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Social Return on Investment (SROI), the value added for families before and after using Solvatten in the Bungoma district in western Kenya

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Abstract

The lack of fresh and clean water today causes severe problems, mostly in developing countries. Waterborne diseases like typhoid, cholera, amoebic dysentery and diarrhea create health problems and deaths among people. There is a need for low cost interventions like household-based water treatment and safe storage (HWTS). Solvatten AB is a Swedish company based in Stockholm. Their product, Solvatten, is a household water treatment unit that can treat water containing viruses, parasites and bacteria. The product does not need any chemicals or energy-sources such as charcoal or firewood, it only needs the sun.

The focus of this study is to distinguish the specific effects Solvatten have on the people using it in the Bungoma district in western Kenya. This can be done by using a framework named Social Return on Investment (SROI) which has its origins from Impact Assessment (IA) and social Cost Benefit Analysis (CBA). The social added value from Solvatten AB can be calculated by conducting an evaluative SROI analysis. This will result in a ratio that can be used by Solvatten AB for fundraisings, scholarships and other recourses. Data will be collected by interviewing a target group in the Bungoma district. It will be one to one interviews and a questionnaire will be used. The target group consists of buyers of the unit from 2010. The SROI ratio has been calculated to 1: 26 KES. The calculations are based on 9 different outcomes that all are presumed to last five years.

Solvatten is without any doubts a great invention and there is a constant need for HWTS solutions in developing countries where water is a scarcity. Solvatten is right in time, easy to use and small children can carry it. The problem is that the organization around Solvatten in the Bungoma district needs to be improved and better structured, the product itself works fine as it is today.

Sammanfattning

Att ha tillgång till rent vatten är idag inte en självklarhet för många människor. I utvecklingsländer har vattenproblemet existerat länge och behovet av lösningar är ständigt aktuellt. Solvatten AB är ett svenskt företag vars produkt, Solvatten, renar vatten genom solens UV. Solvattenbehållaren kan fyllas med 11 liter vatten och användas upp till tre gånger en solig dag. I Bungoma i västra Kenya har Solvatten AB opererat sedan 2009. Genom att intervjua en målgrupp av köpare från 2010 vill vi ta reda på värdet före och efter användningen av Solvatten, ett såkallat SROI värde för familjerna i Bungoma. Genom att gå igenom olika steg i en SROI analys mynnar värdet ut i ett samband. Sambandet kan användas av Solvatten AB för att visa vilket värde deras produkt skapar till bland annat investerare. Efter att stegen i SROI analysen fullgjorts fick vi fram sambandet 1: 26 KES. Det innebär att varje KES investerad i Solvatten skapar ett värde av 26 KES. Förhållandet 1: 26 gäller för vilken valuta som än används. I en SROI analys tas ekonomiska, miljömässiga och sociala värden med i beräkningen. Det finns ett behov idag att ta reda på hur effektivt resurser egentligen används. Genom att genomföra en SROI analys för Solvatten AB kan företaget i sig få en bättre förståelse för produktens påverkan och utfall den genererar för dess användare.

Abbreviations

Household-based water treatment and safe storage (HWTS)

Low cost interventions that can significantly reduce the pathogen load in drinking water.

Impact Assessment (IA)

A system of producing knowledge and investigate in what has happened in the past.

Kenyan Shilling (KES)

Monitoring and evaluating (M&E)

Non-market-valuation (NMV)

A toolbox of strategies for estimating the value of goods and services not commonly bought and sold in markets.

Social Cost Benefit Analysis Social (CBA)

It relates to social dimensions about matters which affect a group of individuals or larger groups.

Social Return on Investment (SROI)

Is used to understand how efficiently resources are being used. Social, economic and environmental values are taken into account in a SROI analysis, a triple bottom line approach is provided.

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1 Introduction

Everyday our actions cause effects that are sometimes intentional, and sometimes not. Every now and then we even get some extra positive or negative effects that may be hard to capture, and even more difficult to measure in financial terms. Many organizations today are developing interventions to help marginalized members in developing countries to strive after a better life. The work through different organizations provides great opportunities and new possibilities for many people, but the question is how you separate a good intervention from a destructive one. More and more businesses, non-profits and non-governmental-organizations (NGO's) are trying to understand what makes a successful project and how to evaluate their outcomes. The problem in many cases is to find out whether those investments or products actually make the difference they intend to. Social Return on Investment (SROI) is a tool that can help with this evaluation. This thesis will slightly touch on some commonalities and differences between Impact Assessment, social Cost Benefit Analysis and Social Return on Investment. The main focus will be on explaining the process of conducting a SROI analysis and the benefits of using this framework to do so. The fieldwork for this bachelor thesis was conducted in the Bungoma district in Western Kenya. Our case company Solvatten AB provides a water purifier and storage unit and has been in the area since 2009. Solvatten AB's headquarter is located in Stockholm, Sweden. To this date there are approximately 1300 Solvatten units in use in the province. We have focused on the findings in target groups of buyers from the year 2010 in the field study in the Bungoma district.

1.1 Problem background

Clean and safe water is today a scarcity for the bigger part of the earth's population (Calas & Martinon, 2010). It is a prerequisite for all human and economic development and yet today nearly one billion people lack access to clean water, the vast majority of these people are living in developing countries. Reducing deaths connected to waterborne diseases like bacteria, viruses and parasites that cause typhoid, cholera, amoebic dysentery and diarrhea depends largely on delivering life-saving treatment (UNICEF/WHO, 2009). Each year an estimated 2, 5 billion cases of diarrhea occur among children under the age of five and killing 1,5 million children under five every year, being the second largest disease to cause child deaths in the world. In Africa and South Asia more than 80 percent of child deaths occur due to diarrhea. Children with poor nutritional status and overall health living in poor environmental conditions are more fragile to dehydration and diarrhea. Young children use more water over the course of a day due to their higher metabolic rates and they are less able to conserve water than older children. Diarrhea is a disease not focused on by developed countries, making it an issue difficult to break. Improving unsanitary environments alone will not be enough, if it is not sustainable. UNICEF and WHO released in 2009 a 7- point plan that can be used as a step-by-step plan to solve the issue of contaminated water in developing countries. The package contains foremost prevention of dehydration and zinc treatment but safe household water and storage is also on the important list.

It is concluded that there is a strong need for low cost interventions like household-based water treatment and safe storage (HWTS) that can significantly reduce the pathogen load in drinking water (WHO, 2011). This can thereby reduce the risk of diarrhea and other waterborne diseases. HWTS is not aimed to be a replacement for adequate provision of safe drinking water through improved sources, but it addresses the real need in conditions where people still lack basic access to safe water.

There is a growing demand for accountability in development and pressure to verify program outputs and impacts in the public health and water sanitation sector, especially those on HWTS programs (WHO, 2011). Many donors have steps to improve the rigor and comparability of monitoring and evaluating (M&E) and to develop indicators that allow comprehensive analysis and reflection on the benefits of HWTS. An overall assessment and understanding of the many inter-related factors that influence the use, sustainability and benefits of HWTS is important for improvements in future HWTS programs and what processes to choose for M&E.

The primary motivation for improving drinking water quality through HWTS is health (WHO, 2011; McAllister, K. 1999). But likewise is household environmental health important. Apart from the HWTS the improved stove is a second important intervention that prevents sicknesses. The process of evaluating HWTS has by the WHO been narrowed down to focus on outputs and outcomes, where outputs are immediate consequences of the input and related to tangible consequences of the project activity. Outcomes describe the intermediate effect of the output. Physical evidence of HWTS is being used as indicators. And finally, impacts are the long-term consequences of the delivering outputs.

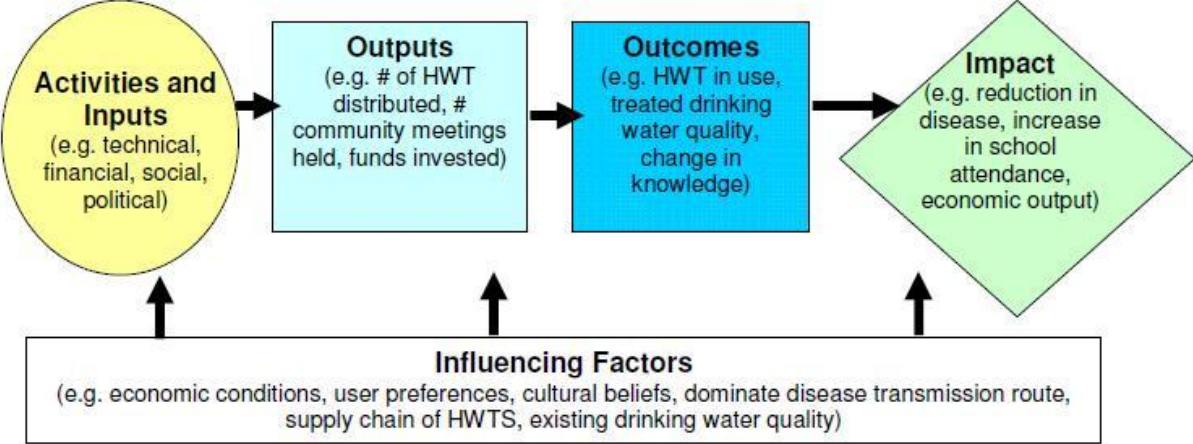


Figure 1 HWTS-related program outputs, outcomes and impacts (Internet, WHO, 2009).

While measuring impact may require research methods beyond what is practical to many HWTS implements, measuring outputs and even outcomes is practically possible (WHO, 2011; McAllister, K. 1999). Outputs provide a direct reflection the amount of recourses that are invested while outcomes provide more detailed information on how these recourses have been used and what impact they have caused.

Solvatten AB was founded in 2006 by Petra Wadström as a result of her seeing the need for clean and safe water when living in Indonesia (Internet, Solvatten AB, 1, 2011). Her mission became “to develop a cost efficient and sustainable household water treatment solution for family use in developing countries” (Internet, Solvatten AB, 3, 2011). Already in 1997 Wadström became aware of the key factors that needed to be taken into account when developing an intervention to purify water, particularly where resources are limited (Internet, Solvatten AB, 1, 2011). During the development of the unit Wadström had a vision that the units should (1) use the sun’s UV rays for water purification, (2) indicate when the water is safe for drinking, (3) feature a container that keeps clean water safe, (4) be easy for anyone to use and, (5) can be carried by a child.

Solvatten is a household water treatment unit and the technology is a patented and scientifically proven Swedish invention (Internet, Solvatten AB, 2, 2011). The unit itself can hold 11 liters of water per utilization and needs to be exposed to the sun for between two to six hours, depending on the weather. This means that the unit can be used between one and three times a day giving the user up to 33 liters of clean and safe water in one day. This method of using a combination of filter and UV radiation helps to kill micro-organisms like bacteria, viruses and parasites that can cause typhoid, cholera, amoebic dysentery and diarrhea. The unit produce water that meets the WHO's Guidelines for Safe Water (<1 E-coli/100ml water). Another positive effect of heating water by the sun is that it will reduce soil erosion, deforestation and CO2 emissions.

Solvatten AB cooperates with different NGO's that run projects in places where there is an urgent need for clean and safe water (Internet, Solvatten AB, 2, 2011). Solvatten AB cooperates with the SCC-ViAgroforestry in the Bungoma district. The SCC-ViAgroforestry is a Swedish NGO with several projects in developing countries (Internet, Vi Skogen, 1, 2011). The SCC-ViAgroforestry operates in all countries surrounding Lake Victoria, mostly focusing on capacity building as their main aid.

1.2 Problem

Solvatten AB started installing water treatment units for homestead use in the year of 2009 in the Bungoma district in Western Kenya (pers. med., Felix, 2011). This was done with the help of the NGO SCC-ViAgroforestry. The unit was installed in the region because many households had been affected with waterborne diseases. Eliminating waterborne diseases has led to outcomes like for example improved living standards, improved health, protection of the environment and more opportunities for income generating activities. In this study we focus on the units sold for 1200 KES, equivalent of 13 USD, to locals in the Bungoma district during 2010.

In proving the value Solvatten have on the families using the unit, Solvatten AB needs to distinguish the specific effect that Solvatten has. Solvatten needs to be evaluated with the condition that you can distinguish the effect from Solvatten apart from any possible involvement from another stakeholder. As WHO recommends, a framework that helps you locate the input, activity, output, outcome and impact from the HWTS needs to be used. The value created needs to be comprehended by Solvatten AB in order to understand the whole process of creating this effect (WHO, 2011).

An appropriate tool framework for evaluating would be Social Return on Investment (SROI), a framework originated from Impact Assessment (IA) and Social Cost Benefit Analysis (CBA). The concept of Social Return on Investment would be new and highly in time, but the concept of evaluating impacts are old. Social Return on Investment is used to understand how efficiently resources are being used (SERUS, 2010). Social, economic and environmental values are taken into account in a SROI analysis, a triple bottom line approach is provided. This means that the results are based on wider value perspectives. SROI helps organisations understand their impact and indicators are used to measure if they are efficient in their invested time and money. It is also used to interpret the intangible values to tangible and measurable values. If for example one dollar is invested in a project, the value created from the investment can be five dollars, 1:5. It is important to clarify that the value created is not money the investor will receive in return. It is the value added to the social structure from the investment. To motivate new investments there is a need to demonstrate to stakeholders that

their investments are generating a substantial value. For organisations depending on investors it is therefore important to show the holistic value the product or activity creates. This SROI analysis will result in a ratio that Solvatten AB will be able to use for fundraisings, scholarships and other recourses. The problem here is to see if the framework of SROI is applicable on the target area and how to conduct an evaluative SROI analysis. Also the suggestion of impact evaluation that WHO (2011) recommends, resembles SROI work process, social CBA and IA.

Regarding the gender perspective, women in rural areas in western Kenya are often the ones in charge of the homestead while the husband sometimes works and lives away from the home (pers. med., Oparah, 1, 2011). The wife is therefore the one responsible for the family and household and this can be very time consuming. One of the stakeholders gaining the most from the Solvatten unit may then be the wife. The question is how to capture the benefits that are higher for the wife than the husband, when we might have to interview the head of the homestead (the husband) most of the times.

1.3 Aim and delimitations

The aim of this study is to perform an evaluative SROI analysis and analyze the social added value on purchases of Solvatten from 2010 in the Bungoma district and secondary to see if SROI is a framework that can be applied to evaluate HWTS projects from the given recommendations of WHO. The social added value from Solvatten AB can be calculated by conducting an evaluative SROI analysis. The target group is buyers of the unit from 2010 and they have in the past experienced significant difficulties in reaching clean and safe drinking water. This has given the target group severe problems regarding their personal health, time limitation, home economic stress and decline in wellbeing.

The target group consists of 47 families and our goal is to interview as many of them as possible. The total number of Solvatten buyers in 2010 is higher but due to time limitations and other circumstances the list of the 47 families is the one we will be working with. This group is the main stakeholder group and the targeted group of the thesis. A reference group of non-users of Solvatten living in the Bungoma district have been identified to clarify the added value. The core is to locate the structural effects from Solvatten and measure them by using appropriate indicators.

We have chosen the SROI guidelines as framework for this thesis to evaluate the Solvatten project in the Bungoma district. We will use “A guide to Social Return on Investment” developed by the Cabinet Office- Office of the Third sector (OTS) and a leading actor in this field. The document is also supported by The SROI Network- accounting for value, New Economic Foundation, charities evaluation service, NCVO (National Council for Voluntary Organisations) and New Philanthropy Capital in association with The Scottish Government. We will also include a Swedish support named SERUS (Social Economics and Regional Development in Scandinavia) and educated in SROI analysis by the New Economic Foundation. The document published by SERUS is named SROI- Social Return on Investment.

SROI is influenced both from Impact Assessment and Cost Benefit Analysis. In most cases a simple typology is used to generalise different assessments: environmental, economical, technical and social (Becker, 2001). Out of this social impact assessment was chosen because of the social value needed to be studied. There are also three different levels of social impact

assessment; micro, meso and macro. Type 1, micro-social impact assessment was chosen because of the aim of this thesis. The micro level focuses on the individuals and their behaviour therefore the need to conduct the SROI analysis for this project.

Data for this study were acquired by the use of a questioner implemented in one to one interviews. A draft questioner was pilot-tested using a sample of three families in a village outside the study area. The questioner was then improved based on the results from the pilot study results. The questioner was approved by our supervisor from the Swedish university of Agricultural Sciences and our supervisor at the SCC-ViAgroforestry in Kenya. The acquired data was then used to perform the SROI analysis.

As this being a learning process you are always faced with the risk of devaluing and missing out on data. The study is largely based on beneficiaries perception of what has changed in their life after purchasing the Solvatten unit.

2 Method

2.1 Literature review

The SROI framework is used for the analysis and the framework itself is supported upon social Cost Benefit Analysis and Impact Assessment (Dasgupts, *et al.*, 1972; Pearce & Nash, 1981; Alton and Underwood, 2002). By using social Cost Benefit Analysis and Impact Assessment in combination with the SROI framework increased understanding for the SROI analysis will be provided.

Due to the fact that the SROI framework is still in the making process only two reliable sources will be used for the analysis, “A guide to Social Return on Investment” and “SROI-Social Return on Investment” by SERUS (Internet, New Economics, 1, 2011; SERUS, 2010).

In this thesis both primary and secondary data will be used. The primary data is the theories and framework, and the secondary data is interviews performed in the Bungoma district.

2.2 Social Cost Benefit Analysis

The essence of social Cost Benefit Analysis (CBA) is that it is not confined to decisions that affect one individual (Dasgupts, *et al.*, 1972; Pearce & Nash, 1981). It relates to social dimensions about matters which affect a group of individuals, perhaps locality or larger groups. Social CBA involves preferences of people’s judgment and their choice and knowing what made them decide that one choice was better than the other and how they value this choice. Social CBA is sensitive to the value of underlying judgment. It deals with some economic votes such as *willingness to pay* and *prevailing income distribution*. It is necessary to emphasis the point that any attempt to value cost and benefits on the basis of an income distribution other that prevailing one is tantamount to the analyst ‘imposing’ his/her own value and judgment into the analysis.

Social CBA provide a basis of evaluating prices appropriate for social calculations (“shadow prices” as appose to market prices) and serves as a substitute for pure ad hoc decision making (Dasgupts, *et al.*, 1972; Pearce & Nash, 1981). Shadow prices tell us the social value of

outputs and inputs concerned. Since the publication of OECD manual in 1968 it has become acceptable to say that different methods should be used for appraising projects in developing countries from those in developed countries (Little & Mirrlees, 1968). Shadow prices are one method.

It is very important to recognize that project forecast or evaluation cannot be successfully done by concentrating only on so called “economic” benefits and costs – the benefits and costs must include all relevant factors (Dasgupts, *et al.*, 1972; Pearce & Nash, 1981). You can not only distinguish between economic and non-economic projects – that could be somewhat arbitrary.

