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Improved Cooking Stoves for Enhanced Nutrition Security. Identifying Essential Factors for Implementing Improved Cooking Stoves in Rural Tanzania

Recommendations for Outscaling in Morogoro and Dodoma Regions

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Abbreviations

ARI	Agricultural Research Institute
GACC	Global Alliance for Clean Cookstoves
CO_2	Carbon Dioxide
CC	Climate Change
CCS	Case Study Site(s)
DFID	Department for International Development
FAO	Food and Agricultural Organization of the United Nations
FGD	Focus Group Discussion
FHH	Female-Headed Household
GACC	Global Alliance for Clean Cookstoves
GHG	Greenhouse Gas
HH	Household
IAP	Indoor Air Pollution
ICS	Improved Cooking Stove(s)
ICSS	Implementing Case Study Site(s)
IEA	International Energy Agency
IIRR	International Institute of Rural Reconstruction
MDG	Millennium Development Goal
MHH	Male-Headed Household
MVIWATA	Mtandao wa Vikundi Vya Wakulima (National Network of Small-Scale Farmers' Groups, Tanzania)
NGO	Non-Governmental Organization
PCSS	Planning Case Study Site(s)
PVC	Polyvinyl Chloride
SDG	Sustainable Development Goal
SLA	Sustainable Livelihood Approach
SSA	Sub-Saharan Africa
SUA	Sokoine University of Agriculture
UN	United Nations
UNDP	United Nations Development Programme
UNFCCC	United National Framework Convention on Climate Change
UNICEF	The United Nations Children's Fund
UPS	Upgrading Strategy/Strategies (sg., pl.)
TNBS	Tanzanian National Bureau of Statistics

TSH	Tanzanian Shilling
TSF	Three-Stone-Fire Stove
VEO	Village Executive Officer
WHO	World Health Organization

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1 Introduction

1.1 Problem Statement

People have been cooking on open fires since the beginning of mankind and since about 12.000 years the so-called *Three-Stone-Fire Stove* (TSF) is in use throughout the world (KSHIRSAGAR AND KALAMKAR, 2014). It is a simple stove type that can be set up anywhere with three stones and solid fuel like biomass. In many rural areas people do not have access to commercial fuels or cannot afford them, therefore they are dependent on biomass, charcoal or other bioenergy resources for cooking and heating. In most cases, these solid fuels are 'accessible' and 'free' which means they can be collected by a household (HH) itself and do not have to be paid for (BEYENE ET AL., 2015). While urban areas often rely on charcoal, rural areas are characterized by mostly using firewood for direct burning (CLOUGH, 2012). In developing countries more than 90 percent of consumed energy in the rural areas rely on traditional bioenergy sources, with the majority using firewood. As can be seen in figure 1, firewood is still the main source for cooking purposes throughout Tanzania, especially in rural areas. The percentage of the population using these sources has remained steady over the past decades (TANZANIA NATIONAL BUREAU OF STATISTICS (TNBS), 2012).

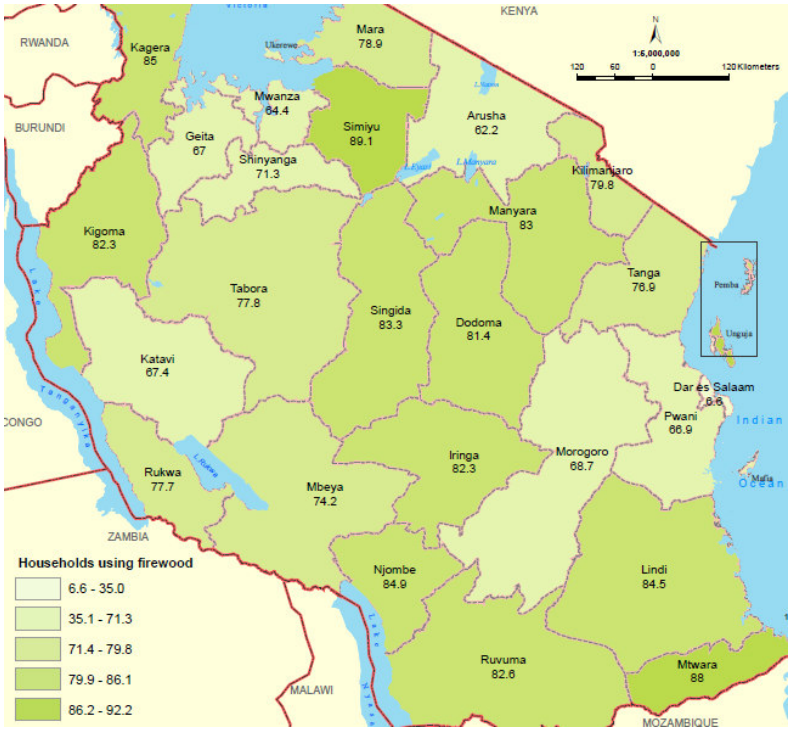


Figure 1 Percentage of HHs per region using firewood for cooking (TNBS, 2012)

