to dealing with the broader capacity spheres in which many gaps, but also enabling factors are present. Improving a broader spectrum of human capacity will also contribute to overcome the personal barriers that many course participants were facing and which prevents them from implementation.

An organisation cannot directly influence and develop all levels of capacity, especially when considering the wide range moving from cultural and institutional capacity to for example financial capacity, but should at least teach the ones participating in the training course how to deal with the different spheres and problems and offer them the opportunity to embed their newly formed knowledge into practice on the ground. Perhaps institutions cannot be changed - in favour of ecosan practices - easily by a single NGO but the course participants could practice under supervision of ESF in developing their plans within an institutional context. Whereas the focus of the training is broad and inclusive, referring also to some of the capacities, the mere provisioning of a training programme might not be a sufficient strategy to develop capacities of the sometimes not so powerful course participants in order to lead to implementation. Another option would to only include influential stakeholders, that do not need a broader programme in order to start implementing. In the next section a more elaborated answer to these issues is developed.

7.2. Recommendations for developing capacities

The recommendations made in this research, are related to many different spheres. In all forms of capacities, gaps have been discovered for which solutions have been provided. This has all been visualised in the tables in chapter 5 and 6. For now it is important to notice that although ecosan has a great potential, there are many barriers that prevent ecosan from becoming a common practice. These are issues that go from cultural taboos, the absence of priority for ecosan, the lack of awareness, the copy-pasting of Western technologies, to a partly lack of government involvement and the absence of a well functioning ecosan market. Recommendations equally range from ideas about awareness raising programmes, bottom

up processes, new research, increased involvement of the government and the market to financial assistance by rich people and donors and the provisioning of successful examples. An inclusive overview of all these points has been given in tables in chapter 5, and the solutions in the tables in chapter 6.2. In the case of the Ecosan Services Foundation the advices given about internal organisational issues are summarised in table 6.3. and describe how for example a decrease in hierarchy and the hiring of lower caste people can contribute in making ESF a more efficient organisation. Also, some suggestions in order to improve the training programme have been made, such as the reduction of time spent on ceremonial functions and the reimplementation of an exam for the course participants.

What is highlighted in this section is the sometimes vague formulation of objectives by the staff of ESF. After discussion of the objectives of the organisation and the training programme within the interviews, some more clear formulations have been given. It is, however, very problematic that the organisation is not evaluating if objectives are met and whether the organisation is functioning to a satisfying standard. Policies can only become effective once it is clear what their impact is. This thesis, therefore, recommends to constantly evaluate the organisation's policy and their impact. The absence of evaluation formed a starting point for this research and the impact of the training has been analysed. The conclusion from this evaluation is that the training does not meet the goal that it was set for, namely the increase of on ground implementation by newly created experts. This can be attributed to a lack of targeting of the audience, or to the fact that a single training, which addresses knowledge sharing, needs to be supplemented by different skills or a practice with on ground realities. When looking at the targeting of audiences, it can be stated that the strategy of ESF, making it possible for everybody who pays to participate to the training, is not a successful one. It might be necessary to financially survive as an organisation, but it can be said that a lot of time, energy and resources are wasted within the organisation to develop a training which is in the end not so successful while it does not change the ground realities. When targeting the audience it could be decided to make use of a stakeholders approach and to include stakeholders in the training that are influential within their organisation. Those stakeholders, who are interested in new ideas and open for their implementation, stand a better chance to start up ecosan projects. Besides, when using a stakeholder approach, several stakeholders could meet in the training programme and join forces. For those that are less influential or may not associated with the right organisation, but are nonetheless very enthusiastic about ecosan, a programme could be offered in the form of for example an internship, where in addition to training the participants learn to implement a project by actually performing one. Merely giving them knowledge does not teach them how to develop funding skills, or how to deal with the daily cultural realities. In this case, ESF, should mix software solutions (training and knowledge) with hardware solutions (implementation of toilets) for their training participants. When developing these broader programmes, participants could learn how to set up a programme but also see in real life how to exploit the success factors within a project and how for example maintenance problems can be overcome or how case specific solutions can be designed.

These recommendations can be taken to a more general level. NGOs working in capacity development should be aware that software solutions are more successful when mixed with hardware solutions. By the same token they should be aware of the several layers of capacities and the gaps within these, in order to develop an effective capacity response that

incorporates (without necessary fully solving all) these issues. Thereby, the questions: “capacities for what” should always be central. Capacities should serve human capabilities in the end.

7.3. Limitations of research

Taken that only one organisation has been part of the empirical scope in this research, generalising results is difficult. Further research, focusing on several organisations with similar or different capacity development strategies, is desirable to test the results and to come to general binding conclusions. Further research could, moreover, give deeper insights in how to develop a successful strategy for organisations to provide solutions to a visualised capacity gap.