2.3 Impact assessment

Impact assessments has for a long time only been written for the researchers themselves (Alton and Underwood, 2002). Outside the bubble of scientists, corporate or the realm of public policy, decision makers consider the process of decision making an art and not on linear schemata to follow. When talking about decision making, there are some guidelines that are important to follow. It is possible to see a comparison with SROI guidelines later on in the paper. Five basic fundamentals of implementing are being considerate as a useful impact assessment. These five solutions to the separation in between are: scientifically sound, easily understood, feasible, legally defensible and timely. This last sentence has a lot of similarities to SROI and the principles. In this research about decision making they also found out that is it much more useful to be generally correct than precisely wrong when presenting information.

It is stressed in earlier work that it is easy to be influenced by dispositional, demographic and situational factors such as environmental worldviews and attitudes (Alton and Underwood, 2002). This worldviews are not specific but is based on attitudes, judgement and behaviour which may be directed toward more specific issues. One should also note that the perception of environment is not a class issue, the environmental worldview is often a worldview written by the western upper class education.

Indicators are used in order to determine “within the project” or “without the project” (Cloquell-Ballesterm *et al.*, 2005). The alternative is to go with expert judgement. The indicator instrument allows a more verifiable assessment, but depending on the indicator used the quality will be preformed after that. Although: (1) The project-territory assessment has singular characteristics in each study. (2) There exists the possibility of a great shortfall of environmental and social information for the location where the activity is found. (3) Some of those indicators which are acceptable by the scientific community might be obstacles. Consequently the “the working team” have to design the necessary indicators ad hoc in order to proceed with the impact assessment (Cloquell-Ballesterm *et al.*, 2005).

There are some principle guidelines one can find making it possible to work with the impact assessment (International Committee on Guidelines and Principles for Social Impact Assessment, 1995). One can later in the paper find a similarity with the impact assessment guidelines and the SROI framework.

The guidelines for IA are:

- Involve the diverse public
- Analyze impact equity
- Focus the assessment
- Identify methods and assumptions and define significance in advance
- Provide feedback on social impacts to project planners
- Use Social Impact tools (SIA) partitions
- Establish monitoring and mitigation programs
- Identify data sources and plan for gaps in data

The variables in a social IA have then been suggested as population characteristics, community and institutional structures, political and social recourses, individual and family changes and community recourses (International Committee on Guidelines and Principles for Social Impact Assessment, 1995). In this report we will not need all the variables because of the study being so narrow. The main variables will lie in individual and family changes and community recourses. Critic to this kind of listing variables has been made by many social scientists, changes have a way of not following a list and the dimensions are just too many (Vanclay, 2002). There are endless lists about social IA, and it is therefore important that the list from the International Committee on Guidelines and Principles for Social Impact Assessment provides possible indicators that can be helpful when looking for social impact. Direct social impact results from a planned intervention. They may be intentions of specially designed activities to influence the social setting, or unintentionally result from the activities. Indirect social impacts are results of changes in the biophysical environment.

One should always regard social IA as a system of producing knowledge and investigate in what has happened in the past (Wilkins, 2003). Social IA is a tool for making informed decisions but also a source of directing the development of social values. Considering this it is a curtail tool for long lasting planning concerning sustainable development. The subjective element in social IA is rather an aid than a hinder in the process.

2.4 Social Return on Investment

Social IA will have a big impact on our project because it helps managing the consequences of development projects (Ahmadvand *et al.*, 2011). There is a concern that the value will not only be represented by development value but also a mitigation tool (Parry, M. *et al.*, 2009). A concern will therefore be to distinguish in the outcome of the ratio how much is represented by development and how much is represented by climate proofing.

The research on social structures and cost benefit analyses are plenty but the Social Return on Investment analysis has for a long time been pioneered by the Roberts Enterprise Development Foundation, REDF (Yurtkap, 2010). It was based on venture philanthropy subsidize, as a response to a growing need of social reliable profit organizations. Although RDEF had a genuine and improved SROI approach, it is more suitable for large scale research. SROI also stand on a foundation of IA and social CBA.

The theoretical basis lies in the core of the SROI framework and its theory of change (Yurtkap, 2010). The framework will measure the changes occurring in the targeted issue in ways that are relevant to the people or organisation that are experiencing it or contributing to the change. The theory of change takes into account the chain of events connected to the

specific action monitored. SROI then have the possibility to deliver key stakeholders a monetized ratio (for example 1:5) of their contributed impact. This will tell you how much social return over the given period of time has saved because of this particular investment. For example, for every one dollar invested the beneficiary will have a social return on five dollar. As for calculating the ratio we will use an Excel sheet given to us by Erik Nilsson at the SROI course we attended 2011-01-26 – 2011-01-27.

SROI is about value, rather than money (Internet, New Economics, 2011; TRSO, 2011; SERUS, 2010). SROI involves reviewing the inputs, outputs, outcomes and impacts made and experienced by stakeholders directly related to the intervention. To make the result understandable a monetized value is applied to the result of the social, economical and environmental benefits and costs created by Solvatten AB. SROI is more than the end result of a ratio, it is an understanding of the process and an understanding of why certain things did succeed where others did not. SROI is a tool to explore how social change is achieved and how change can be demonstrated and illustrated with the purpose of proving that value has been created. By the very nature it is also hard to measure social and environmental value, and there is always a risk of not discovering important outcomes or of miscalculating their importance. There is also the risk of ignoring these more holistic values where economic indicators automatically can claim a greater value as they are a product of a well known system of measurements.

The framework is built so that it will take costing studies to another level and make the process more holistic to include all tangible and intangible values (Internet, New Economics, 2011; TRSO, 2011; SERUS, 2010). All stakeholders should have the possibility to be represented by an active voice in the planning process, from the bottom to the top of the pyramid; it is important to take all stakeholders into account. Because of the stress on stakeholder involvement in SROI it brings decision making from the local level up to the broad systematic level. This tool will prove to be a great way of quality control so that the intervention will match the real needs in the target group

SROI will also serve as a management tool to improve performance, inform expenditures and highlight added value (Internet, New Economics, 2011; SERUS, 2010). In the start-up phase for new businesses, SROI can also be useful for establishing a business plan. Meanwhile for established organizations it can help with forecasting and evaluating internal and external projects and internal re-organizations. The framework is also adaptable to forecasting programming/pre-procurement as a statistical planning tool and how to set up the programs and determine the scope. Moreover the framework can give you tools for bidding on different contracts or determining which applications will give you the most social return. During installation it will also give you tools for monitoring and evaluating of the processes. When it comes to contract management SROI can be used to monitor the performance of the chosen contractor or to keep track on the results.

The process of working with SROI

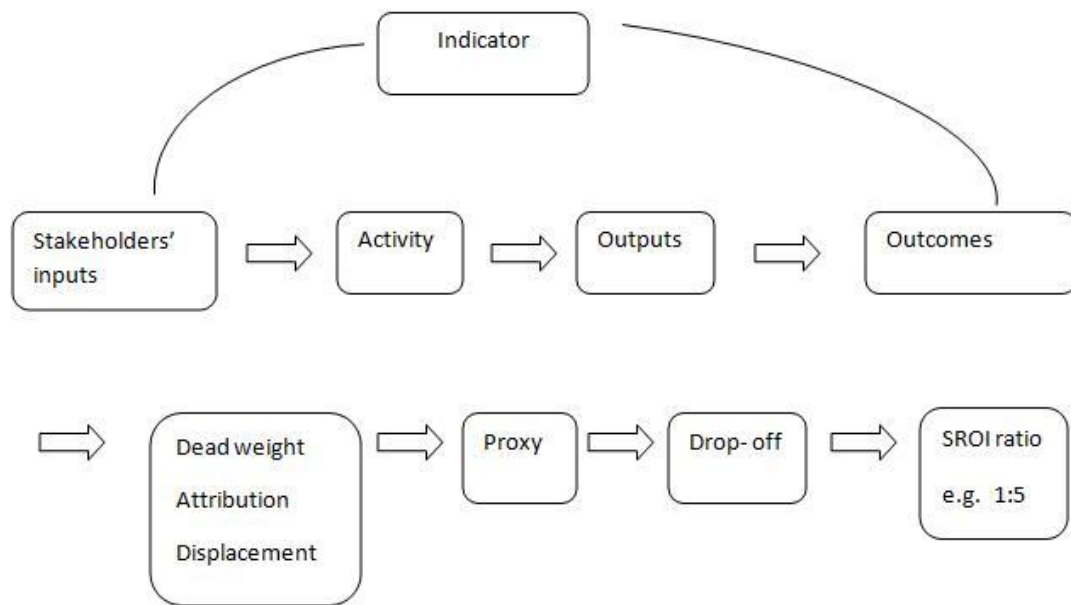


Figure 2 Model, The process of working with SROI, own process (2011).

The illustration above shows the flow chart of the working progress that will make out the impact map we will use to calculate the final ratio for the impact. Stakeholders are not something added in the Excel sheet but we will also consider the inputs from small scale stakeholders to compare their outcome with ventured inputs.

There are six stages in the SROI analysis and they involve: (1) Establishing the scope and identifying key stakeholders, (2) Mapping outcomes, (3) Evidencing outcomes and giving them value, (4) Establish impact, (5) Calculating the SROI and (6) Reporting, using and embedding. All of this will be captured in an impact map that will be the worksheet throughout the whole process.

2.4.1 Establishing scope and identifying key stakeholders

Establishing scope

This is a statement about the boundary of what the working process will be carried out in (Internet, New Economics, 2011; SERUS, 2010). This is the time when the working team will negotiate about what is feasible or not and the reason why the evaluation should be conducted.

Defining the key stakeholders

“Stakeholders are defined as people or organisations that experience change, whether positive or negative, as a result of the activity being analysed” (Internet, New Economics, 2011, page 20). The SROI guideline suggests that the team should list those who might affect or be affected by the activity within the scope. While SROI stresses in stakeholder engagement such as getting people together and flipchart exercises, they do not stress participatory processes methods in the definition of stakeholders and finding stakeholders, such as participatory action research (PRA) (McAllister, 1999; TRSO, 2011). Stakeholder analyses should be a bigger part of the SROI framework when the world and nature appears to

be more interconnected than ever (Byron, J. 2003). In this thesis we have used findings in our interviews to determine the stakeholders throughout the work process.

Deciding how to involve stakeholders

The guide gives out some examples on how to involve stakeholders, like get them together in one place and ask the directly, workshop, have them complete a form, call them, email, social events or one-to-one interview (Internet, New Economics, 2011; SERUS, 2010). The guide also suggests that it is ideally that the team collects information directly from the stakeholder. This however is not always up to the team to decide, they will need to adapt to the schedule of the stakeholders in most cases.

2.4.2 Mapping outcomes

Impact Map

Mapping outcomes is the only way you can be sure that change has taken place (Internet, New Economics, 2011; SERUS, 2010). The guidelines suggest that in the decision process of deciding on outcomes, one should consider other factors such as the organisations objectives. How to include these objectives and what method to use is not clear (McAllister, 1999). To map the outcomes it would have been appropriate to suggest the reader to do a livelihood analysis, ecosystem analysis or an institutional analysis. In this theses interview technique has been used to localise the different outcomes.

Identifying inputs

When it comes to inputs in SROI it is not clear at all times how much each and every stakeholder has contributed within the Excel sheet given to us. The main investment from the top investor is in the end divided with the total created value in the Excel sheet (Internet, New Economics, 2011; SERUS, 2010). But what is less clear and needs to be added in the sheet is how much time and money each of the stakeholders have ventured to receive the invention. In the Excel sheet we have used the inputs are not fully declared. There will also be a difference in intangible and tangible inputs where tangible is easier to locate and intangible will need some more depth in the interviewing and also time (TRSO, 2011).

Valuing inputs

There will be easier to value tangible inputs and tracing them than the intangible ones (Internet, New Economics, 2011; SERUS, 2010). Valuing all inputs the team will also need to use non-market-values. This is also the point where the evaluative SROI will need information from stakeholder organizations and providing all data collected that the analysis will need.

Clarifying Outputs

An outcome is what is directly related to the activity (Internet, New Economics, 2011; SERUS, 2010). It is a quantitative summary of an activity which is different from outcomes. In a social CBA outputs and outcomes are not separated in the same way as in SROI (Dasgupts, *et al.*, 1972; Pearce & Nash, 1981). After the activity has been performed as a product of the installed intervention, the output will be something tangible. This outcome will be the foundation of an outcome (Internet, New Economics, 2011; SERUS, 2010). Sometimes an output will be related to more than one stakeholder, but we are focusing the outcomes, not the outputs.

Describing Outcomes

In describing the outcomes it is important to see to the objectives of the organization as well as the stakeholder's objectives (Internet, New Economics, 2011; SERUS, 2010). The stakeholder's view of the invention may differ but are only factors in deciding the outcomes. To trace the outcomes you might need to use some pedagogical tool or stakeholder involvement in tracing the outcome to be sure that these are outcomes that actually exist and is not only a perception from the team. This is not suggested by SROI guidelines but explored by Helfgott, Sova Corner-Dolloff, Chaudhury and Wikman during field study in Kisumu, Kenya in July 2011.

2.4.3 Evidencing outcomes and giving them a value

Developing outcome indicators

In SROI indicators are applied to prove the connection between outcomes and stakeholders. (Internet, New Economics, 2011; SERUS, 2010). Identifying indicators are based on choice and, like in all impact measurements, there can distort the value of measurement because of the teams' experience. To choose indicators is also a process of choosing how long views has been achieved and should be measured, what is the true base of the indicator that will say (TRSO, 2011). This challenge might not be exclusive to SROI, but transparency is still important. This counteraction appears to a great extent to be based on stakeholder involvement, but how information asymmetry play out between the stakeholders is not clear.

Collecting outcome data

Collecting data to an evaluative SROI analysis should be collected with caution and reviewed if it comes from the organization that already collects data (Internet, New Economics, 2011; SERUS, 2010). New data should come from people directly connected to the creation of value. The most commonly used techniques for primary data collection is presented to be; one-to-on interviews, record keeping, focus groups, workshops and seminars and questionnaires.

Establishing how long outcome will last

The effect of some outcomes will last longer than others, some depend on the activity, some on the invention or some will continue event without the invention (Internet, New Economics, 2011; SERUS, 2010). To estimate the duration one could just ask involved stakeholders, or if it is a tangible intervention, you might follow the lifespan of the invention.

Putting a value on the outcome

After excluding the share of deadweight, attribution and displacement it is time to translate the outcome into a monetized value (Internet, New Economics, 2011; SERUS, 2010). To evaluate there is a need to use a proxy to translate the value of the change from the outcome in to an economic unit. These translated values (proxies) will in the next step be multiplied with the quantity of occurrence after deadweight, attribution and displacement. The product will result in the total annual value that has been added by the activity. To measure extra-financial and non-market goods/services, SROI uses non-market-valuation (NMV) (Internet, Human Dimensions, 2011; pers. med., Sova, 2011). NMV, currently applied in a variety of environmental settings, have a toolbox of strategies for estimating the value of goods and services that are not commonly bought and sold in markets. NMV is SROI's principle tool for measuring what really matters.

General NMV techniques include:

- Hedonic models
- Multiple good valuations
- Benefit transfer
- Damage cost method
- Incremental Cost Analysis (ICA)
- Contingent Valuation
- Willingness to Pay/Accept
- Revealed Preference
- Random Utility (discrete choice)
- Travel Cost

These techniques may be used when putting value on the outcomes (Internet, Human Dimensions, 2011). The technique to use depends on the goods, services and circumstances for the actual situation.

2.4.4 Establishing impact

Determining the outcomes

Deadweight, attribution and displacement are subtracted from the outcome; this is a big part of why SROI stands out as a tool (Internet, New Economics, 2011; SERUS, 2010). To determine the specific added value connected to the Solvatten intervention we need to separate Solvatten AB from other contributors.

Deadweight

Deadweight can be determined through the following question: Is there anything else that could have caused the improved health, if the Solvatten unit had not have been installed in the area? (Internet, New Economics, 2011; SERUS, 2010). Here you need a control group or benchmark to compare the outcome with. A perfect measure will not be possible so this will be estimated.

Displacement

The last step is to establish if there has been any displacement (Internet, New Economics, 2011; SERUS, 2010). In the SROI framework, displacement means that the problem targeted by the action might have been moved to another area as a result of the invention. For example; if an area has a problem with criminal activity, a solution might be to put up street lights. As a result the area might experience less criminal activity, but the problem can be moved to a nearby area. When a problem is relocated like this it is called displacement.

Attribution

It is important to know whether any other stakeholder outside the scope have contributed to the change being made from the targeted input (Internet, New Economics, 2011; SERUS, 2010). In this case the attribution comes from the dispensary where doctors have given out the advice to boil drinking water. (Attribution differs from deadweight in that it is a contribution to the impact that can be traced to a precise source or actor).

Drop-off

| In some occasions there will be an annual drop off, depending on the nature of the action (Internet, New Economics, 2011; SERUS, 2010). But one should assume that the effect from the input will decline with time. If the intervention is of tangible nature the duration of the outcome might follow the life span of the product, but you should assume there is some drop-off. Although in this case the inputs are of tangible nature, the Solvatten unit and the outcome

is clean water for a period of five to ten years, so the annual drop-off will follow the lifespan of the product.

Calculating your impact

You might assume that there is an increase of impact over the years, but this should not be included according to the guide (Internet, New Economics, 2011; SERUS, 2010). It is an assumption not to be made. Financial proxy multiplied by the quantity of the outcome gives you a total value. From this total you deduct any percentages for deadweight or attribution, repeat this for each outcome (to arrive at the impact for each), and add up the total (to arrive at the overall impact of the outcomes you have included).

2.4.5 Calculating SROI

Projecting into the future

This is the step where you include the final step in the Excel sheet and estimate how long the outcomes will last and engage them in the analysis (Internet, New Economics, 2011; SERUS, 2010). Here we already know the duration of the outcome due to earlier steps.

Calculating the net present value

The costs and benefits paid or received will here be added up, costs and benefits are compared and discounting is used (Internet, New Economics, 2011; SERUS, 2010). The value will be calculated to a net present value to mirror a fair value. To use discounting in the future when the values might shift severely and might mislead. Discounting is still controversial in SROI but the guide recommends using net present value.

Calculating the ratio

After the net present value has been calculated we will divide it with the total input, that being the monetary input from investors, being the 100 percent subsidization from the organizational level (Internet, New Economics, 2011; SERUS, 2010). When doing that, the calculation of the SROI-ratio will be complete. For every one Kenyan shilling of input, the beneficiary will have a social return in Kenyan shilling in the amount of year's prognoses. In SROI it is the theory-of-change that is important, but often in analysis when you ask how value is created it has not been understood (Ryan, P. and Lyne, I. 2008; TRSO, 2011). Because of this the drivers and functions from the targeted sector are not understood just by the ratio but you need to follow the process of impact. The ratio and the process cannot be replicated or transferred to a similar projects – it is place specific. An appropriated value as end result needs to be between 1:1,5-15 for you to justify that the ratio and prove that the calculations has been correctly done and the assumptions convincing.

Sensitivity analysis

In this phase we will know how much of the impact is represented by what outcome (Internet, New Economics, 2011; SERUS, 2010). It is also possible to do some estimation of how much of the ratio is represented by development and how much is represented by climate solving. This is possible if the team has a clear distinction between development outcomes and climate outcomes.