Unfortunately, a percentage of the training participants that have started their own projects, could not be given. The reason for this is that the author was dependent on the contacts given by the staff members, a selection method which had a non-random character. In addition, it was discovered that the data of the course participants present in the organisation was often incorrect or incomplete. The conclusion is therefore based on the assumption that there was a low percentages of participants starting up their own projects. This has been concluded since the staff members referred to a small range of examples, implying that successful examples were scarce. This assumption could, nevertheless, not be supplemented with rich and reliable data.

Further research should, moreover, focus those projects that were implemented in order to research the next part of the implementation chain. While the scope did not leave room for a thorough analysis of the sustainability of projects that did get implemented, a sustainability assessment framework should be further developed to test the several cases. Thereby the success factors and the barriers to success, which were described in the 6th chapter, could be tested.

Carrying out research within an organisation did cause some difficulties when trying to protect scientific quality. These difficulties are related to the sometimes doubtable reliability of the answers given by the staff members. It has been suspected that some of the employees have pictured the situation more positively than it actually is, possibly because of loyalty reasons. This has been shown by several contradictions between staff members themselves or contradictions between what was said by staff members and what has been explained by the course participants. A similar comment can be made about some of the course respondents, as it seemed to be the case that they wanted to avoid any potential conflict with ESF. Therefore, some of the answers given by the respondents, do possibly not always fully represent reality. This is, however, possibly compensated by less risk averse respondents or staff members and by the additional observations.

Statements about the institutional context and other broad spheres have mainly been based on the 22 interviews. More research is definitely required to fully asses for example the governmental policy level. Judgments of the success of these projects are premature when only based upon the experiences of a small amount of people. Their vision did not always include the broader institutional picture.

7.4. Putting the results in an broader scientific context

While this thesis showed many layers of capacity, the research of Lienert (2011) focused on broad institutional issues which are related to ecosan practices. Many of his categories, summarised in the table displayed in chapter 2 are related to the solutions that were given in this research, although often in different terms. Interestingly, two of the categories described in the research of Lienert, were absent in the theoretical and empirical findings of this research. These are: the clear defenition of roles and responsibilities of the actors involved within ecosan, which influenced the practices and increased efficiency when allocated in the right way. These additional results show again that more research which is specifically focused on institutional capacity, is needed.

Results about the lack of awareness about sanitation and defecation practices in this research overlaps with the results from a study off Banda et al. (2007) in rural India. In their research, residents of rural areas in Tamil Nadu did not associate unsafe water with diarrhoea and there was no stigma associated with open defecation within the several castes that inhabited the village. Research done in rural Pakistan does, however, show different sanitation practices: open defecation was only commonly accepted for children but faeces where considered as dirty within the Muslim community and adults did subsequently use simple form of sanitation (Drangert & Naweb, 2010). These studies show that cultural and awareness issues are present, but need to be considered within their local religious context. A one size fits all programme will be inappropriate.

This research can, furthermore, be seen in the light of the increased demand for NGOs to give evidence of their effectiveness in the field. While NGOs success cannot be assessed by looking at the profits they are making, different assessment criteria are needed. In this research the internal organisational capacity has been discussed together with the effectiveness of the training programme. This can be related to Chapman & Kelly who state that "*effective outcomes require that the program and influencing work of an organisation is congruent with the identity of the organisation, the values it represents and its approach to development"* (2007: 3). They, moreover, add that efficiency is related to high quality relationships, mutual learning of organisations and adaptation and working together with others. All these points have been discussed when assessing the internal organisational capacities of ESF.

Finally, this research can be of interest when discussing the possibilities for the implementation of new niche technologies. Hegger et al, for example wondered "*how should niche-based approaches be designed in order to have any influence at regime level?"* (2007: 730). A question which they applied to ecosan technology. In their research they claim that niche-based approaches such as ecosan are much more successful once the implementation process is not solely dominated by engineers. Engineers have, according to the authors, the attitude of first sorting out the technology, then prove that it works and are accordingly requesting implementation. Hegger et al. to the contrary, call for a process in which the actors are involved in the development of the technology and no finished solutions are presented and implemented directly. With their scheme, consisting of several steps, they claim that experimentation is more successful once set up in a smarter way. Firstly, a concept should be defined for sustainable transformation of socio-technical systems. They

clearly state this step is not about defining the right technology, while technology is solely a means to realise a sustainable practice. This concept is only a starting point and should be developed further during the whole process. Secondly, the social embedding of this concept is explored. Instead of the more common technological demonstration as a next step in niche projects, it is analysed which actors have a potential interest in the concept and in which way they are involved or not. The next step starts with exploratory talks with these new actors. After these starting up phases, experiments are set up. A major aspect of these experiments is that they are socio-technical and are thereby also experimenting with new forms of social organisation, next to technology experiments. The fifth and final step is evaluation and learning from the experiences. This holistic approach to niche products, where sustainability is central and not the technique of ecosan, provides some interesting learning points. Some of the respondents referred to the necessity to explain and discuss the more holistic approach with the end users of products.