The team will at least:

- Estimate deadweight, attribution and drop-off
- Financial proxies

- The quantity of the outcome
- The value of inputs, where you have valued non-financial inputs

The sensitivity analysis is made by calculating what needs to change in the outcomes to make the SROI ratio 1:1. Several changes may need to be done in order to change the ratio.

Payback period

Here we need to assume that the outcome is an isolated event with the assumptions and stakeholder analysis that we have today (Internet, New Economics, 2011; SERUS, 2010). Also we assume that no other stakeholder will add any value to the outcome created by our outcome. Divide the investment by the impact per month or year.

2.4.6 Reporting, using and embedding

Reporting to stakeholders

This involves more than publishing or finishing the impact map (Internet, New Economics, 2011; SERUS, 2010). The result based on structural changes must be understood to be used, or else the ratio might distort the understanding of SROI or the intervention. As always numbers have values that might not be understood if you do not have the background. As this is a thesis there will be a shorter presentation of what has been performed. The presentation will contain qualitative, quantitative and financial value that can be used by the stakeholder.

Using the result

SROI is a tool for stakeholders to understand the process of created value that you can use to support work, decisions or financial support (Internet, New Economics, 2011; SERUS, 2010). It is important that the value is used in a correct and fully understood way.

Assurance

The report should be verified by an SROI consultant to claim the true value (Internet, New Economics, 2011; SERUS, 2010).

2.4.7 The seven principles

To verify the result you need to check the seven principles and that you have followed good SROI practice, this is the simplified way. To have it fully accredited you need to send it to either SERUS in Sweden or SROI network in Great Britain. The seven principles are:

(1) *Involve stakeholders.* The stakeholders are organisations or people that experience change as a result of the activity and can therefore best describe the change.

(2) *Understand what changes.* There need to be theory incorporated in the principle of how the changes have been created; it needs to be supported by evidence. These changes are connected to outcomes of the activity and are often referred to as social, economic and environmental outcomes.

(3) *Value the things that matter.* By using financial proxies you can recognise the value of the outcomes and give a voice to those that are affected by the activities but excluded from markets.

(4) *Only include what is material.* This principle requires an evaluation if information is excluded and a person makes a different decision about the activity because of the excluded

information. This requires reference to organisations policies, societal norms and short-term financial impacts so that it is possible to decide what is material.

(5) *Do not over-claim.* This principle requires consideration of the contribution of organisations and other people to the reported outcomes. This needs to be done in order to match the contributions to the outcomes.

(6) *Be open and transparent.* This principle requires that every decision relating to stakeholders, indicators, outcomes and benchmarks should be documented and explained.

(7) *Verify the result.* The SROI analysis involves subjectivity, even though the analysis provides the opportunity for a better understanding of how value is created by an activity.

It is important to remember these principles when conducting the SROI analysis so that the analysis will be fully accredited at the end of the process. The seven principles will guide you through the analysis.

2.5 Motivate SROI

The chart below shows benefits regarding IA, CBA and SROI. The benefits are illustrated so that it is possible to compare these methods.

Benefits	Impact analysis	Cost benefit analysis	SROI
Monetized value		X	X
Social structure analysis	X		X
Baseline analyses	X		X
Direct stakeholder involvement		X	X
Step by step guidelines			X
Triple bottom line	X	X	X

Why SROI is chosen as the main method needs to be stressed in this thesis. The chart can motivate the choice of using SROI when comparing it to IA and CBA. As it is possible to see SROI offers all the benefits listed, and can therefore be seen as a combination of IA and CBA.

2.6 Sample

There are different ways of deciding on whom to include in a sample (Körner & Wahlgren, 2006). A random selection or a census can for example be made. A random selection means that a number of individuals from a population are being drawn at random. A census means that the entire population is being surveyed, no random selection occurs, this can be relevant when the population is small. In this thesis a census is what is relevant because the population is considered to be small.

The mean can be used when calculating the respond from a population (Körner & Wahlgren, 2006). The mean shows meaningful information when conducting a detailed study. Another meaningful statistical theory is the spread that shows the difference in size between the answer. The mean of an observation is calculated in the following way:

$$\frac{x_1+x_2+\dots+x_n}{n} = \frac{\sum x}{n}$$

Formula, The mean, own process (Körner & Wahlgren, 2006, p. 79).

The formula above shows that the mean of a population is the sum of the collected values divided with the number of observations (Körner & Wahlgren, 2006). The spread shows the variety area of the statistical material (Körner & Wahlgren, 2009). The variety area can be shown in a bar chart and offers a simplified overview of the spread.

2.7 Survey

When collecting information from different stakeholders it is ideally to gather the information directly from them (Internet, New Economics, 2011). The information can for example be collected through one-to-one interviews. When involving stakeholders in such a way it is important to be efficient so not too much time is taken from them. To know what information is desired beforehand can limit the involvement with the stakeholders to a one time meeting.

In statistic research it is important to plan and carry out the study in a way so that all the information needed is collected (Körner & Wahlgren, 2009). It is therefore significant to know what kind of information that is desirable for the research and then limit the collection of information to only the necessary. Too many questions in an interview can make the quality of the collected information lower due to the fact that it can be tiresome for the interviewee. With too many questions being asked the number of people answering might be lower, a term for this is missing value. The missing value normally occurs in statistical research but should be kept to a minimum, otherwise the research might not be trustworthy. The missing value can also be high when sensitive question are being asked. If sensitive questions are being asked the answer might sometimes not be truthful (Körner & Wahlgren, 2009). There are a few pointers worth following when conducting a survey/interview and they are as follows:

- Ask the question in a way that makes it easy to answer
- Ask about one thing at a time
- Formulate the question so that it cannot be misunderstood
- Avoid leading and prestige connected questions
- Test the questions on forehand to make sure that the questions work as desired
- Explain the reason for conducting the survey/interview, this might also decrease the missing value

If these pointers are being followed the risk of untruthful answers decreases (Körner & Wahlgren, 2009). There are many methods on how to conduct surveys/interviews depending on the situation and environment for the survey/interview. Skilful questioning is the key to a successful interview and useful information can be given by the person being interviewed (Internet, Faculty Development, 2011). When interviewing people from other cultures it is even more important to investigate various interview techniques since it can help bridge cultural difficulties. When interviewing locals in the Bungoma district the interviews will be based on the Funnel Technique.

The Funnel Technique

When using the Funnel Technique the interviewer starts with broad and open questions and then gradually narrows it down to detailed and closed questions (Internet, Questioning Techniques, 2011). The principle is that more and more detailed questions should be asked at each level. When using this technique the person being interviewed will likely focus on important details. There are four steps of the Funnel Technique and they are as follows (Internet, Article Alley, 2011).

1. Motivate- why you are asking the questions
2. Open neutral questions- be non-specific, un-biased information
3. Open leading questions- be specific, biased information
4. Summary and/or get commitment with closed questions

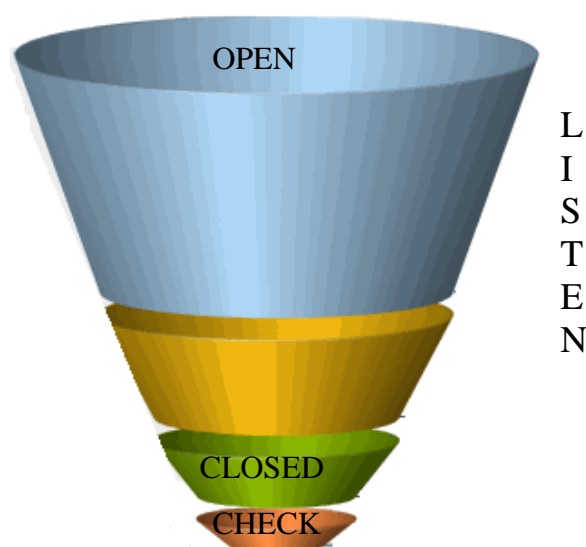
Step one: In the first step the interviewer must motivate the interviewee. The interviewee needs to be prepared for the barrage of questions and the best way to prepare them is with motivation. It might sometimes be a good idea to try and create positive feelings by using something the person said. If they for example talk about their work and you ask another question about it they are more likely to talk about the subject with more depth. In step one it is important not to sound patronizing.

Step two: When the interviewee is more relaxed it is a good idea to start to probe for information. Here it is important to try and find out as much as possible without leading or influencing the interviewee. What is important is to encourage the person to talk and give information. Questions in this step must not be closed or too specific. Pieces of valuable information will most likely be given to you in the second step.

Step three: When information is gathered and uncovered it is possible to start using open questions and to be specific. You want to pin point specific areas that is of relevance and this can be achieved by leading the interviewee. The questions should be as open as possible. In step three you want to explore and lead the interviewee.

Step four: In step four you summarize and use the persons words and information given to you. Here you want to show that you understand the situation and their needs. What you want is a commitment and to show that you have understood the answers from the interviewee. By using the Funnel Technique when asking questions you have a powerful tool when conducting interviews. To be an active listener is a very important part and should not be underestimated. The open questions are important and the skill to differentiate between open neutral and open leading questions needs to be practiced

The Funnel Technique



Model, The Funnel Technique, own process (Internet, ROI Channels, 2011).

At the mouth of the funnel you start with open questions (Internet, Questioning Techniques, 2011). When using the Funnel Technique the person interviewing should work down the body of the funnel and in the end get a complete picture. Sometimes it is necessary to repeat or rephrase questions to draw out more specific information from the interviewee. At the bottom of the funnel you wish to clarify and use a short summary. The summary can be about what you got out from the interview.

3 Empirics

Most of the empirics for this study have been collected in the Bungoma district in Kenya. The main way of collecting data has been through one to one interviews from the target group in the area.

3.1 Establishing scope

Purpose: The purpose of the SROI analysis is to identify the potential social added value for 31 families (targeted beneficiaries) in the Bungoma district after having bought Solvatten in 2010. The motivation is to give Solvatten AB a greater understanding of the process of value adding and for them to be able to motivate new and old stakeholders to invest in the project. Another motivation is to make the beneficiaries understand what they have gained (or lost) as a result of investing in the Solvatten unit by using SROI ratio as a communicative tool.

Audience: The main audience for the analysis are Solvatten AB, Swedish international development cooperation agency (Sida), the Swedish University of Agricultural Sciences (SLU) and the Swedish Cooperative Center (SCC) ViAgroforestry in western Kenya. The analysis will be an including process for all stakeholders, but for non-direct stakeholders the results will be communicated through presentation and the physical thesis.

Background: The aim of this study is to calculate the social added value created by Solvatten AB for the beneficiaries in the Bungoma district. Solvatten AB as constituent wants to

understand the process of the value adding that their intervention can provide. Also how to communicate their work in another way that is understandable for future philanthropy investors. By conducting this analysis Solvatten AB will have more information about the social added value in the family environment where their product has been installed in the specific area. SCC-ViAgroforestry will have a greater understanding of the interventions impact and be able to implement it in new ways.

Recourses: 25 000 SEK as Minor Field Study scholarship for each student, in total 75 000 SEK. As the main NGO in the area, SCC-ViAgroforestry has provided time such as interviews, guidance, supervision and orientation in the Bungoma district. They have also presented us for the Solvatten users who bought the unit in 2010 and provided internal documents of use. Solvatten AB has given us time and physical help such as internal documents, interview time and other valuable information and guidance.

How the work will be carried out: The analysis will be carried out by Jenny Jönsson, Anna Wikman and Tina Wätthammar with the help of the core stakeholders to understand the organisational and cultural structure at the field site.

The range of activities on which you will focus: This analysis will focus on the product Solvatten in the Bungoma district in western Kenya. The period of time over which the intervention will be considered: April 2011-August 2011.

Whether the analysis is a forecast or an evaluation: This SROI analysis is an evaluation analysis.

3.2 Identifying key stakeholders

During the work we have found different groups as being key stakeholders in the SROI analysis and those who are directly affected by the intervention. These are all the beneficiaries of the intervention itself but also stakeholder's benefiting from secondary a benefit. A secondary benefit is not connected to the core function of the intervention – clean water – but in the administrative and facilitating part of the work. The stakeholders excluded are those who will experience a benefit in some years but will have a hard time being connected to the primary intervention and action as impacts will get influenced by other institutions over time. Therefore it will be hard to distinguish apart from the Solvatten intervention.

Selecting stakeholders	
Key stakeholders	Reason for inclusion
Local users of Solvatten-Women	They experience direct change after using the product, for example clean water, improved health, decreased expenses and more spare time.
Local users of Solvatten-Men	They experience direct change after using the product, for example clean water, improved health and decreased expenses.
Local users of Solvatten-Children	They experience direct change after using the product, for example clean water, improved health and higher attendance in school.

Solvatten AB	They are the founders of Solvatten and it is in their interest that the product is selling. Positive or negative change for Solvatten affects Solvatten AB.
Solvatten facilitators	As the facilitators work with promoting and selling the product they experience positive or negative change.
Swedish Cooperative Centre -ViAgroforestry	The SCC-ViAgroforestry cooperate with Solvatten AB and therefore experience positive or negative change alongside Solvatten AB.
Exclude stakeholders	Reason for exclusion
The Kenyan government	They do not experience significant change.
Members of the local community not using Solvatten	They do not experience change because they do not use the product.
Solvatten investors – external investors	When different funders are introduced to Solvatten they might be interested to invest in Solvatten AB. They will not be stakeholders until they are in contact with Solvatten AB.
Local dispensaries	The local dispensaries might experience change but are not included as stakeholders. They are used as a control point regarding the health questions asked to the users of Solvatten.
Relief programs	When different relief programs are introduced to Solvatten they might be interested to invest in Solvatten AB. They will not be stakeholders until they are in contact with Solvatten AB.

The process of identifying stakeholders started in Sweden and continued in Kenya. The stakeholders were identified through continues interviews in the early stage of the fieldwork. In this study the main focus are the local users of Solvatten. They are also the largest group among the identified stakeholders. For each and every stakeholder group we have used modified questioners with the basis of the Solvatten user questioner. This is the case except for the difference in men, women and children, when a family member has been answering the questions. See appendix 1.

3.2.1 How stakeholders have been involved

The stakeholders have all been involved through interviews. For the different stakeholders one-to-one interviews were carried out. The interviews took place between May 11th and June 10th. The table below offers an overview on how to involve the different stakeholders.

Stakeholders	Method of involvement	How many	When
Local users of Solvatten-Women	One-to one interviews	As many of the families using Solvatten in the Bungoma district.	May 11 th until May 25 th
Local users of Solvatten-Men	One-to one interviews	As many of the families using Solvatten in the Bungoma district.	May 11 th until May 25 th
Local users of Solvatten-Children	One-to one interviews with the parents	As many of the families using Solvatten in the Bungoma district.	May 11 th until May 25 th
Solvatten AB	Involvement through email and interviews	One of the Solvatten AB staff.	April 23 rd until August 18
Solvatten facilitators	One-to one interviews	Two facilitators.	June 2 nd
SCC-ViAgroforestry	Involvement through email and questionnaires filled out by the administrators	Four administrators.	June 7 th

The same questionnaire was used when interviewing men and women. The children were not directly involved instead the parents spoke for them. For the other stakeholders other questionnaires were used – see appendix 2-5.

3.3 Mapping outcomes

In this part the work with the impact map commenced. Working with the impact map is a process that takes time, and will be continued until the ratio is calculated. The stakeholders were in this step of the analysis involved to make sure that the relevant outcomes were included.

3.3.1 Starting on the impact map

The impact map is the core worksheet that the data have been compiled and systematically analyzed in. The process of distinguishing outcomes and connecting them to stakeholders and analysing the value is made in the impact map. The impact map provides an overview of the result, the complete impact map can be found in appendix 6.

3.3.2 Identifying inputs

The largest financial input comes from investors. Solvatten is 100 percent subsidized in the Bungoma district and the manufacturing cost could not be covered by the price the unit is sold for in the field. The price in the bottom market differs in the different countries Solvatten AB operates in due to socio-economic factors. In Kenya the unit is sold for 1200 KES, equivalent of 13 USD. When asking about willingness to pay in the target group of Solvatten users, the average was 1219, 35 KES. The spread was large, from 500 to 2500 KES. The average is very similar to the actual price of 1200 KES for a Solvatten unit. The similarities are interesting and can depend on different aspects. One can be that the users were afraid that the price for a unit would go up if their answer was more than the actual price. Another aspect might be that

people sometimes respond what they think is expected of them. Even if the users thought that a higher price for a Solvatten unit might be motivated, they could think that they would not afford to buy it then.

Stakeholder	Input
Local users of Solvatten-Women	The cost of a Solvatten per household. (1200 KES)
Local users of Solvatten-Men	The cost of a Solvatten per household. (1200 KES)
Local users of Solvatten-Children	No input – there might be in time input but most of the time children were not allowed to operate the unit
Environment	Solvatten unit
Solvatten AB	The administration cost, development cost, cost for employees
Solvatten facilitators	Time and money
SCC-ViAgroforestry	Time

Inputs can be misleading if you do not look at the cost connected to the activity. For example do the sellers or facilitators of Solvatten earn provision every time they make a sale – the provision of one unit sold is 200 KES. The facilitators only work on provision, there is always the risk of not making a sale even if you are working with promoting. Then you may spend money on transport without any income. The input from the administrators at SCC-ViAgroforestry is the time spent on administrating and promoting Solvatten. The return from the input is what Solvatten AB values as sufficient pay for their invested time. The return is the 1000 KES that is left of the 1200 KES.

SCC-ViAgroforestry also put in time in Solvatten and the value of this can be estimated as an equivalent to their hourly pay from SCC-ViAgroforestry. The 1000 KES that returns from a sell in Solvatten can be counted as an alternative cost of their pay and may not reflect the true value as Solvatten is a part of their job and not extra time. The profit from one sold Solvatten unit returns to the SCC-ViAgroforestry organization but not as a personal bonus but to cover administration cost, storage and transport.

3.3.3 Valuing inputs

We want to know if the outcomes from all the stakeholders equal or are higher than the inputs. You can invest a lot of time to get the unit for example, but get a very low return on the outcome. To value the intangible inputs we used alternative cost and willingness to pay to illustrate this in the impact map. The intangible input is low from the target groups and stakeholders in the field, these proxies have instead been used to value intangible outcomes. The top investors’ inputs are in the end divided with the total impact calculated in the impact map.

Inputs	Outputs	Stakeholders
Operating the unit, cost and time spend (1200 KES, 0,15 h)	HWTS, maximum 33 liters per day	Solvatten users
Operating the unit, cost and time spend (1200 KES, 0,15 h)	Safe water and storage, maximum 33 liters per day	Solvatten users

Operating the unit, cost and time spend (1200 KES, 0,15 h)	Safe water and storage, maximum 33 liters per day	Solvatten users
Operating the unit, cost and time spend (1200 KES, 0,15 h)	Safe water and storage, maximum 33 liters per day	Solvatten users
Operating the unit, cost and time spend (1200 KES, 0,15 h)	Safe water and storage, maximum 33 liters per day	Solvatten users
Operating the unit, cost and time spend (1200 KES, 0,15 h)	Safe water and storage, maximum 33 liters per day	Solvatten users
A Solvatten unit	CO2 savings, two tons per year and Solvatten	The environment
Time, average 46 hours per month	Provision per sold Solvatten, 200 KES	Facilitators
Time	Provision per sold Solvatten, 1000 KES	SCC-ViAgroforestry administration

In the Excel sheet there has been no added space for valuing inputs compared to specific outcomes. We need to know if the input of time and money compared to the outcome per stakeholder and if the ratio is worth the investment for each stakeholder.

3.3.4 Clarifying physical outputs

These are the physical tangible outputs directly produced by Solvatten units. Outputs are the direct consequence of operating the unit.

Stakeholders	Output	Value of output
Solvatten users	Operating the Solvatten unit	Maximum of 33 litres of water in one day
The environment	CO2 saving, two tons per year and Solvatten	3000 KES (37 USD)
Facilitators	Selling the unit - facilitator	Provision of 200 KES
SCC-ViAgroforestry	Selling the unit SCC-ViAgroforestry	Provision of 1000 KES

Although each stakeholder may only have one output the number of outcomes might be higher. The value of the outputs is sometimes easily calculated in monetary values. In other cases such as the Solvatten users, the value is more difficult to capture in monetary values.

3.3.5 Describing outcomes

You could choose to look for more than one outcome per activity and stakeholder, but as this thesis is a combination of assignment from Solvatten AB and a review of the possibilities and challenges of the SROI framework the process is simplified and adapted to the worksheet given to us by Erik Nilsson at SERUS.

Stakeholder	Activity	Output	Outcome 1
Solvatten user	Operating the Solvatten unit	HWTS	Less waterborne diseases in the family
Solvatten user	Operating the Solvatten unit	HWTS	Saved money in fuel and chemicals such as water guard

Solvatten user	Operating the Solvatten unit	HWTS	Gained time as a result of less sickness connected to waterborne diseases
Solvatten user	Operating the Solvatten unit	HWTS	Saved time on collecting fuel, preparing food and purifying eater
Solvatten user	Operating the Solvatten unit	HWTS	Value of improved health
Solvatten users	Operating the Solvatten unit	HWTS	Gained in Social status in the community as a result of the Solvatten purchase
Environment	Saving firewood and charcoal	CO2 savings	CO2 savings
Facilitators	Selling and promoting the unit	Provision per sold Solvatten	Improved economy as a result of promoting and selling Solvatten
SCC-ViAgroforestry administration	Promoting and temporary selling the unit, storing it and distributing it.	Provision per sold Solvatten	Income to the organization per sold Solvatten
<i>Solvatten users-children under five years</i>	<i>Operating the Solvatten unit</i>	<i>HWTS</i>	<i>Estimated children under five years saved as a result of HWTS</i>
<i>Solvatten users</i>	<i>Operating the Solvatten unit</i>	<i>HWTS</i>	<i>Less chlorine for water treatment and therefore lesser chance of exposure to carcinogenic substances</i>
<i>Solvatten users - farmers</i>	<i>Using the Solvatten water to clean the udder</i>	<i>Milk (quantity or quality?)</i>	<i>More milk or better quality</i>

The outcomes and indicators in italic are not part of the calculation because it is difficult to value saved lives. It is not proven scientifically enough that chlorine used as water purifier can cause miscarriage and cancer. The data for quality and quantity of milk have not been successfully collected throughout the field study.

3.4 Evidencing outcomes and giving them value

In this step of the analysis we developed outcome indicators to evidence that the outcomes were occurring. The work of developing indicators started in Sweden with Solvatten AB staff.

The work continued in Kenya with the help of SCC-ViAgroforestry and our supervisor Cleophas Oparah.

3.4.1 Developing outcome indicators

In the questioner used in the Bungoma district the indicators and possible outcomes were intergraded in the questionnaire to make up assumptions of possible answers. The assumptions have their background in the previous findings from Solvatten AB's pilot study from 2009. As an outline we used the outcomes mapped out by Solvatten AB in their pilot study and narrowed down some additional possibilities with the help of Oparah. The table below offers an overview of the indicator for each of the outcomes. After pilot testing the questioners on a control groups the questioner was modified and then used on the actual target group.

Choosing indicators		
Outcome	Indicator	Subjective or objective
Less waterborne diseases in the family	The domestic house hold water is safe and occurrence of waterborne diseases has decreased	Objective
Saved money in fuel and chemicals such as water guard	The household reports to have saved money as a result of the Solvatten purchase	Subjective
Gained time as a result of less sickness connected to waterborne diseases	Respondents who reports less sick days per month as a result of Solvatten	Subjective
Saved time on collecting fuel, preparing food and purifying eater	Households that have saved time on collecting fuel, preparing food and purifying water	Subjective
Value of improved health	Respondents who see the improved health as connection to the investment of Solvatten	Subjective
Gained in Social status in the community as a result of the Solvatten purchase	Respondent reports that the family have gained in social status in the community	Subjective
CO2 savings	Sum of saved CO2 (ton) emissions per Solvatten unit per year	Objective
Improved economy as a result of promoting and selling Solvatten	Total number of sold Solvatten in 2010 by facilitators	Objective
Income to the organization per sold Solvatten	Total number of sold Solvatten in 2010 by SCC-ViAgroforestry administrators	Objective
<i>Estimated children under five years saved as a result of HWTS</i>	<i>Estimation that there would have been a heightened mortality risk for children under five years if Solvatten had not been in the homestead.</i>	<i>Subjective</i>
<i>Less chlorine for water treatment and therefore lesser chance of exposure to carcinogenic substances</i>	<i>Estimation that there would have been a heightened miscarriage and carcinogenic</i>	<i>Subjective</i>
<i>More milk or better quality</i>	<i>Estimation that there would be a higher quantity or quality if Solvatten user cleans the udder of the cow with Solvatten water.</i>	<i>Subjective</i>

In this thesis, many of the indicators used are subjective indicators. The result in the analysis will therefore largely be based on the beneficiary's perception of their improved social and economical situation. Some objective indicators were of course used.

Less waterborne diseases in the family

From the interviews we found that 24 families have had cases of typhoid in the past, five amoebic dysentery, three cholera and 19 diarrhoea. On an average someone in the family was sick 4, 3 times per month before Solvatten was purchased and 0, 03 times per month after Solvatten was purchased. Before Solvatten was bought, 67 percent of the children in the families had irregular attendance at school as a result of being sick, often by waterborne diseases. After purchasing Solvatten the children had an increased school attendance with an average of 87 percent, this is stated by the parents.

Saved money in fuel and chemicals such as water guard

Most of the families use the improved stove for cooking only. Most families collect fire wood, so the saved money comes foremost from charcoal and chlorine savings. Seven families reported that they had saved money in fuel cost and 11 reported that they had saved money in water guard.

Gained time as a result of less sickness connected to waterborne diseases

As a result of Solvatten, waterborne diseases disappeared. Before Solvatten was bought someone in the family was sick on average four times a month, if we multiply that by average length of working hours (5,40 hours) we get an indicator saying how many hours a month someone was sick. 3, 73 days were gained as a result of Solvatten and not having to be sick, in total an outcome of 20 hours per stakeholder per month. Top choice of reprioritising the time saved was mostly connected to income generating activities.

Saved time on collecting fuel, preparing food and purifying water

The average time to walk back and forth to an outside compound water source is 25 minutes, and the average distance is 0, 75 km. On average water was collected four times a day and the size of the container is 20 litres.

Average time spent on purifying water before Solvatten was 1, 36 hours and after Solvatten 0, 6 hours are left. The operating time of Solvatten is not included as you do not need to supervise it if it's put in a safe place. Out of the 31 stakeholders 75 percent claimed that they have saved time in purifying water because of Solvatten.

How time has been saved has been ranked the following way: 24 percent on collecting fuel, 23 percent on boiling water and 13 percent on buying fuel. Less time has been saved on other ways of purifying water (eight percent), tea/coffee (five percent), preparing food (four percent), preparing and collecting water (0, 8 percent). The indicator consists of the collected value of where time has been saved and who many of the stakeholders have experienced saved time as an outcome of Solvatten.

During the questioning of the control group and unofficial conversations with local stakeholders we found that women are often the ones responsible for collecting and supplying clean and safe water to the family. She is the one who needs to make sure that there is clean water in the house. Financing any chemicals or new inventions that affects the family budget is decided within the family (40 percent) but most often decided by the husband (60 percent).

When asking unofficially outside the interview about any potential disagreement, our perception was that the husband in most cases had the last word.

Value of improved health

94 percent/or 29 stakeholders see the improved health as a direct connection to Solvatten.

Family has gained in social status in the community as a result of the Solvatten purchase

94 percent/29 stakeholders stated that they had gained in social status in the community as a result of purchasing Solvatten. When questioning about if anything was more time consuming after purchasing Solvatten, the only thing more time consuming was talking to neighbours about Solvatten and educating them. Ten respondents from the target group said that they needed to talk to neighbours more often as a result of buying Solvatten. 95 percent also stated that they value themselves differently (in a positive way) after investing in Solvatten. 70 percent also say that the caretaker of Solvatten gained in social status in the family, this would be the wife in 68 percent or 21 stakeholders. 84 percent say that the family gained in social status in the community.

CO² saving

Carbon has been saved if the beneficiary switched from boiling water with firewood to only purifying water with Solvatten, in that case 1, 6-2, 4 ton CO₂ per Solvatten per year has been saved. Before buying Solvatten 50 percent in the target group used firewood as main fuel to purify water, after buying the unit 90 percent use only Solvatten as purifier of drinking water.

Improved economy as a result of promoting and selling Solvatten

This information comes from a different questioner used to interview the two facilitators Solvatten AB uses in the Bungoma district to sell units. The facilitators earn a provision of 200 KES for every sold unit. Units are sold by both SCC-ViAgroforestry staff and the facilitators. The facilitators sold 13 Solvatten in total in 2010.

Income to the organization per sold Solvatten

This information comes from yet another questioner used when interviewing the four SCC-ViAgroforestry administrators that are working with promotion, training promoters, SCC-ViAgroforestry staff and government officials, selling's and administrative tasks. They state that they do not have enough time to work with Solvatten as their main assignments are taking most time. The administrators at SCC-ViAgroforestry have during 2010 sold in total 18 units.

Estimated children under five years saved as a result of HWTS

There are in total 36 children under 5 years in all the families that bought Solvatten 2010 that had access to Solvatten. Through conversations outside the interviews parents said that their children did not drink any other water than Solvatten, since they understood the difference in drinking purified water and untreated water.

Less chlorine for water treatment and therefore lesser chance of exposure to carcinogenic substances

There are in total 216 persons in the 31 families that were interviewed and 11 of these families used chlorine before Solvatten. There are therefore 11 families that may have been spared from cancer or miscarriage within the family.

More milk or better quality

There is a perception that cleaning the udder with Solvatten water will improve the quality and quantity of the milk. It is difficult for us as economic students to prove if and in that case how much such as change has given. The value of improved milk quality and quantity will therefore not be calculated in this thesis.

3.4.2 Collect outcomes data

In the process of a SROI evaluation we have used a lot of data from Solvatten AB and from their sources, such as SCC-ViAgroforestry and the local beneficiaries in the Bungoma district. To collect data we mainly used one-to-one interviews and questionnaires to record the large scale interview and the deep interviews. The questionnaire used for the target group is divided into nine parts, for example economy/budget, health and farm. The questions were developed and improved with the help of Oparah, Lagerkvist and Solvatten AB. Outcomes Solvatten AB found in 2009 was used when building the questionnaire, see appendix 1. Additional questions and improvement of the questions took place after arriving in the Bungoma district.

There were 31 families in Bungoma district that bought Solvatten in 2010 and still have the unit within the homestead, all were successfully interviewed, 11 males and 19 females. The two facilitators and the four administrators were all successfully interviewed. We interviewed a randomised selected control group of 10 families, one male and nine females, to establish if the outcome could be connected to Solvatten alone.

3.4.3 Establishing how long outcomes last

The life expectancy of a Solvatten is five-ten years and the prognosis is that the water cleaning effect will not decrease with time. We have used five years considering the lowest value principle and the precautionary principle. The outcome is directly connected to the use of the product and as long as Solvatten is being used regularly the effect will stay. This is an assumption in the data gathering based on the fact that no other institution will interfere with the activity or outcome.

Stakeholder	Activity	Output	Outcome 1	Duration of outcome
Solvatten user	Operating the Solvatten unit	HWTS	Less waterborne diseases in the family	Lifespan of Solvatten – five years
Solvatten user	Operating the Solvatten unit	HWTS	Saved money in fuel and chemicals such as water guard	Lifespan of Solvatten – five years
Solvatten user	Operating the Solvatten unit	HWTS	Gained time as a result of less sickness connected to waterborne diseases	Lifespan of Solvatten – five years
Solvatten user	Operating the Solvatten unit	HWTS	Saved time on collecting fuel, preparing food and purifying eater	Lifespan of Solvatten – five years

Solvatten user	Operating the Solvatten unit	HWTS	Value of improved health	Lifespan of Solvatten – five years
Solvatten users	Operating the Solvatten unit and teaching neighbours about the benefits of the unit	HWTS	Gained in Social status in the community as a result of the Solvatten purchase	Lifespan of Solvatten – five years
Environment	Operating the Solvatten unit	CO2 savings	CO2 savings	Lifespan of Solvatten – five years
Facilitators	Distributing the unit	Provision per sold Solvatten	Improved economy as a result of promoting and selling Solvatten	Assumes that the facilitators will continue sell units – five years
SCC- ViAgroforestry administration	Selling and promoting the unit	Provision per sold Solvatten	Income to the organization per sold Solvatten	Assumes that the facilitators will continue sell units – five years
<i>Solvatten users – children under five years</i>	Using the water within the family and	<i>HWTS</i>	<i>Estimated children under five years saved as a result of HWTS</i>	As long as the family have children under five years and the Solvatten unit operates as normal
<i>Solvatten users</i>	Operating the Solvatten unit instead of sing chlorine	<i>HWTS</i>	<i>Less chlorine for water treatment and therefore lesser chance of exposure to carcinogenic substances</i>	Lifespan of Solvatten – five years
<i>Solvatten users - farmers</i>	Operating the Solvatten unit and using the water for cleaning the udder	<i>Milk (quantity or quality?)</i>	<i>More milk or better quality</i>	Lifespan of Solvatten – five years

When asking the users if they knew where to buy spare parts if their unit breaks 42 percent answered that they do not know. When calculating other outcomes outside the HWTS lifespan, the duration of the expected outcome will vary. This data is treated as five years of isolated events with the knowledge of today, but in time Solvatten will have end effects that will change the livelihood as a result of a better health, saved time and money.

3.4.4 Putting a value on the outcome

When valuing outcomes outside non market values we have used willingness to pay, alternative costs and market values as medical costs for measures as savings. Also this average value of time might be undervalued because of the farmers living condition being under market value. The real value in the everyday life for the farmer might be a higher income per hour. This is a value referred to the respondents own judgement on their own household budget. Many times the respondent from the Solvatten users target group had no bookkeeping of their household incomes and expenses. But they do have a good judgement on present value on products, sales prices per season and were able to give us a weekly, monthly or seasonal average in KES.

Selecting proxies		
Outcome	Indicator	Proxies
Less waterborne diseases in the family	The domestic house hold water is safe and occurrence of waterborne diseases has decreased	Saved medicine cost for waterborne diseases in the family, total cost for waterborne diseases
Saved money in fuel and chemicals such as water guard	The household reports to have saved money as a result of the Solvatten purchase	Saved money in fuel cost and other chemicals such as chlorine
Gained time as a result of less sickness connected to waterborne diseases	Respondents who reports less sick days per month as a result of Solvatten	Value in KES in an average working hour in an average farmer household times the average saved time per day
Saved time on collecting fuel, preparing food and purifying eater	Households that have saved time on collecting fuel, preparing food and purifying water	Value in KES in an average working hour in an average farmer household times the average saved time per day
Value of improved health	Respondents who see the improved health as connection to the investment of Solvatten	Willingness to pay
Gained in Social status in the community as a result of the Solvatten purchase	Respondent reports that the family have gained in social status in the community	Willingness to pay
CO2 savings	Sum of saved CO2 (ton) emissions per Solvatten unit per year	The market price for one ton of CO2 in 2011
Improved economy as a result of promoting and selling Solvatten	Total number of sold Solvatten in 2010 by facilitators	Average monthly salary after expenses connected to promoting
Income to the organization per sold Solvatten	Total number of sold Solvatten in 2010 by SCC-ViAgroforestry administrators	Income per sold unit
<i>Estimated children under five years saved as a result of HWTS</i>	<i>Estimation that there would have been a higher mortality risk for children under five years if Solvatten had not been in the homestead.</i>	<i>No proxy</i>
<i>Less chlorine for water treatment and therefore lesser chance of exposure to carcinogenic</i>	<i>Estimation that there would have been a heightened miscarriage and carcinogenic</i>	<i>No proxy</i>

<i>substances</i>		
<i>More milk or better quality</i>	<i>Estimation that there would be a higher quantity or quality if Solvatten user cleans the udder of the cow with Solvatten water</i>	<i>No proxy</i>

The proxies used are the average value calculated from the answers in the questionnaire. It is important to note that the spread varies in size between the different proxies, for example did the willingness to pay have a large spread. This can result in that the mean can be a bit misleading compared to proxies that have a smaller spread. This is not an indicator of money that has changed hands but you can still place a value on it. The value of the proxies is written below and gives an explanation of the values found in the impact map:

Saved medicine cost for waterborne diseases in the family, average cost for waterborne diseases

To value better health as a cost saving from the total costs of waterborne diseases we have used average cost from all stakeholders medical cost (2193 KES; 24 USD) times how often someone in the family where sick of- waterborne diseases per month, 4, 3 times.

Saved money in fuel cost and other chemicals such as chlorine

Many have not saved money in fuel cost as most collect firewood, the savings comes mostly from charcoal. Seven stakeholders reported that they have saved money on fuel costs from purchasing Solvatten and that value is estimated to an average 112 KES per month (1, 2 USD) during rainy season and off rain season 88 KES per month (0, 95 USD). 11 stakeholder reported that they had saved money in chlorine; 100 KES (1 USD) per month. Total savings for this stakeholder group is 1401 KES (15, 21 USD) per year for this outcome.

Value in KES in an average working hour in an average farmer household times the average saved time per day

Average household income (13 355 KES; 144 USD per month) divided by average working hours in one month (108 hours) times how much time that has been saved as a result of Solvatten. The 30 stakeholders that report saved time has gained that from collecting fuel, buying fuel, boiling water, other ways of purifying water, preparing food, preparing tea/coffee and collecting water.

Willingness to pay

When we asked about willingness to pay we presented a scenario for the respondent. The value of the situation before Solvatten and after Solvatten, see appendix 1. The conditions for agreeing on an amount where if they could afford it on a regular basis, not feel that there were more important things to spend money on or if they were not sure about being prepared to pay. Willingness to pay ended up being 1219 KES (13 USD) Minimum willingness to pay was 500 KES (5 USD) and maximum 2500 KES (27 USD).

The market price for one ton of CO2 in 2011

The market price on CO2 emission rights is 37 USD or 3000 KES (Internet, Naturskyddsforeningen, 2011).

Average monthly salary after expenses connected to promoting

200 KES (2 USD), and 100 KES (1 USD) are calculated to be spent on travel. This is for one sold Solvatten and the average monthly salary is connected to the number of Solvatten being sold.