Such a holistic approach has not always been observed within ESF. It is believed that these kind of approaches are very interesting and a good way to reach successful projects. It is however problematic to receive funding for such broad projects which contain many policy steps. What can be learned from these approaches is that technology should not be a starting point, but an outcome that can be reached through several solutions. Although ESF is not solely focusing on simply one technique and the staff clearly states that there are no one size fits all solutions, they do take a number of specific ecosan technologies as their focal point. As stakeholders are highly important during an implementation process, this could be stressed more within ESF. They refer to stakeholder approaches in the training, but it is not their main topic. Also, hardware and software need to be integrated. As Chapman and Fisher state about the mere implementation of awareness raising campaigns: *"Campaigning or advocacy work is very valuable, but its effect in isolation is limited"* (2000: 163). Capacity development strategies are thereby likely more successful when encompassing several steps or broader programmes. These are all lessons to learn for the many NGOs working within the capacity development sphere.

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Appendix

1. Overview of respondents

Number of Respondent, plus specification	Gender	Education	Function	Other activities
1.	Male	Geography, business administration and environmental sciences	Employed at Seecon	
2.	Male	Land and Water Management and Engineering	Employed at Seecon	
3.	Male	Master in Environmental management and environmental engineering, currently postgraduate in environmental law	Employed at ESF	Director of a waste water management company
4.	Female	Master in botanic plant sciences	Employed at ESF	
5.	Female	Master Degree in Environmental Sciences & Bachelor in Botany	Employed at ESF	
6.	Female	Master Degree in Ecology and Environment and Bachelors in Environmental Monitoring and Management	Employed at ESF	
7.	Male	Mechanical Engineering	Employed at ESF	Director of a waste water management company
8.	Female	Chemical engineering	Employed at ESF	
9.	Female	Master in environmental sciences and bachelor in zoology	Employed at ESF	
10.	Female	Environmental sciences	Currently unemployed, before working at a sustainable solutions company	
11.	Male	Civil engineering	Employed at PCMC,	

			governmental oganisation	
12.	Male	Civil engineering	Employed at PCMC, governmental oganisation	
13. Double interview, Together with number 14.	Male	Civil engineering	Employed at water supply department, government of Maharastra	
14. Double interview, Together with number 13.	Male	Civil engineering (not completely certain)	Employed at governmental training centre, watter supply department government of Maharastra	
15. Phone interview	Female	?	Onwer of an NGO in awareness raising projects.	
16.	Male	Civil engineering	Consulting engineer	
17.	Male	Social work	Works with different projects for several NGO's	
18.	Male	Civil engineering	Governmental employee	
19.Phone interview	Male	?	Working for an NGO in water and sanitation	
20.	Male	Environmental sciences	Depute engineer for semi-government organisation	
21.	Male	Architecture	Works on different projects for several NGO's-people	
22.	Male	Civil engineering	Engineer for semi-government organisation	
23. Focus group	8 men	Several educations	Many are contributing to NGO projects but work besides that as well	

2. Questions ESF/Seecon

Colour legend

Red: Questions related to the disclosing of the capabilities.
Green: Questions related to the capacities as defined in chapter 3.
Blue: Barriers for successful implementation.
Purple: Solutions defined to overcome these barriers.
Orange: Assessing the success of the training programme.

Introductory questions:

1. What did you study?
2. What is your task in ESF/Seecon? Any specialisation?
3. Historical process of the organisations and their relations to each other?
4. What is ESF exactly working on regarding sanitation? (training/lobbying/implementation)
5. Who exactly developed the internet tool of Seecon/ESF?
6. Who exactly developed the training programme?
7. How does ESF gets funded?

Questions about ecological sanitation

8. Background of ecosan → Where is the idea coming from?
9. Generally speaking what do you believe are the main drivers for ecosan?
10. What are the main advantages of ecosan?
11. How does ecosan improves quality of life for people?
12. Are sanitation services a priority for the people of India?
13. Are the social attitudes of people beneficial for ecosan implementation?
14. What do you believe are the main barriers for ecosan (what are difficulties for implementation?)
15. Are there any problems that are related to people's personal circumstances that form a barrier?
16. How is Ecosan promoted by ESF?
17. Which sanitation technique is preferred by the Indian public? (if not ecosan)
18. Is there a market for ecosan?
19. What do you think is necessary in order to improve ecosan services overall?
20. Which incentives do you think can contribute to this?