Income per sold unit

This is SCC-ViAgroforestry's organisational income per sold Solvatten unit, 1000 KES (11 USD)

The time spent per unit or the takes connected to Solvatten does not increase the personal salary, therefore the value of working with Solvatten is the provision of one unit, 1000 KES. The provision goes to the organisation.

3.5 Establish impact

Ten control interviews were conducted to ensure the value of the deadweight, attribution and displacement. In the questionnaire used the focus was on other projects the participating families were involved in, for example the SCC-ViAgroforestry carbon project. When comparing the answers from the control group participants with the answers from the Solvatten users deadweight, attribution and displacement assumptions could be made. The deadweight, attribution and displacement can be found in the impact map in appendix 6.

3.5.1 Deadweight

In the outcomes there is no deadweight due to the fact that all the outcomes are the only effect of Solvatten or another institution being in the area. There is no action that would have happened anyway just because of social structural change. If the case study would have longer duration, we would have the possibility of auditing any social trends that might occur and interfere with the outcome.

3.5.2 Attribution

One might think that medical advice from the doctor would give the outcome a large attribution, but the percentage of stakeholders following the advice from the local dispensaries is rather low. People in rural areas in western Kenya have the habit of not boiling the water because of the bad taste the smoke brings to the water. The statement from the interviews collected at the dispensaries by interviewing nurses and doctors is that approximately 60 percent listen and 50 percent out of these actually do go home and make a change. This means that the attribution has been reduced to a more reasonable value, 30 percent.

In the case where improved stove were an attribution to a better health, this is not an attribution to the better health in the same way as Solvatten is. Improved stove helps to create a better cooking environment and helps lower the quantity of smoke that in other cases severely irritates lungs and eyes. Still they use Solvatten for purifying water and improved stove for cooking.

3.5.3 Displacement

There will be no displacement regarding safe water and storage due to the reason that no dirty water is being moved to another area. The invention only cleans and protects unsafe water, it does not move or interfere with the actual water source.

Outcome	Dead weight	Attribution	Displacement
Less waterborne diseases in the family	No deadweight	Medical advice	No displacement
Saved money in fuel and chemicals such as water guard	No deadweight	Improved stove	No displacement
Gained time as a result of less sickness connected to waterborne diseases	No deadweight	Improved stove	No displacement
Saved time on collecting fuel, preparing food and purifying eater	No deadweight	No attribution	No displacement
Value of improved health	No deadweight	Improved stove	No displacement
Gained in Social status in the community as a result of the Solvatten purchase	No deadweight	No attribution	No displacement
CO2 savings	No deadweight	No Attribution	No displacement
Improved economy as a result of promoting and selling Solvatten	No deadweight	No attribution	No displacement
Income to the organization per sold Solvatten			
<i>Estimated children under five years saved as a result of HWTS</i>	No deadweight	No attribution	No displacement
<i>Less chlorine for water treatment and therefore lesser chance of exposure to carcinogenic substances</i>	No deadweight	No attribution	No displacement
<i>More milk or better quality</i>	No deadweight	No attribution	No displacement

The invention itself is in 100 percent of the cases bought from the families own budget, the purchase do not hinder any other families to make an own investment. Many of the Solvatten users are members of social groups and can therefore receive financial support in “marry go round”, a community money sharing service or micro finance.

3.5.4 Drop-off

In this thesis we have outcomes directly connected to the action of Solvatten. All outcomes that are connected to the main stakeholder, the 31 beneficiaries have outcomes that will follow the lifespan of the product. Therefore there is no drop-off in the calculations.

In this case the inputs are of tangible nature, - the Solvatten units - and the outcome is clean water for a period of five-ten years (in this study the calculations are made on five years). The

annual drop-off will follow the lifespan of the product. But for the administrators and the facilitators the drop-off will vary from the time they put in, but we have estimated that they will continue to sell Solvatten at the same rate for five years. It will also depend on Solvatten AB agreement with the facilitators and SCC-ViAgroforestry on how long they will sell, promote and store the unit.

3.4.5 Calculating your impact

When calculating the impact we have been following the precautionary principle, always calculating with lowest value principle. Each outcome has been calculated on its own and then the values have been added together to get the total impact. The total impact has been calculated to **8180946** KES.

3.6 Calculating the SROI

In this part the collected information will be used to calculate the SROI ratio. During the period we collected data the information was transcribed continuously into the Excel worksheet. The calculation was then made in the impact map connected to the other worksheets in Excel.

3.6.1 Projecting into the future

The projection of the outcomes for Solvatten in this study is five years. The life expectancy for the product is between five-ten years. The outcome is directly connected to the use of the product, once you stop using it the outcomes will cease to exist. The value of the outcomes are constant during the five year period, there is no drop-off. The reason why there is no drop-off is because the product is used continuously and the outcomes are connected to the use of Solvatten.

3.6.2 Calculating the net present value

The values have been added together over the different time periods for each of the outcomes. A discount has then been made to identify the value in present day. When calculating the net present value a discount rate has to be established. The rate used in this thesis is three percent, 3-3, 5 percent is recommended in the SROI framework.

3.6.3 Calculating the ratio

When calculating the SROI ratio we divided the total discounted value by the total investment. It is important to have in mind that the SROI ratio is only applicable for the specific district and time period in which the fieldwork took place.

SROI ratio: Total present value of outcome/ Total input: $8180946/316200=25,87 \approx \mathbf{26}$

The SROI ratio was calculated to 1:26. This means that for every one KES invested in Solvatten the value of 26 KES was created, it is the same ratio for any currency.

3.6.4 Sensitivity analysis

The outcome that gives the highest value in the impact map is “Less waterborne diseases in the family”. If this outcome was to be excluded in the calculation of the SROI ratio the ratio would change from 1:26 to approximately 1:5. The reason why “Less waterborne diseases in the family” has such a high value is that the proxy has a high value due to the high costs of doctor’s visits and medicine. The high value also depends on that a lot of the respondents experience such a big change, an improvement of health regarding waterborne diseases. The

other outcomes affect the SROI ratio less, this depends on if the respondents experience less change and the value of the proxy.

To reach the SROI ratio 1:1 several of the outcomes needs to be excluded. There are different combinations of outcomes that will end up with the ratio 1:1. The Excel worksheet enables the user to easy exclude different outcomes to change the SROI ratio. Due to the fact that the SROI ratio is high many changes must be made in order to reach the ratio 1:1.

3.6.5 Payback period

We have calculated the payback period for the investment that the local users did in the Bungoma district in 2010. The payback period was calculated in the following way:

$$(\text{Investment}/(\text{Annual impact}/12 \text{ months})) = 1200/(1961678/12) \approx 0,007 \text{ months}$$

The calculated payback period is very low. The calculation shows that the investment in a Solvatten for 1200 KES will take 0,007 months before a value is being created that equals the invested money. This depends on the fact that the money invested is very low compared to the value created.

3.7 Reporting, using and embedding

This part is about reporting to the stakeholders, using and communicating the results made and to embed. It is important that the results can be reported to all the stakeholders involved, both in Sweden and Kenya.

3.7.1 Reporting to stakeholders

The results will be communicated to the various stakeholders through different channels. A presentation will take place on August 25th in Uppsala, Sweden where stakeholders in the ambient environment have a chance to come and listen. Another way of communicating the results to stakeholders is through this physical thesis. This paper will be communicated to the following stakeholders; Solvatten AB, SCC-ViAgroforestry, SLU and Sida. For the local users in the Bungoma district the results can be communicated through the SCC-ViAgroforestry staff that can forward the information. It is of great importance to communicate the payback period to the local users in the Bungoma district. The payback period can be used to show the efficiency of the product, and hopefully get more people to understand the importance of it.

3.7.2 Using the results

The results will primarily be used by Solvatten AB. This report can be used by Solvatten AB to communicate with potential investors and other stakeholders about the value of the product. This report is also useful for Solvatten AB when applying for different grants and attributions. It is important to note that the calculated SROI ratio only applies to the activities Solvatten AB performed in the Bungoma district during the limited time period we studied the Solvatten units in the area. To be able to show investors and other stakeholders an updated value it is of importance that Solvatten AB does follow ups.

3.7.3 Assurance

Due to the fact that this is a bachelor thesis the paper will not be assured by any others then our supervisor Carl-Johan Lagerkvist at SLU and Erik Nilsson at SERUS. The assurance received is not complete according to the type 1 and type 2 assurances.

4 Results

The SROI ratio has been calculated to 1: 26. The total value of the outcomes are discounted to approximately 8 200 000 KES and this has then been divided by the total input which is approximately 316 000 KES.

	Total	Total
Total present value of outcome:		8180946
Total input:	850	316200
SROI:	1:	25,87

The table above shows the final step of the calculation made in an Excel sheet. The calculations are based on 9 different outcomes that all are presumed to last five years. The value is calculated in present time as an isolated event with the assumption that nothing else will interfere with the inputs and outcomes. The value is place specific to the Bungoma district during the time period of 2010.

5 Analysis and discussion

5.1 Impact Assessment

In the literary review we state that the project (1) must have territory specific characteristics (2) will have possibility of a great shortfall of environmental and social information for the location where the activity is found and (3) some of those indicators which are acceptable by the scientific community might be obstacles. In this thesis we have also stated that (1) the project objectives for the target group in specific is their characteristics due to the SROI evaluative analysis. (2) There was a greater risk of information shortfall: we were new to the information, project and the environment. (3) In the project we used non-economic indicators as well as economic indicators to measure both intangible and tangible values.

5.2 Cost Benefit Analysis

In the project execution we also used *willingness to pay* and *prevailing income distribution* to evaluate non-economic values and take a holistic approach to the costs and benefits of Solvatten. We have shown that SROI is very much alike CBA and have also in the literary review shown the similarities between CBA, IA and how it mirrors SROI.

SROI as a tool has been working as great support in valuing the social, economical and environmental outcomes located from the field work. If you work with SROI as the only

framework you will have a challenge with the base line, a complement to the SROI framework would be to analyze each and every input from every stakeholder, intangible and tangible. Also a complement to SROI would be a more thorough stakeholder analysis and how to find them and work with them. To use participatory action research would be a great compliment to involve stakeholder at the bottom of the pyramid in a future SROI analysis.

5.3 Establishing scope and identifying stakeholders

Establishing scope

The scope was successfully narrowed down to a clear purpose where Solvatten users have been the main beneficiary. We agreed with Solvatten AB to conduct an evaluative SROI analysis with the resources given, which covered all the expenses. The background of this study was to calculate the social added value as a result of using the Solvatten unit, which has been done.

Solvatten AB wants to understand the change of value Solvatten creates in the Bungoma district with the help of SROI. A benefit is that we also got to experience the process of working with SROI.

Identifying stakeholders

Stakeholders are particularly stressed in SROI, this is the main point that is suppose to make SROI stand out as a tool, although you need to involve stakeholders in social CBA and social IA. We would have expected that women were the main beneficiary in the family since the women most often are the one to operate the unit and the main caretaker of the unit, but children are likewise a big beneficiary. Although women get a lot of time released from their daily work after investing in Solvatten, children who are more vulnerable to waterborne diseases may have been give a better chance surviving and having a better life. This considered when diarrhea is the second cause of deaths for children under five years.

Deciding how to involve stakeholders

Women and children are portrayed as being the biggest group of beneficiaries in this thesis, but the possibility to involve them in the process have been somewhat difficult. We succeeded to have a fair spread of woman and men among the Solvatten users (F: 19; M: 11) but we did not interview any children. This would have been a good way of knowing if the children had learned anything from the Solvatten unit about health, and if they had changed their behaviour as a consequence of having the unit in the homestead. Parents have stated that their children have been sick from waterborne diseases after drinking water outside the homestead, but this information was given to us through unofficial conversations. Involving the stakeholder's children would have been good for this study, it is something to be considered when conducting another study.

Using one-to-one interviews have been a good way of involving the stakeholders. This has not been the focus on knowledge exchange as we hoped, instead it has been more of a data gathering. It would have been good to involve stakeholders through workshops, participatory learning and action research methods or likewise for the sake of ensuring the outcomes. During the fieldwork email, one-to-one interviews and questionnaires were used as the main source of collecting data and it has been proved to work out well for this study.

5.2 Mapping outcomes

Impact Map

We have used the model of an impact map given to us by Nilsson to structure the outcomes and the workflow. This Excel sheet has been the main physical frame the work has been structured around. This has made the whole process of working with SROI a step-by-step process. The Excel sheet however lacks input overview of the small scale stakeholder's ventured inputs. For this to be illustrated an extra input column has been added to illustrate the difference in volume between ventured inputs and returned outcomes.

Identifying inputs

To identify inputs one-to-one interviews, emails and questionnaires were used. We identified time and money as main input from all the stakeholders. We can conclude that inputs were large for SCC-ViAgroforestry and the facilitators compared to the return from the outcome. Inputs from the Solvatten users are marginal when you compare inputs of 1200 KES with the return period of 0,007. To learn and understand the costs and benefits from Solvatten will consume approximately one hour.

Willingness to pay, or future inputs, was on average 1258 KES for the unit and the spread was between 500 and 2500 KES. Seven stakeholders voted for 500 KES and only one for 2500. You can discuss whether 1258 KES is a fair value when Solvatten AB wants to reach the most marginalised, but it shows that stakeholders are prepared to pay a little more for the service that Solvatten offers with the narrow budget they often have. This information should not be treated as an incentive to raise the price as Solvatten is 100 percent subsidised but as a benchmark that many are prepared to pay more for the value Solvatten offers them. To better grasp the value of KES you can compare it with one kilo of fuel in Kenya that costs about 10-30 KES, equivalent of 1-3 SEK (pers. med., Felix, 2011).

We assume that the input is a onetime investment and that everything else after that is connected to the activity of operating the unit and making use of the service.

Valuing inputs

Valuing inputs have not hindered the workflow as the input has been mostly tangible and identified as time and money. However, most of them have already a monetised value. This means that there is a risk of missing out on non-market-values and more intangible inputs, but this risk could be regarded as minor when inputs from small scale stakeholders is foremost 1200 KES and the time it takes to learn how to operate the unit.

When it comes to the environment as a stakeholder, the inputs are of course largely simplified to the inputs from the environment. An appropriate life cycle analysis would need to cover the input from nature. In this analysis the next best thing is used to value the input from the environment. We assume that the input from the environment is likewise the outcome in CO² savings that Solvatten provides from the unit. Solvatten AB also climate compensates for all cargo transports connected to the unit, we have therefore not considered transport emission.

Time invested from SCC-ViAgroforestry in promoting, selling and storing Solvatten is not an extra assignment that gives extra working hours or higher salary. Inputs are currently valued by the provision of every sold Solvatten unit, 1000 KES. Working with Solvatten is something that is included in the daily work. The inputs might be argued that it is the

alternative cost of the project that might suffer in time input instead of SCC-ViAgroforestry staff or salary per hour from the SCC-ViAgroforestry staff. However, in all job sights workers need to know how to prioritise between different tasks, and considering the SCC-ViAgroforestry staff knowledge about the district and organisation it is considered that they make the best decisions out of the knowledge and experience available.

Inputs from facilitators in time may also cause alternative cost, but both are unemployed and no other job opportunities will be neglected. Therefore the alternative cost can be argued as being low or insufficient. What the input will do is to consume time from the families, homestead chores and other obligations sine the facilitators are housewives. You could argue that it would be appropriate to include alternative cost for the working hours of being a housewife. This includes valuing all the household tasks, this is something recommended for a future SROI analysis.

Clarifying outputs

Outputs of this invention are mainly tangible in the form of clean water to the Solvatten user and money to the facilitator and SCC-ViAgroforestry. Outputs and outcomes are treated differently in SROI but not in social CBA and social IA. In this SROI analysis it makes sense because of the process in the impact map where you want to know what output that has caused this outcome. The experience we have is also that tracing outcomes becomes easier if you make a distinction between outputs and outcomes.

Describing outcomes

Stakeholder's involvement when developing the questionnaire has shown to be very helpful as they know the district, people living in it and have the experience. To not involve stakeholders would have denoted that data gathering or even developing a sufficient questionnaire would be impossible. We prognosticated the outcomes in the questionnaire with the base of the findings in the 2009 Solvatten AB pilot study and also with help of SCC – ViAgroforestry staff. We also included double indicators that could verify the answers if one question failed in communication.

When it comes to describing indicators it is words described by us with the base of outcomes from the pilot study. These outcomes are however tested in the field on stakeholders, and if there would have been any incorrect assumption it would have been discovered. SROI stresses the involvement on stakeholders which showed helpful in this stage. However the stakeholders involved in the manufacturing of the questioner was not the target group, only the secondary beneficiaries – to involve the immediate beneficiaries in the making of the questioner is something to recommended to next time.

5.3 Evidencing outcomes and giving them a value

Developing outcome indicators

Using the questionnaire as a worksheet and multiple possible indicators formulated in different ways was used to ensure the outcomes and in the case of some indicators being wrongly formulated. Developing indicators while using stakeholders in the process has been very helpful, involving small scale stakeholders should be done in the next SROI analysis.

Collecting outcomes data

Most of the data collected have according to SROI come directly from people connected to the unit. The pilot study from 2009 is written by Solvatten AB employees and SCC-ViAgroforestry. Most of the data used is new and cannot be found in other data sources, all new data comes from stakeholders directly. Most of the data is also subjective, we have not been able to monitor any long term change and also most stakeholders do not keep records. This means that the outcomes are a mirror on a changes appreciation on how life has changed as a result of purchasing Solvatten.

When collecting data the translator used did also work as a door opener. You can argue theoretically that a translator with knowledge about the area might distort the data gathering, however you might then end up needing more involvement from other people which will slow down the process. Another risk is that you might not end up getting any data at all. Using a translator as door opener was a great contributor and made the process easy and we had the opportunity to have relaxed and comfortable interviews. This applies both on us and the respondent.

Establish how long outcomes last

The outcomes connected to the Solvatten unit will last for at least five years or as long as the unit is operated, minimum five years and maximum ten years. This is an assumption based on the fact that Solvatten AB will not be replaced by another invention from external stakeholders. The outcomes are also treated as an isolated event without interference or changes in the surroundings. An assumption is also that the outcomes will completely disappear if the unit is transferred or taken away for the user, which is somewhat an unsustainable situation to be in. If the unit is removed however, the family now know what is demanded for HWTS and can locate likewise, but for it to disappear fully it needs to break completely as 55 percent knows where pick up spare parts. You can say that they have higher demands on the quality of their domestic household water. But as WHO argues WHTS is a very good solution until safe water sources has been established.

We have assumed that SCC-ViAgroforestry and facilitators will continue to sell in the same phase for the next five years. This is an assumption based on the data we have collected but will of course change over time. If we would have the benefit to audit during a longer time period another value might have been captured. The facilitators had also worked for Solvatten AB in between seven and eight months.

Putting a value on the outcome

Using non-market-values and market values to convert the outcomes into monetary values was a big challenge in the work of SROI. This is the step when you will see some result even in the impact map. Choosing proxies is part of processing the collected data. Proxies has here been constructed in the impact map out of the data collected about monetary savings, average income, benchmarks and so forth. This is also a process that has been consulted with expert knowledge from Nilsson. However you need to plan for proxies during the construction of questioner, but new proxies will appear during field work that will show to be useful.

Average value of time might be undervalued because of the farmers living condition being under market value. The real value in the everyday life for the farmer might be a higher income per hour. This is a value referred to the respondents own judgement on their own household budget. Many times the respondent from the Solvatten users target group had no record keeping of their household incomes and expenses. But they do have a good judgement

on present value on products, sales prices per season and were able to give us a weekly, monthly or seasonal average in KES.

5.4 Establishing impact

To say that we were able to exclude all external stakeholders might be a bold assumption, to do this we would have needed to do a proper institutional analysis with a focus group from the beneficiaries. But however most of the Solvatten users still connect the improved health to Solvatten as a direct result, so we can be somewhat certain. We can say that with the information that we have and the analysis we made, we have an escapable result of excluding any institution that might interfered with the outcome.

Deadweight

This is an area which has not affected Solvatten since it is the water that has been treated, not the water sours. Whether or without Solvatten the water quality would not have been improved by itself, in that case it would already have happened. Deadweight is something that spontaneously happens in structures, as doctors' advice when hospitals are a compulsory in a society.

Attribution

Attribution comes from another institution or stakeholders that might have some aims as Solvatten AB, clean water. We have used SCC-ViAgroforestry as stakeholder in attribution when considering health aspects because of the improved stove. The improved stove decreases smoke in the cooking department and this contributes to better conditions for lungs and eyes. To differ between attribution and deadweight might be quite difficult, for example the doctor's advice might be mistaken as attribution. It differs as a patient goes to the hospital to treat sickness as some form of health care is a part of social structures.

Displacement

There has not been any problem in identifying if there has been any displacement, it is not the water source that has been treated or moved just the water uptake. Hence, you do not infect any other people of waterborne diseases as nothing is done with the original water source. Displacement in SCC-ViAgroforestry might be that they have neglected other tasks at work, but as we declared in the empirics, it is assumed in the impact map that SCC-ViAgroforestry use the best practises. Only displacement might be that SCC-ViAgroforestry has too little time with Solvatten and might be displacement as others do not reach Solvatten.

Drop-off

Solvatten has no drop-off since the outcomes are directly connected with the use of the product. The same "amount" of outcome will be constant during the period over which the unit is used. The affect will not wear off gradually, but it will cease to exist once the unit is no longer in use.

We assumed that Solvatten will continue to be sold during the next five years, as it probably will. But the volume of units sold will hopefully increase in time. It should be assumed that there is no-drop off – Solvatten provides safe water for at least five years. Other drop-offs as social objectives are almost impossible to calculate as we cannot monitor these changes.

Calculating your impact

You cannot predict or anticipate how the impact will increase over the years, only that it might decrease. This with the assumption that you should not overvalue, there is no source

that can be applied. This is the total impact from all the outcomes on all stakeholder involved in a monetized value in a period over five years.

5.5 Calculating the SROI

Project into the future

The five years of safe water is treated as isolated outcomes and assumes that nothing else will interfere, improve or snowball from the Solvatten connected outcomes. This is of course a distorted assumption – if we even consider the value created for children under five years it is likely a difference between life and death and a possibility of proper schooling as they stay healthy. The total outcome will snowball into other investments that the family will prefer, something we cannot predict.

Calculating the net present value

The net present value was calculated using the discounting rate of three percent. If another percentage were to be used the value would differ somehow, but will not have a significant impact on the SROI ratio. The duration of the product is presumed to be five years, if the duration would have been longer another percentage might have been motivated to use.

Calculating the ratio

The SROI ratio has been calculated to 1:26 KES. This is a rather high ratio. Anything higher than 1:15 is considered to be unusually high. But we believe that the calculated ratio is motivated because the Solvatten unit is very useful and have many different outcomes. The difference in outcomes is real and we understand the value of the product much better after conducting the interviews. The ratio could not have been calculated without interacting with the local users and seeing the Solvatten unit in the field. When calculating a SROI ratio it is of great importance that the stakeholders are involved and is a part of the process.

Sensitivity analysis

The calculation was easily made in an Excel work sheet. All the values have been connected to the final calculation and it is therefore automatically calculating the ratio. This means that different values can easily be changed and you can immediately see how the ratio changes. To have been given the outlines of the SROI in an Excel work sheet has been of great value to us. This has made the calculation part easier and a better understanding has occurred. When excluding environment from the outcomes we found that the return went down to 1: 24, the return from the environment was then 1:2. Note that this is a distorted value when we do not have the full life cycle analysis to account for the full environmental input.

Payback period

From our experience during interviews with the local users it soon became clear that the positive outcomes were something that occurred rapidly after the purchase. This might somehow defend the short payback period although it may not be fully realistic with such a short period. Also data have been treated as average and you might need to look at the stakeholder's bulk incomes and expenses to get a realistic view of their everyday life.

5.6 Reporting, using and embedding

Reporting to stakeholders

It is of great importance that we can communicate the results of this thesis to the different stakeholders. To ensure that Solvatten AB understands what the SROI ratio means and how they can use it, a meeting with them is planned. The communication with the local users in the Bungoma district will be possible with the help of SCC-ViAgroforestry. There is no way for us to get in contact with the local users in Kenya without them. SCC-ViAgroforestry will operate as a bridge between us and them.

Using the results

Solvatten AB can use this thesis for different actions. It can be used as a communication tool with stakeholders and funders. The results can also be used if another SROI analysis is to be made, both in the Bungoma district but also in other locations. This report can be used as a guide when conducting further research.

Assurance

We do not have the means to assure this report the way that is desired. To have the report assured costs money and this final step will not be realized by us. We suggest that Solvatten AB send the report to have it validated by an SROI consultant.

5.7 Results

Solvatten AB markets their unit as a development tool but also a tool for mitigation and adaptation. The question is how to argue how much of the return (1: 26) that can be derived to development versus mitigation and adaptation. We found in the sensitivity analysis that the return to the environment are not more than 1:2, but we want to stress that this needs to be looked at with careful eyes. Solvatten is a great way of reducing emissions, which may not have been fully captured. The lifespan of Solvatten is between five-ten years. In this study the calculations are based on five years to be conservative. If in the calculation the lifespan of a Solvatten unit would have been changed from five to ten years the SROI ratio would change. The ratio would then increase to almost the double.

Solvatten is foremost a development tool that helps people into a better health situation with a return of saved and gained money and time. People might also use the purified water for business; we have not observed any entrepreneurship like this in Bungoma. However this might be because of the stakeholder being far away from any market place. Solvatten has a development return of 1:24 when you not convert the purified water into a business income. The ratio do not either include the last tree outcomes: Estimated children under five years saved as a result of HWTS, less chlorine for water treatment and therefore lesser chance of exposure to carcinogenic substances and more milk or better quality. These outcomes have substantial values but cannot be included. The valuation of a saved live and the possibility of not being exposed to carcinogenic do not have enough theoretical coverage and the non-market-value are to bold to be assumed.

The result is also an evaluation of an isolated intervention in the Bungoma district, but to give you estimation on how well the unit contributed to the development of livelihoods. The recommendation from SROI networks is that the ratio should not reach more than 1:15. This is however only a recommendation, if a product is very good a higher ratio is motivated. Although it is high it is not distorted, it is completely comprehensible that the value is high

when the unit has such a great impact in changing people's conditions of livelihoods to the better.

What also has been proven is that SROI is a great tool that matches the demands from the WHO on how to evaluate HWTS projects. The process of evaluating and forecasting inputs, outputs, outcomes and impacts that is suggested by the WHO does mirror in the guidelines of SROI and would also be a recommended tool for other similar projects.

6 Conclusions

This thesis has been conducted in order to understand the social, economical and environmentally added value for families using Solvatten in the Bungoma district. This study has also contributed to the understanding of how these families can benefit from clean and safe water, apart from gaining an improved health. Saving time and money showed to be positive benefits and has improved the overall life quality, minimizing the fatigue among the users. Saved time in this study excludes the time Solvatten operates as it does not need constant supervision. Total saved time per stakeholder is 1, 30 hours, it only includes purifying water and excludes collecting firewood. Collecting firewood has been excluded as many users found it difficult to estimate the time it takes. For some families collecting firewood is a daily chore that takes a few minutes. Others buy one big tree that sustains a long period, but what that tree weighs is difficult to estimate and therefore also how long it will last. On average Solvatten saves up to two tones of CO² per year, so it adds up in the end. Saved money in medical cost are estimated to be 21 600 KES in a period of five years for the target group.

The Solvatten unit has primarily benefited women and children since it is the women who are responsible of bringing clean and safe water to the homestead. The women have the main responsibility for the homestead, therefore it is often the wives that experience saved time and money after installing Solvatten. Regarding the children we can see that they have a higher attendance at school as a result of an overall improved health (87 percent increased attendance), which also is a huge benefit for the family. Before Solvatten was installed the children were sick 3, 4 times a month on average, and now the figure is 0,03 which might be represented by malaria.

The SROI framework has proven to be an appropriate tool when conducting this type of research, it is also a framework proposed by the WHO. The social added value for the families using Solvatten is the ratio 1: 26 which means that the social return will be one to 26 in the local currency. This means a Social Return on Investment in these outcomes:

- (1) Less waterborne diseases in the family
- (2) Saved money in fuel and chemicals such as water guard
- (3) Gained time as a result of less sickness connected to waterborne diseases
- (4) Saved time on collecting fuel, preparing food and purifying water
- (5) Value of improved health
- (6) Gained in social status in the community as a result of the Solvatten purchase
- (7) CO₂ savings
- (8) Improved economy as a result of promoting and selling Solvatten for facilitators
- (9) Income to the organization per sold Solvatten for SCC-ViAgroforestry.

Tracing outcomes and constructing methods of doing so are central in SROI and is recommended for further research as this part of the data collection methodology seems to be a field where there exists no definitive toolbox for the most accurate way of ensuring high quality data coverage.

In this thesis we have argued that Solvatten might work as a (10) lifesaver for children under five. To include this as an outcome would be difficult as valuing life with proxy might give a distorted value. Other excluded outcomes have been (11) less chlorine for water treatment and therefore lesser chance of exposure to carcinogenic substances as extern research is limited and proving a connection would be challenging. (12) Better quality or quantities in milk from dairy animals were excluded as a result of insufficient data.

A ratio of 1:26 is no understatement for the invention Solvatten when considering the outcomes. This ratio is important both for Solvatten AB (as an evidence of the benefits brought by the technology) as well as for the families using the unit. The Solvatten firm can use this evidence in communication with stakeholders. Funding and donor agencies typically require this kind of verified efficiency in the process of supporting development projects. The families, on the other hand, can be sure that the invested money will be returned by creating a higher social, economical and environmental value than the cost of the unit. In order to fully understand this, one must comprehend the input and outcome of the activity. This stresses that the understanding of the process of SROI being equally important as the actual SROI ratio. SROI is a tool to understand the creation of a created value as well as the internal process of repeating the chain.

For further research we recommend the SROI framework is thoroughly looked at prior to the actual research begins and that focus on constructing methods of outcome tracing and stakeholder analysis becomes a bigger part of the guidelines. If further research is to be made in the Bungoma district we suggest that primary stakeholders are involved in the making of questionnaires and that they consider including disabled, old and sick from other diseases. The outcomes excluded from this calculation could also be valuable to include.

It is easy to forget that safe and clean water is one of the main foundations and building blocks of human life. With this said, diarrhea is still the second cause of child deaths and kills approximately 1, 5 million children below the age of five every year. If the facilitators in the Bungoma district were to be given recourses like salary, an office or transport the administration of Solvatten would easily be carried out. The organizational work in the Bungoma district needs to be structured so that resources are better allocated. Solvatten has a great potential of being the number one sustainable HWTS unit that WHO searches and alerts for. It is a much needed product in countries where people lack safe and clean water and do really make a significant impact in people's lives that will change their everyday life to the better.

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Appendix 1: Questionnaire- local users of Solvatten in the Bungoma district



Consumer experiences of using Solvatten less than 12 months in western Kenya district – Bungoma area

Survey quality control

Date of interview:.....
time.....

Start

Interviewed by:.....

End time.....

Approved by
nr:.....

Interview

Part 1 – Respondent track

Respondent track ID.....
Female

Gender: Male

Respondent: Family participants

Part 2 – demographic characteristics

Number of people in your household/ that live under your roof?

How many children under 2 years.....

How many children under 2 -5 years.....

How many children under 6-15 years.....

How many women:.....

How many men:.....

Marital status

1. Married
2. Married but spouse is away
3. Separated
4. Divorced
5. Single (never been married)
6. Widow/Widower

Level of highest attended education:

1. Primary school
2. Secondary school
3. College
4. University
5. PhD or equivalent

Number of weeks of other education e.g. short course

What is your current status of employment?

1. Full-time employee
2. Part-time employee
3. Self-employed
4. Student
5. Retired
6. On benefit
7. Unemployed
8. Other

How many hours is an average working day for you?

How much income does your household earn on an average month from in KSH:

1. Agriculture
2. Non- agriculture
3. Farming income
4. Other business
5. Other.....

House hold economics

Please read up on the cost items in your household, and how much (in Khs) of your household income that is spent on the cost items

Rent	
Electricity	
Food	
Fuel	
Medical	
Farm - Agriculture	
Savings	
Other	

Part 3 – Membership to social organisation

1. Are you a member of any social group? Yes No

2. If Yes to Q1. What kind of organisation:

1. Community based org	4. Youth club	7. Welfare/funeral club
2. Religious org	5. Residence association	8. Women club
3. Consumer org	6. Farmer org	9. Other; specify...

3. What is the name(s) of the association(s) or groups?.....

4. What benefits do you get because of the membership?.....

Part 4 - Benefits/Positive effects

1. How long have you used Solvatten?

0 months

12 months

6 months

2. What is your general perception of Solvatten?

Very good Good Not so good Bad

3. What do you use Solvatten water for?

Drinking

Washing dishes

Showering

Dairy animal

Health

Poultry

Personal hygiene

Other

Cooking

4. How many green faces do you normally get in one day when **it's not** rain season?

5. How many green faces do you get per day **during** rain season?

- In rain season, how many times per week do you expose the unit to the sun?
- How many green faces do you then get on a weekly basis?
(Remember zero might not be the right answer)

6. How many red faces do you normally get in one day when **it's not** rain season?

7. How many red faces do you get per day **during** rain season?

8. Where do you get the domestic water from?

Tap water

River/stream

Purchased

Rain water

Protected spring

Unprotected spring

Borehole/deep well

9. Where is the water source located?

If answered **a)**, go to Q12, if answered **b)**, go to Q 10 and Q11

a) In compound

b) Outside compound

10. How far away is it?

11. How long does it take to get there and back?

12. a) How many times a day do you collect water from the source?

b) Size of the container?

13. Is Solvatten useful? Yes No

14. Is Solvatten easy to use? Yes No

15. How much time did you spend on purifying water **before** Solvatten?

16. How much time do you spend on purifying water **now**?

17. Have you saved time on purifying water per day because of Solvatten? Yes No
If **Yes**, answer question 17, if **No** skip to 18;

18.

How have you saved time?		How many hours have you saved on the previous answer per day
a) Collecting fuel	<input type="checkbox"/>	
b) Buying fuel	<input type="checkbox"/>	
c) Boiling water	<input type="checkbox"/>	
d) Other ways of purifying water;	<input type="checkbox"/>	
e) Preparing food	<input type="checkbox"/>	
f) Preparing tea/coffee	<input type="checkbox"/>	
g) Collecting water	<input type="checkbox"/>	
h) Other.....	<input type="checkbox"/>	

19. What is now more time consuming, because of Solvatten?

- *Your neighbours' might come and drink the clean water so you have to go to the water source and get more. The question is about the workload connected to the Solvatten unit which it not voluntary for the user. E.g. You (the user) needs to get more water.*

- a) Collecting fuel
- b) Buying fuel
- c) Boiling water
- d) Other ways of purifying water;
- e) Preparing food
- f) Preparing tea/coffee
- g) Collecting water
- h) Other;.....

20. Do you have more power over your life situation, e.g. can you decide what to do with your day? Yes No

Please explain;

21. What do you do with the time saved; grade the following options, 1 – 9. 1 being what you do **most** with the time saved and 9 being the **least** what you do with the time saved.

This part you leave the questioner to the respondent to grade by him/her self.

- Spend more time with neighbours Church
- Socialising Woman group meetings
- Income generating activity Engage in community organisations
- Improve life quality Other
- Farm work

22. Can you leave Solvatten unattended? Yes No
If Yes go to Q22, if No, go to Q23

23. What can happen if you leave Solvatten unattended?

Someone steals the Solvatten unit

Someone breaks it

Someone steals the Solvatten water

Animals step on it

Nothing

Other _____

Part 5 - Economy/Budget

24. What kind of fuel did you use for purifying water **before** Solvatten? More than one?

Firewood

Kerosene

Sawdust

Charcoal

Gas

Maize/sugar cane

Other _____

25. What kind of fuel do you use for purifying water **now**? More than one?

Firewood

Kerosene

Sawdust

Charcoal

Gas

Maize/sugar cane

Solvatten

Other _____

26. Did you add or use other ways to purify the water besides boiling **before** Solvatten? More than one?

Filter

Filter-chlorine

Chlorine

Other _____

27. Do you add or use other ways to purify the water besides boiling **now**? More than one?

Filter

Filter-chlorine

Chlorine

Other _____

28. a) How much fuel did you use per day before Solvatten **during** the rain season?
Answer in bundle or kilo or litre:

b) How much fuel did you use per day before Solvatten **off** rain season?

Answer in bundle or kilo or litre

c) *How much fuel do you use per day when you have Solvatten **during** rain season?*
Answer in bundle or kilo or litre

d) *How much fuel do you use per day when you have Solvatten **off** rain season?*
Answer in bundle or kilo or litre

e) *How many days a week do you have to buy firewood **during** rain season when you have Solvatten?*

f) *How many days a week do you have to buy firewood **off** rain season when you have Solvatten?*

g) i) *Have you saved money in fuel cost **during** rain season because of Solvatten?*

Yes No

ii) *How much money in Khs per week?*

h) i) *Have you saved money in fuel cost **off** rain season because of Solvatten?*

Yes No

ii) *How much money in Khs per week?*

i) *How much does the fuel cost in Ksh per week? _____*

j) *What do you do with the money you save?*

Investing in the farm e.g. animals, tools, seeds

Hospital e.g. visit the doctor, pay medicine cost

Pay school fee, school material e.g. uniform, pencils, books, food

Savings

Buy more nutritious food

Clothes

Start a bussines

Buy another Solvatten unit

Other _____

29. *How much did you pay for Solvatten?*

30. *Support from church or other organisations?*

Yes No

31. *With the experience that you and your family now have, what is the amount that you would be willing to pay for a Solvatten unit today, considering the following scenarios?*

Issue of cleaning water - Scenario 1

The water is cleaned either by boiling or adding chemicals e.g. chlorine. You use it as domestic water e.g. washing yourself, food, the udder of the dairy cattle and your family drinks it.