Discussing the tool & training program

1. What is the main objective of the tool and the training program?
2. Is there a scientific basis for the tools and the training?

3. (what does the tool and the training wants to reach? How is a long term vision adopted in the course programme?)
4. Are stakeholders (experts, end-users) involved in the formulation of the objectives and the programme? Any women?
5. How does the programme strive to reach these objectives?
6. Which problems can prevent Seecon and ESF from reaching its objectives?
7. Are there any solutions for these problems?
8. How is the progress towards the initial mission and the targets monitored?
9. What is taught to course participants? Why?
10. How are the course participants stimulated to develop their project?
11. Do you have any idea how many well-functioning projects where started up after the visit of a training course?
12. How are projects maintained afterwards?
13. Are the course participants supported after they have followed a training?
14. Is there any way of assessing if they course participants are successful in starting up their own projects in line with what they have learned at ESF?
15. How is the Indian cultural context adopted in the course programme?
16. How is the institutional context adopted in the course programme?
17. How are organisational, resource or business related aspects adopted in the course programme? Such as organising your own projects, etc.
18. How successful do you think the training on average is?

Framework conditions

19. Which institutions in India are important for (ecological) sanitation projects?
20. How are they enabling?
21. How are they limitative?
22. Do you believe they transparent?
23. Do the institutions actively enhance ecosan? (Any projects/objectives of the government? Or: Is policy for (eco)sanitation developed?)
24. Is there public participation in the institutional context?

Organisational questions

25. Which internal organisational aspects contribute to reaching a sound ecosan tool & training?
26. Which organisational aspects form a barrier in reaching a sound ecosan tool & training?
27. Is there enough budget in ESf to meet the initial statement of the organisation?
28. Is ESF involved in a broader network with NGO's, organisations and or institutions?
29. Does ESF misses any knowledge or skills for a successful operation?
30. Are employees of ESF trained from time to time?

3. Questions for course participants (NGO-officials)

Introductory questions

1. What is your profession?
2. Why did you decide to participate in the training programme?
3. Did you have any interest or knowledge about (ecological) sanitation before going to the training?
4. What information did you want from the training?
5. What was your personal goal for the training?

Questions about the training

6. Did you follow a two weeks training course?
7. What have you learned at the training course? (be as precise as possible…)
8. Do you think the training was well adapted to the Indian context?
9. Did you and the other course participants ask for some specific information at the course?
10. Was the contact with other course participants useful for you? Did you contacted them later?
11. Did the training change your attitude towards ecological sanitation?
12. Did you learn how to start up a project?
13. What is your overall opinion on the training programme?
14. Where you inspired by the topic?
15. Would you be interested to take a follow up course?

Questions on ecosan

16. Do you think improved sanitation is a priority for Indian people?
17. Do you think people want ecosan toilets? If so, why?
18. What do you think are the benefits of ecological sanitation?
19. What do you think are the disadvantages of ecological sanitation?
20. What do you think are the main barriers in starting up an ecosan project?
21. How do you think ecosan as a practice should be promoted (focusing on what?)
22. Do you think ecosan improves the quality of life for people? *How?*
23. What do you think is necessary in order to improve ecosan services overall?

Questions on implementation

24. Did you started an ecosan project?

25. If yes, what was your strategy for the project?
26. Did you do any research before starting the project?
27. What kind of ecosan technology was implemented?
28. Which knowledge, gained at the training course, did you apply at the project?
29. Were any organisations or stakeholders involved in implementation of the project?
30. *If so, how was the collaboration between you and the organisation/stakeholders?*
31. *If so, Was there any way of supporting these organisation/stakeholders?*
32. How many toilets where constructed?
33. Are there any barriers/difficulties for implementation? What are they?
34. How is the project maintained?
35. Does the projects need any improvement?
36. Is the process of project implementation monitored?
37. Do you think the project is sustainable? Why?
38. *If not, what do you think is necessary to make the project sustainable?*
39. Do you think the project improved quality of life? How?

40. *If not, why did you not implement any project?*
41. What do you think is needed, to make you (and your organisation) start a project?
42. Did you do any research on how to start up a project?

Questions on ESF

43. How would you evaluate ESF?
44. What would you like to change in the way ESF operates?
45. Do you think they are successful?

Questions on institutional framework

46. Do you think the institutions in India are enabling for ecosan projects?
47. Is it possible to have influence in governmental processes in order to improve governmental policy related to ecological sanitation?

Additional questions

48. Do you think you can contribute into making ecological sanitation into a flourishing practice?
49. *If so, how?*

The questions were slightly adapted when speaking to governmental officials. There were some additional questions on the government added.