Issue of cleaning water - Scenario 2

The water is cleaned by using only Solvatten. You use it as domestic water e.g. washing yourself, food, the udder of the dairy cattle and your family drinks it.

Starting at the top of the list and moving down please ask yourself: 'Am I willing to pay 100 shilling extra per unit of Solvatten to buy it? Or would I rather not pay this amount and have the first scenario described? If you are almost certain you would pay the amounts of money in the card to buy the Solvatten then place a tick in the space next to these amounts.

Less than 100 Khs _____

1300

100
200
300
400
500
600
700
800
900
1000
1100
1200

1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
2500

More than 2500 Khs _____

Please don't agree to pay an amount if you think you;

- Can't afford it on a regular basis or,
- You feel that there are more important things for you to spend your money or,
- You are not sure about being prepared to pay or not.

We are asking for your most truly willingness-to-pay here so it is important that you provide us with a sincere and honest response.

Part 6- Health

32. *What are the most common waterborne diseases in your family?*

Typhoid

Diarrhoea

Amoebic dysentery

Other _____

Cholera

33. *Do you and your family members normally visit the doctor when you are sick of the waterborne disease/s you mentioned earlier?*

Yes

Money issue

No

Distance issue

34. How often do and/or your family then need to buy medicine for the waterborne disease/s you mentioned earlier?

Every time

Never

Sometimes

Other _____

35. How much does the medicine for the waterborne disease/s cost?

Typhoid

Diarrhoea

Amoebic dysentery

Other _____

Cholera

36. a) How often per month **did** you or family member need to stay home from work/school because of sickness **before** Solvatten?

b) How often per month **do** you or family member need to stay home from work/school because of sickness **after** Solvatten?

37. Do you feel healthier now that you have Solvatten? Yes No

If yes; answer the following

a) In what ways are you healthier?

b) Do you or family member need less medicine? Yes No

c) Do you or family member need to visit the doctor less now? Yes No

d) Can you or family member perform better at work/school? Yes No

e) Do you or family member have less sick days from work/school? Yes No

37. a) How many times per month where someone in your family sick before Solvatten?

- How many?

b) *How often is someone sick now after Solvatten?*
- *How many?*

c) *Is the improvement of health in your family connection to the investment of Solvatten?*

Yes No

d) *Have you gotten medical and hygiene advice from your doctor how to treat the sickness? That you feel has been important for your health condition? In the case of yes, what was the advice?*

38. *Did your children attend school on a regular basis **before** Solvatten?* Yes No
- *Bough boys and girls?*

39. *Do your children attend school on a regular basis **after** Solvatten?* Yes No
- *Bough boys and girls?*

a) *How many days a week did they attend school **before** Solvatten?*

b) *How many days a week do they attend school now **after** Solvatten?*

c) *Do you see a connection to Solvatten or has something else contributed to the improved health?* Yes No

d) *If No, what are the other reasons the children do not attend school?*

Need to work at home

Family sickness

Take care of siblings

Geographical issues

Not enough money

Need to work in town

Child sickness

Other _____

Part 7 - Farm

40. *Do you have dairy animal?* Yes No

a) What kind of animal do you have?

Cow Sheep
Goat Other.....

b) Do you use Solvatten water for hygiene purposes before milking the animal, for example cleaning the udder of the animal?

Yes No

c) If yes, does the milk have better quality e.g. the milk is not contaminated, the udders has not been infected?

Yes No

41. Does the dairy animal generate any income? Yes No

a) If yes, have you had an increase of income from the animal as a result of higher milk quality? If **Yes**, answer in Khs per liter.

Part 8 - Power

42. a) Who/whom is responsible of taking care of Solvatten?

b) Does everyone in the family have access the Solvatten water? Yes No

c) Has the caretaker gained in social status in the household? Yes No

d) Has the family gained in social status in the community? Yes No

43. Have your thoughts about you future changed after Solvatten? Yes No

a) If yes, in what way? The interviewer may say the alternatives out loud

Hopeful

Feel empowered

Positive

Experience more social freedom

Less concerned about health

You can develop your self

Feel safe

Other_____

Confident about your children's future

43. Have you gained new knowledge as a result of Solvatten e.g. group dynamics, democracy, seeing other perspectives?

Please explain:

45. Do you value yourself differently now after investing in Solvatten?

Yes No

Part 9 - Disadvantages

46. Is there anything negative with Solvatten?

Difficult to carry

Not efficient

Difficult to use

Fragile, easily broken

Time consuming

Other

Weather dependent

47. a) Do you know where to buy a new one if Solvatten breaks? Yes No

- Where?

b) Do you have access to buy spare parts if something in Solvatten breaks? Yes No

- Where?

48. Would you consider buying a new product when the one you have is consumed?

Yes No

49. Have you recommended Solvatten to a;

Friend

Organisation

Club

Other

No

50. Do you think Solvatten is a good investment? Yes No

Appendix 2: Questionnaire- control group in the Bungoma district



Questionnaire for control group – farmers in the carbon project that have not yet bought a Solvatten unit. Western Kenya district – Bungoma area

Survey quality control

Date of interview:..... Start
time.....

Interviewed by:..... End time.....

Approved by Interview
nr:.....

Part 1 – Respondent track

Respondent track ID..... Gender: Male
Female

Respondent: Family participants

Part 2 – demographic characteristics

Number of people in your household/ that live under your roof?

How many children under 2 years.....

How many children under 2 -5 years.....

How many children under 6-15 years.....

Female:.....

Male:.....

Marital status

- 1. Married
- 2. Married but spouse is away
- 3. Separated
- 4. Divorced
- 5. Single (never been married)
- 6. Widow/Widower

Level of highest attended education:

- 1. Primary school
- 2. Secondary school
- 3. College
- 4. University
- 5. PhD or equivalent

Number of weeks of other education e.g. short course

What is your current status of employment?

- 1. Full-time employee
- 2. Part-time employee
- 3. Self-employed
- 4. Student
- 5. Retired
- 6. On benefit
- 7. Unemployed
- 8. Other

How much income does your household earn on an average month in Ksh from:

- 1. Agriculture
- 2. Non- agriculture
- 3. Other business
- 4. Other.....

Part 3 – Membership to social organisation

1. Are you a member of any social group? Yes No

2. If Yes to Q1. What kind of organisation:

1. Community based org	4. Youth club	7. Welfare/funeral club
2. Religious org	5. Residence association	8. Women club
3. Consumer org	6. Farmer org	9. Other; specify...

3. What is the name(s) of the association(s) or groups?.....

4. What benefits do you get because of the membership?.....

Part 4 - Benefits/Positive effects

1. *Who/whom is in your family responsible for collecting and bringing clean water to your household?*

2. *What do you use your household/domestic water for?*

Drinking

Showering

Health

Personal hygiene

Cooking

Washing dishes

Other

3. *Where do you get the domestic water from?*

Tap water

River/stream

Purchased

Rain water

Protected spring

Unprotected spring

Borehole/deep well

4. *Where is the water source located?*

a) In the compound

b) Outside the compound

5. *How far away is it?*

6. *How long does it take to get there and back?*
- size of the container?

7. *How many times a day do you collect water from the source?*

8. *Do you purify your water for drinking?*

Yes No

9. *If yes, how do you purify the water?*

- *Estimate time taken on purifying water? (hrs)*

10. *Have you saved any time in purifying water because of the carbon project?*

Yes No

- *If yes, how?*

- *On what?*

11. What do you do with the time saved; grade the following options, 1 – 9.
1 being what you do **most** with the time saved and **9** being the **least** what you do with the time saved.

- | | | | |
|---------------------------------|--------------------------|-----------------------------------|--------------------------|
| Spend more time with neighbours | <input type="checkbox"/> | Less fatigue | <input type="checkbox"/> |
| Socialising | <input type="checkbox"/> | Woman group meetings | <input type="checkbox"/> |
| Income generating activity | <input type="checkbox"/> | Engage in community organisations | <input type="checkbox"/> |
| Improve life quality | <input type="checkbox"/> | Other | <input type="checkbox"/> |
| Farm work | <input type="checkbox"/> | | |

12. Do you have more power over your life situation, e.g. can you decide what to do with your day; as a result of the carbon project? Yes No

Please explain;

Part 5 - Economy/Budget

13. How do you clean the water?

- Boiling, adding chemicals or other ways?
- If respondent answers other ways, skip to Q 22

14. What kind of fuel did you use for purifying water **before** the carbon project?

- | | | | |
|----------------|--------------------------|------------------|--------------------------|
| Firewood | <input type="checkbox"/> | Kerosene | <input type="checkbox"/> |
| Sawdust | <input type="checkbox"/> | Charcoal | <input type="checkbox"/> |
| Gas | <input type="checkbox"/> | Maize/sugar cane | <input type="checkbox"/> |
| Improved stove | <input type="checkbox"/> | Other | _____ |

15. What kind of fuel do you use for purifying water **now** when implementing the carbon project?

Firewood

Kerosene

Sawdust

Charcoal

Gas

Maize/sugar cane

Improved stove

Other _____

16. Who /whom is in your family responsible for collecting the fuel?

17. Who /whom is in your family responsible for buying the fuel?

18. Did you add or use other ways to purify the water besides boiling **before** the carbon project?

Filter

Filter-chlorine

Chlorine

Other _____

Water guard

19. Do you add or use other ways to purify the water besides boiling **now** when implementing the carbon project??

Filter

Filter-chlorine

Chlorine

Other _____

Water guard

20. Who /Whom is in your family responsible for purchasing the added chemical?

21. How much fuel did you use per day before the carbon project **during** the rain season?

- a) *How much fuel did you use per day before carbon project **off** rain season?*
- b) *How much fuel do you use per day when you have carbon project **during** rain season?*
- k) *How much fuel do you use per day when you have carbon project **off** rain season?*
- l) *How many days a week do you have to buy firewood **during** rain season when implementing the carbon project?*
- m) *How many days a week do you have to buy firewood **off** rain season when implementing the carbon project?*
- n) i) *Have you saved money in fuel cost **during** rain season because of implementing the carbon project?*
- Yes No
- ii) *How much?*
- o) i) *Have you saved money in fuel cost **off** rain season because of implementing the carbon project?*
- Yes No
- ii) *How much?*
- p) *How much does the fuel cost per week? _____*

q) *What do you do with the money you save?*

Investing in the farm e.g. cattle, tools, seeds

Hospital e.g. visit the doctor, pay medicine cost

Pay school fee, school material e.g. uniform, pencils, books, food

Savings

Buy more nutritious food

Clothes

Start a bussines

Buy a Solvatten unit

Other _____

22. *If you are not boiling or using other chemicals to clean water, how do you purify your water?*

- *Was it the same before and after implementing the carbon project?* Yes No

- *If NO, What has changed?*

23. *Who/whom is responsible for facilitating this way of cleaning water?*

24. *Do you know what Solvatten is?*

- *Please explain*

25. *Who told you about Solvatten?*

26. *What did they tell you?*

27. What is your general perception of Solvatten?

Very good Good Not so good Bad

28. Would you like to buy one?

29. With the experience that you and your family have heard from friends, neighbors and family concerning the Solvatten unit, what is the amount that you would be willing to pay for a Solvatten unit today, considering the following scenarios?

Issue of cleaning water - Scenario 1

The water is cleaned either by boiling or adding chemicals e.g. chlorine. You use it as domestic water e.g. washing yourself, food, the udder of the dairy cattle and your family drinks it.

Issue of cleaning water - Scenario 2

The water is cleaned by using only Solvatten. You use it as domestic water e.g. washing yourself, food, the udder of the dairy cattle and your family drinks it.

Less than 100 Khs _____	1300
100	1400
200	1500
300	1600
400	1700
500	1800
600	1900
700	2000
800	2100
900	2200
1000	2300
1100	2400
1200	2500
	More than 2500 Khs _____

Please don't agree to pay an amount if you think you;

- Can't afford it on a regular basis or,
- You feel that there are more important things for you to spend your money or,
- You are not sure about being prepared to pay or not.

We are asking for your most truly willingness-to-pay here so it is important that you provide us with a sincere and honest response.

Part 6- Health

30. *What are the most common waterborne diseases?*

Typhoid

Diarrhoea

Amoebic dysentery

Other _____

Cholera

31. *Do you normally visit the doctor when you are sick?*

Yes

Money issue

No

Distains issue

32. *How often do you then need to buy medicine?*

Every time

Never

Sometimes

Other _____

33. *How much does the medicine for each of the waterborne diseases cost you mentioned earlier?*

- *Did you get any medical or hygiene advice when you when to the doctor? What?*

34. *How often per month **did** you need to stay home from work/school because of sickness **before** implementing the carbon project?*

35. *How often per month **do** you need to stay home from work/school because of sickness **after** implementing the carbon project?*

36. Do you feel healthier now that you have implemented the carbon project?

Yes No

If yes; answer the following

f) In what ways are you healthier?

g) Do you need less medicine? Yes No

h) Can you perform better at work/school? Yes No

i) Do you have less sick days from work/school? Yes No

e) Do you see the improved health connected to implementing the carbon project?

Yes No

37. Do your children attend school on a regular basis? Yes No

a) How many days a week did they attend school **before** implementing the carbon project?

b) How many days a week do they attend school now **after** implementing the carbon project?

c) Do you see a connection to implementing the carbon project? Yes No

d) **If No**, what are the other reasons the children do not attend school?

Need to work at home

Family sickness

Take care of siblings

Geographical issues

Not enough money

Need to work in town

Child sickness

Other _____

e) Do all children go to school, both boys and girls? Yes No

Part 7 - Farm

38. Do you have dairy cattle? Yes No

a) What kind of cattle do you have?

Cow

Goat

Sheep

b) Do you use warm water for cleaning the udder before milking?

Yes No

c) If yes, what quality does the milk have?

Very good Good Not so good Bad

39. Do your dairy cows sometimes have problems to be milked?

- Problems with the udder?

40. Do the dairy cows generate any income? Yes No

a) If yes, how much is your income per litre from the dairy animal?

b) Have you changed your production on the farm as a result of implementing the carbon project – e.g. bought more cattle?

Part 8 - Power

41. Who/whom is in charge of the action of purifying water?

a) Who is responsible of making sure that the family always has clean water?

b) *Who is responsible of the family budget?*

c) *Who is responsible for decision-making, e.g. entering the carbon project?*

d) *Who is decides about new monetary investments in the family, e.g. whether your family invested in a Solvatten unit?*

42. *Have your thoughts about you future changed after implementing the carbon project?*

Yes No

a) *If yes, in what way?*

Hopeful

Feel empowered

Positive

Experience more social freedom

Less concerned about health

You can develop your self

Feel safe

Other _____

Confident about your children's future

43. *Have you learned any new knowledge as a result of implementing the carbon project e.g. group dynamics, democracy, seeing other perspectives?*

44. *Do you have a different attitude towards your future after investing in the carbon project?*

Yes No

45. *Do you value yourself differently now after implementing in the carbon project?*

Yes No

Appendix 3: Questionnaire- Deep interviews in the Bungoma district



Questionnaire for deep interviews Benefits from the Solvatten unit – units bought in 2010 Western Kenya district – Bungoma area

Survey quality control

Date of interview:..... Start
time.....

Interviewed by:..... End time.....

Approved by Interview
nr:.....

Part 1 – Respondent track

Respondent track ID..... Gender: Male
Female

Respondent: Family participants

Part 2 – demographic characteristics

Marital status

- 1. Married
- 2. Married but spouse is away
- 3. Separated
- 4. Divorced
- 5. Single (never been married)
- 6. Widow/Widower

Level of highest attended education:

- 1. Primary school
- 2. Secondary school
- 3. College
- 4. University
- 5. PhD or equivalent

Number of weeks of other education e.g. short course

What is your current status of employment?

- 1. Full-time employee
- 2. Part-time employee
- 3. Self-employed
- 4. Student
- 5. Retired
- 6. On benefit
- 7. Unemployed
- 8. Other

How much income does your household earn on an average month in Ksh from:

- 1. Agriculture
- 2. Non- agriculture
- 3. Other business
- 4. Other.....

Part 3 – Membership to social organisation

1. Are you a member of any social group? Yes No

2. If Yes to Q1. What kind of organisation:

1. Community based org	4. Youth club	7. Welfare/funeral club
2. Religious org	5. Residence association	8. Women club
3. Consumer org	6. Farmer org	9. Other; specify...

3. What is the name(s) of the association(s) or groups?.....

4. What benefits do you get because of the membership?.....

Part 4

1. When you entered the Carbon project and committed to do energy savings, did you only choose Solvatten or something else?

- Why did you choose Solvatten out of the options?

2. Who/whom is in charge of the action of purifying water?

a) Who is responsible of making sure that the family always has clean water?

b) Who is responsible of the family budget?

c) Who is responsible for decision-making, e.g. entering the carbon project?

d) Who is decides about new monetary investments in the family, e.g. whether your family invested in a Solvatten unit?

3. What has been the biggest change in your family since you bought Solvatten?

Please explain;

4. Who do you think benefit from Solvatten most in a family? Mother, father, children?

Please explain;

5. On a normal working day, how did your daily calendar look like before Solvatten?
Ask this question and use a separate sheet to make notes!

i) Women daily calendar

ii) Men daily calendar

iii) Boys daily calendar

iv) Girls daily calendar

6. On a normal working day, how does your gender daily calendar look now after Solvatten?
Ask this question and use a separate sheet to make notes!

i) Women daily calendar

ii) Men daily calendar

iii) Boys daily calendar

iv) Girls daily calendar

7. Who benefits the most from the time saved as a result of Solvatten, the wife, the husband or the boys or girls most? What do these persons do with the time saved?

Appendix 4: Questionnaire- Solvatten facilitators in the Bungoma district



Questionnaire for Solvatten facilitators Time input in the facilitation of the Solvatten unit Western Kenya district – Bungoma area

Survey quality control

Date of interview:..... Start
time.....

Interviewed by:..... End time.....

Approved by Interview
nr:.....

Part 1 – Respondent track

Respondent track ID..... Gender: Male
Female

Respondent: Family participants

Part 2 – demographic characteristics

Marital status

- 1. Married
- 2. Married but spouse is away
- 3. Separated
- 4. Divorced
- 5. Single (never been married)
- 6. Widow/Widower

Level of highest attended education:

- 1. Primary school
- 2. Secondary school
- 3. College
- 4. University
- 5. PhD or equivalent

Number of weeks of other education e.g. short course

What is your current status of employment?

- 1. Full-time employee
- 2. Part-time employee
- 3. Self-employed
- 4. Student
- 5. Retired
- 6. On benefit
- 7. Unemployed
- 8. Other

How much income does your household earn on an average month in Ksh from:

- 1. Agriculture
- 2. Non- agriculture
- 3. Other business
- 4. Other.....

Part 3 – Membership to social organisation

1. Are you a member of any social group? Yes No

2. If Yes to Q1. What kind of organisation:

1. Community based org	4. Youth club	7. Welfare/funeral club
2. Religious org	5. Residence association	8. Women club
3. Consumer org	6. Farmer org	9. Other; specify...

3. What is the name(s) of the association(s) or groups?.....

4. What benefits do you get because of the membership?.....

Part 4

8. How many Solvatten units have you sold in 2010?

9. How many units do you sell on a monthly basis?

- Is the sales season dependent?

- Is the sales dependent on something else, like SCC-ViA

10. How many hours a week do you spend on promoting the Solvatten unit?

- Estimate how much you spend on travel per week, in time and Khs?

11. How long have you been a Solvatten promoter?

12. Have you gotten any training by SCC- ViA concerning the facilitation of Solvatten?

Yes

No

- If yes, how many hours do you estimate the training took?

13. How far did you need to travel to get to the training?

14. How much of the provision are left after you paid e.g. transport, airtime and other expenses for selling purpose?

15. How often do you need to travel to repair someone's unit that has broken?

16. What do you think is the best price for a Solvatten unit?

-Why?

17. Do you think the price should be different between working class and farmers?

- How should it be?

18. How would you like to be paid by Solvatten? On provision, weekly salary?

19. Would you work more with promotion if you got weekly salary?

20. How would you then like to report your results?

- To Solvatten

- To ViA

21. Do you think Solvatten is empowering?

Female

Male

Please explain;

Appendix 5: Questionnaire- SCC-ViAgroforestry administrators in the Bungoma district



Questionnaire for SCC-ViAgroforestry in time input in Solvatten unit facilitation Western Kenya district – Bungoma area

Survey quality control

Date of interview:..... Start time.....

Interviewed by:..... End time.....

Approved by Interview nr:.....

Part 1 – Respondent track

Respondent track ID..... Gender: Male Female

Respondent: Family participants

Part 2 – demographic characteristics

What is your current status of employment?

- 1. Full-time employee
- 2. Part-time employee
- 3. Self-employed
- 4. Student
- 5. Retired
- 6. On benefit
- 7. Unemployed
- 8. Other

Part 3

1. Do you sell Solvatten units?
 - How many have you sold in 2010?
2. How many Solvatten community promoters have you trained?
 - Who is in the group, SCC-ViA staff?
3. How long does it take to train one group?
 - How many in one group?

 - Are the community promoters allowed to sell Solvatten units?
4. How much time per month do you spend on administration connected to Solvatten?
5. Is Solvatten a grounded part of your daily work and in your organisation?
6. What are the tasks connected to Solvatten? E.g. administration, connecting Solvatten units to facilitators, distributing units, forward information.
7. What do you think is a good price for a Solvatten?
 - Do you think the price should be different between farmers and working class?

Appendix 6: The Impact map

Inputs	Outputs	Stakeholders	Number of stakeholders	Outcome	Description of indicators	occureas indicator	Occurrence of outcome	Description of deadweight	Share of deadweight
Operation the unit, cost and time spend (1200KES, 1h)	HWTS, maximum 30 liters per day	Solvatten users	31	Less waterborne diseases in the family	The domestic household water usage and occurrence of waterborne diseases has decreased	0,34	29	Medical advise from doctor	0,14
Operation the unit, cost and time spend (1200KES, 1h)	Safe water and storage, maximum 30 liters per day	Solvatten users	31	Saved money on fuel and chemicals such as water guard	The household reports to have saved money as a result of the Solvatten purchase	0,58	18,00	Improved stove	0,00
Operation the unit, cost and time spend (1200KES, 1h)	Safe water and storage, maximum 30 liters per day	Solvatten users	31	Gained time (h) as a result of less sickness connected to waterborne diseases	Respondents who reports less sick days per month as a result of Solvatten	20,58	638,05	No deadweight	0,00
Operation the unit, cost and time spend (1200KES, 1h)	Safe water and storage, maximum 30 litres per day	Solvatten users	31	Saved time on collecting fuel, preparing food and purifying water	Household that have saved time on collecting fuel, preparing food and purifying water	0,37	30,19	Improved stove	0,00
Operation the unit, cost and time spend (1200KES, 1h)	Safe water and storage, maximum 30 liters per day	Solvatten users	31	Value of improved health	Respondents who see the improved health as connection to the investment of Solvatten	0,34	29,00	No deadweight, outcome is directly connected to Solvatten	0
Operation the unit, cost and time spend (1200KES, 1h)	Safe water and storage, maximum 30 liters per day	Solvatten users	31	Gained in social status in the community as a result of the Solvatten purchase	Respondent reports that the family have gained in social status in the community	0,87	27,00	No deadweight, outcome is directly connected to Solvatten	0,00
A Solvatten unit	CO2 savings, two tons per year and Solvatten	The environment	31	CO2 saving	Sum of saved CO2 (ton) emissions per Solvatten unit per year	2,00	62,00	No deadweight	0,00
Time, average 46 h per month	Provision per sold Solvatten, 200 KES	Facilitators	2	Improved economy as a result of promoting and selling Solvatten	Total number of sold Solvatten in 2010 by facilitators	6,50	13,00	No deadweight	0,00
Time	Provision per sold Solvatten, 1000 KES	SCC-ViAgroforestry administration	4	Income per sold Solvatten	Total number of sold Solvatten in 2010 by SCC-ViAgroforestry administration	4,50	18,00	No deadweight	0,00

Share of occurrence: stakeholder or outcome?	Occurrence of deadweight	Occurrence after deadweight	Share of attribution	Occurrence after deadweight and attribution	Share of displacement	Occurrence after deadweight, attribution and displacement	Description of proxy-terms	Proxies	Total annual value adding
Solvatten users, target group	4,43	24,57	0,00	24,57	0,00	24,57	Saved medicine cost for winterborne diseases in the family, total cost for waterborne diseases	63242,86	1554030,29
Solvatten users, target group	0,00	18,00	0,00	18,00	0,00	18,00	Saved money in fuel cost and other chemicals such as chlorine	1401,00	25218,00
Solvatten users, target group	0,00	638,05	0,00	638,05	0,00	638,05	Value in KES in an average working hour in an average farmer household times the average saved time per day	159,78	101947,36
Solvatten users, target group	0,00	30,19	0,02	29,61	0,00	29,61	Value in KES in an average working hour in an average farmer household times the average saved time per day	159,78	4730,78
Solvatten users, target group	0,00	29,00	0,00	29,00	0,00	29,00	Willingness to pay	1258,06	36483,87
Solvatten users, target group	0,00	27,00	0,00	27,00	0,00	27,00	Willingness to pay	1258,06	33967,74
The environment	0,00	62,00	0,00	62,00	0,00	62,00	The market price for one ton of CO2 in 2011	3000,00	186000,00
Solvatten facilitators	0,00	13,00	0,00	13,00	0,00	13,00	Average monthly salary after expenses connected to promoting	100,00	1300,00
Vi-Angoforestry administrators	0,00	18,00	0,00	18,00	0,00	18,00	Income per sold unit	1000,00	18000,00

Annual drop-off	Value year 1	value year 2	Value year 3	Value year 4	Value year 5	Total value	Present value			
0,00	1554030,29	1554030,29	1554030,29	1554030,29	1554030,29	7770151,47	6702600,92			
0,00	25218,00	25218,00	25218,00	25218,00	25218,00	126090,00	108766,34			
0,00	101947,36	101947,36	101947,36	101947,36	101947,36	407789,44	351762,76			
0,00	4730,78	4730,78	4730,78	4730,78	4730,78	23653,90	20404,06			
0,00	36483,87	36483,87	36483,87	36483,87	36483,87	145935,48	125885,23			
0,00	33967,74	33967,7419	33967,7419	33967,7419	33967,7419	169838,71	146504,36			
0,00	186000,00	186000,00	186000,00	186000,00	186000,00	744000,00	641780,94			
0,00	1300,00	1300,00	1300,00	1300,00	1300,00	6500,00	5606,96			
0,00	18000,00	18000,00	18000,00	18000,00	18000,00	90000,00	77634,79			
									Total	Total
								Total present value of outcom		8180946
								Total input:	850	316200
								SROI:	1:	25,87

Appendix 7: Assumptions and information

Description	Value	Example of sources where
Basic information		
Number of participating residents in Bungoma	31	SCC-ViAgroforestry
Average age of family respondent	41,24	Interview, questionnaire
Percentage of families who are a part of the carbon project	0,65	SCC-ViAgroforestry
Average number of family members in participating families in Bungoma	7,03	Interview, questionnaire
Average number of children under 2 years	0,55	Interview, questionnaire
Average number of children between 2-5 years	0,61	Interview, questionnaire
Average number of children between 6-15 years	2,42	Interview, questionnaire
Percentage of females in a family	0,63	Interview, questionnaire
Percentage of males in a family	0,34	Interview, questionnaire
Percentage of respondents highest education; Primary school	0,52	Interview, questionnaire
Percentage of respondents highest education; Secondary school	0,52	Interview, questionnaire
Percentage of respondents highest education; Collage	0,23	Interview, questionnaire
Percentage of respondents that is self-employed	0,06	Interview, questionnaire
Percentage of respondents that is full-time employed	0,71	Interview, questionnaire
Average number of weeks of additional education	39,13	Interview, questionnaire
Average hours in a working day for the respondents	5,53	Interview, questionnaire
Average household income in a month for the respondents	13613,57	Interview, questionnaire
Membership of social organisations		
Percentage of respondents that are a member of a social group	0,97	Interview, questionnaire
Average number of social groups participants are members of		Interview, questionnaire
Benefits/Positive effects		
Average number of months participants have used Solvatten	7,19	Interview, questionnaire
Percentage of general perception of Solvatten; Very good	0,68	Interview, questionnaire
Percentage of general perception of Solvatten; Good	0,32	Interview, questionnaire
Percentage of general perception of Solvatten; Not so good	0,00	Interview, questionnaire
Percentage of general perception of Solvatten; Bad	0,00	Interview, questionnaire
Average number of different uses for the Solvatten water		Interview, questionnaire
Average number of green indicators per day during off rain season	2,10	Interview, questionnaire
Average number of green indicators per day during rain season	1,13	Interview, questionnaire
Percentage of domestic water collected from; Protected spring	0,13	Interview, questionnaire
Percentage of domestic water collected from; Borehole/deep well	0,77	Interview, questionnaire
Percentage of domestic water collected from; River/stream	0,03	Interview, questionnaire
Percentage of domestic water collected from; Rain water	0,03	Interview, questionnaire
Percentage of domestic water collected from; Unprotected spring	0,06	Interview, questionnaire
Percentage of respondents water source located in compound	0,52	Interview, questionnaire
Percentage of respondents water source located outside compound	0,58	Interview, questionnaire
Average distance to water source located outside compound, km	0,74	Interview, questionnaire
Average time to go to water source located outside compound and back, h	25,00	Interview, questionnaire
Average times per day water is collected from the water source outside compou	3,79	Interview, questionnaire
Average size of the container the water is collected in	20,97	Interview, questionnaire
Percentage of respondents finding Solvatten useful	1,00	Interview, questionnaire
Percentage of respondents finding Solvatten easy to use	1,00	Interview, questionnaire
Average time spend on purifying water per day before Solvatten	1,36	Interview, questionnaire
Average time spend on purifying water per day after Solvatten	1,17	Interview, questionnaire
Percentage of respondents that have saved time because of Solvatten	0,75	Interview, questionnaire
Percentage of respondents that have not saved time because of Solvatten	0,23	Interview, questionnaire
Average time saved because of Solvatten, h	0,31	Interview, questionnaire
Average respondents finding something more time consuming because of Solv	14,00	Interview, questionnaire
Average time more time consuming, h		Interview, questionnaire
Percentage of respondents experience more power over their life situation	0,84	Interview, questionnaire
Percentage of respondents not experience more power over their life situation	0,10	Interview, questionnaire
Percentage of respondents who can not leave Solvatten unattended	1,00	Interview, questionnaire

Economy/Budget	Value	Example of sources where the value could be
Percentage of respondents using fuel for purifying water before Solvatten; Firewood		Interview, questionnaire
Percentage of respondents using fuel for purifying water before Solvatten; Sawdust		Interview, questionnaire
Percentage of respondents using fuel for purifying water before Solvatten; Gas		Interview, questionnaire
Percentage of respondents using fuel for purifying water before Solvatten; Improved	0,00	Interview, questionnaire
Percentage of respondents using fuel for purifying water before Solvatten; Kerosene		Interview, questionnaire
Percentage of respondents using fuel for purifying water before Solvatten; Charcoal		Interview, questionnaire
Percentage of respondents using fuel for purifying water before Solvatten; Maize/sugar cane		Interview, questionnaire
Percentage of respondents using fuel for purifying water before Solvatten; Other		Interview, questionnaire
Percentage of respondents using fuel for purifying water after Solvatten; Firewood		Interview, questionnaire
Percentage of respondents using fuel for purifying water after Solvatten; Sawdust		Interview, questionnaire
Percentage of respondents using fuel for purifying water after Solvatten; Gas		Interview, questionnaire
Percentage of respondents using fuel for purifying water after Solvatten; Improved st	0,00	Interview, questionnaire
Percentage of respondents using fuel for purifying water after Solvatten; Kerosene		Interview, questionnaire
Percentage of respondents using fuel for purifying water after Solvatten; Charcoal		Interview, questionnaire
Percentage of respondents using fuel for purifying water after Solvatten; Maize/sugar cane		Interview, questionnaire
Percentage of respondents using fuel for purifying water after Solvatten; Other		Interview, questionnaire
Percentage of respondents using other ways of purifying water besides boiling before Solvatten; Filter		Interview, questionnaire
Percentage of respondents using other ways of purifying water besides boiling before Solvatten; Other	11,00	Interview, questionnaire
Percentage of respondents using other ways of purifying water besides boiling after Solvatten; Filter		Interview, questionnaire
Percentage of respondents using other ways of purifying water besides boiling after Solvatten; Other	5,00	Interview, questionnaire
Percentage of respondents using other ways of purifying water besides boiling after Solvatten; Other		Interview, questionnaire
Average amount of fuel used per day before Solvatten during rain season, bundles		Interview, questionnaire
Average amount of fuel used per day before Solvatten during off rain season, bundles		Interview, questionnaire
Average amount of fuel used per day after Solvatten during rain season, bundles		Interview, questionnaire
Average amount of fuel used per day after Solvatten during off rain season, bundles		Interview, questionnaire
Percentage of respondent who have saved money is fuel costs during rain season bec	0,23	Interview, questionnaire
Average money saved in fuel costs as a result of Solvatten	25,48	Interview, questionnaire
Percentage of respondent who have saved money is fuel costs during off rain season	19,90	Interview, questionnaire
Average money saved in fuel costs as a result of Solvatten during off rain season		Interview, questionnaire
Average amount paid by respondents for a Solvatten, Khs	1200,00	Interview, questionnaire
Percentage of respondents who got support from an organisation to buy Solvatten	1,00	Interview, questionnaire
Respondents average willingness to pay	1258,06	Interview, questionnaire
Health	Value	Example of sources where the value could be
Percentage of respondents that experience waterborne diseases; Typhoid		Interview, questionnaire
Percentage of respondents that experience waterborne diseases; Amoebic dysentery		Interview, questionnaire
Percentage of respondents that experience waterborne diseases; Cholera		Interview, questionnaire
Percentage of respondents that experience waterborne diseases; Diarrhoea		Interview, questionnaire
Percentage of respondents that experience waterborne diseases; Other		Interview, questionnaire
Percentage of respondents who visit the doctor when sick from a waterborne disease		Interview, questionnaire
Percentage of respondents who do not visit the doctor when sick from a waterborne disease		Interview, questionnaire
Percentage of respondents who buys medicine every time after a doctors visit		Interview, questionnaire
Percentage of respondents who sometimes buys medicine after a doctors visit		Interview, questionnaire
Average cost for a waterborne disease; Typhoid		Interview, questionnaire
Average cost for a waterborne disease; Amoebic dysentery		Interview, questionnaire
Average cost for a waterborne disease; Cholera		Interview, questionnaire
Average cost for a waterborne disease; Diarrhoea		Interview, questionnaire
Average cost for a waterborne disease; Other		Interview, questionnaire
Average number of days per month a family member needed to stay home from work/school before Solvatten		Interview, questionnaire
Average number of days per month a family member needed to stay home from work/school after Solvatten		Interview, questionnaire
Percentage of respondents who feel healthier as a result of Solvatten	0,97	Interview, questionnaire
Percentage of respondents who need to buy less medicine as a result of Solvatten	0,94	Interview, questionnaire
Percentage of respondents who need to visit the doctor less often as a result of Solv	0,90	Interview, questionnaire
Percentage of respondents who can perform better in work/school as a result of Solv	0,94	Interview, questionnaire
Percentage of respondents who experience less sick days from work/school as a resu	0,94	Interview, questionnaire
Average times per month a family member where sick before Solvatten	4,33	Interview, questionnaire
Average times per month a family member where sick after Solvatten	0,03	Interview, questionnaire
Percentage of respondent who see a connection between the improved health to Solv	0,94	Interview, questionnaire
Percentage of respondents who has gotten medical or hygiene advise from a doctor	0,74	Interview, questionnaire
Percentage of respondents whose children attended school on regular basis before \$	0,19	Interview, questionnaire
Percentage of respondents whose children attended school on regular basis after Sol	0,87	Interview, questionnaire
Average number of days per week children stayed home from school before Solvatter	1,53	Interview, questionnaire
Average number of days per week children stayed home from school after Solvatten	2,39	Interview, questionnaire
Percentage of respondents who see a connection to the improved health and Solvatte	0,84	Interview, questionnaire

Farm	Value	Example of sources where the value could be obtained
Percentage of respondents who has dairy animals	24,00	Interview, questionnaire
Percentage of respondents who has dairy animals; Cow	0,77	Interview, questionnaire
Percentage of respondents who has dairy animals; Goat	0,06	Interview, questionnaire
Percentage of respondents who has dairy animals; Sheep	0,03	Interview, questionnaire
Percentage of respondents who has dairy animals; Other	0,00	Interview, questionnaire
Percentage of families with dairy animals who use Solvatten for hygiene purpos	0,71	Interview, questionnaire
Percentage of families with dairy animals who use Solvatten for hygiene purpos	0,58	Interview, questionnaire
Percentage of respondents with dairy animals whose animals generate income	0,58	Interview, questionnaire
Average price per litre milk for respondents with dairy animals		Interview, questionnaire
Power	Value	Example of sources where the value could be obtained
Percentage of respondents who claims that everyone in the family has access to	1,00	Interview, questionnaire
Percentage of respondent who claims that the caretaker has gained in social sta	0,77	Interview, questionnaire
Percentage of respondent who claims that the family has gained in social statu:	0,87	Interview, questionnaire
Percentage of respondent who has change their thoughts about the future after	0,97	Interview, questionnaire
Percentage of respondents who has learned a new knowledge as a result of Solvatten		Interview, questionnaire
Percentage of respondent who value themselves differently after investing in Sc	0,97	Interview, questionnaire
Percentage of respondents who reports something negative about Solvatten		Interview, questionnaire
Percentage of respondents who have access to buy a new Solvatten if the one th	0,65	Interview, questionnaire
Percentage of respondents who have access to buy spare parts if something bre	0,55	Interview, questionnaire
Percentage of respondents who would consider buying a new Solvatten when th	0,97	Interview, questionnaire
Percentage of respondents who has recommended Solvatten to someone		Interview, questionnaire
Percentage of respondents who thinks Solvatten is a good investment	1,00	Interview, questionnaire