While in industrialized and most developing countries more efficient and cleaner models have been established, the TSF remains the main cooking tool in many of the least developed countries where around 2,7 billion people are still dependent on solid biomass for cooking, especially in Asia and Sub-Saharan Africa (SSA) (INTERNATIONAL ENERGY AGENCY (IEA), 2016). The TSF is characterized by a very low fuel efficiency, which means more solid fuel is needed for combustion compared to other stove types. The inefficient combustion results in a high use of firewood and often contributes to accelerated local deforestation and forest degradation (KSHIRSAGAR AND KALAMKAR, 2014). Furthermore, the exposure to smoke has direct short- and long-term consequences for the health of users and other HH members like eye irritation, headache or pulmonary diseases (RUIZ-MERCADO ET AL., 2011). Furthermore, improper cooking of food can decrease its nutrient content and especially children may lose their appetite or eat less when food is being poorly cooked due to fuelwood scarcity. Well-cooked food can therefore improve the intake of nutrients (HOFFMANN ET AL., 2015). Scarcity of fuelwood may also cause people to choose food with low cooking time over food that might be more nutritious but demand more time to be cooked, e.g. beans (KEES AND FELDMANN, 2011). As a consequence malnutrition and health problems do not only affect individuals and their families personally but can also have a profound impact on the socioeconomic development of communities, regions or even nations (FAO ET AL., 2017). According to the last report on 'The state of Food Security and Nutrition in the World 2017' (ibid.), the food security situation has worsened on a global scale in 2016, particularly in SSA and Asia. The number of chronically undernourished people rose to 815 million, especially affecting Eastern Africa where around one third of the population is suffering from malnutrition. In Tanzania, around 17,3 million people of the almost 60 million inhabitants are undernourished. 3,2 million children were found to be stunted, which serves as indicator for chronic undernutrition (ibid.). This applies especially to rural semi-arid regions in Tanzania where the intake of animal products is limited and the food system is mostly based on cereals, starchy roots and pulses. The situation of food and nutrition security is further affected by improper cooking facilities (MUTABAZI, 2016).

Since almost 50 years so-called *Improved Cooking Stoves* (ICS) are being promoted and distributed in developing countries. The term is used for various designs that are all characterized by improved insulation which results in less fuel consumption. The reduced amount of fuelwood can reduce pressure on local forest resources (Hoffmann,

2015). The improved stoves reduce the amount of smoke being emitted while cooking and lead it away from the user via chimneys which results in beneficial health impacts. ICS contribute to food security by enabling a proper cooking of food what facilitates nutrient absorption by the human body. Additionally, due to the reduced amount of firewood that needs to be collected, people gain time that they can subsequently spent on farming or other income-generating activities which also increases food security (UCKERT ET AL., 2017). ICS have been widely distributed through numerous programs on a global scale but many projects have faced problems with adoption and long-term use of the newly introduced stoves.

1.2 Research Question and Objectives

The purpose of this thesis is to identify and analyze essential hindering and fostering factors for the adoption and diffusion of ICS in Morogoro and Dodoma regions of rural Tanzania. The research was conducted within the framework of two projects, Trans-SEC and Scale-N, both targeting Case Study Sites (CSS) in Morogoro and Chamwino regions in Tanzania. Trans-SEC is implementing ICS in four CSS, henceforward called Implementing Case Study (ICSS), since 2014 while Scale-N was still in the initial planning phase in its four CSS, henceforward called Planning Case Study Sites (PCSS), during the fieldwork for this thesis in September to November 2016. The research was conducted in all eight target villages.

One objective will be the analysis of the ongoing implementation and outscaling process in the ICSS regarding socioeconomic, biophysical and operational factors as well as the perceived attributes of ICS from an adopter perspective. The second objective will be the assessment of those factors in the PCSS and to identify influential site-specific factors. The overall goal is to derive recommendations for further ICS outscaling approaches in comparable regional settings.

The main research questions are therefore:

1. What are essential factors for ICS adoption in Trans-SEC implementation and outscaling activities that should be taken into account to support the outscaling of ICS to Scale-N and other comparable villages in rural Tanzania?
2. What are site-specific factors that need to be taken into account for implementation and outscaling activities in Scale-N CSS?

1.3 Outline of the Thesis

The second chapter of this thesis gives a detailed overview over the current status quo of literature on ICS, followed by the presentation of the scientific concepts used for the purpose of this study. In chapter three, the Trans-SEC and Scale-N projects, the applied implementation approach and the study area will be described. Chapter four presents the methodological approach this thesis has pursued. First, the development of the analytical framework is explained, followed by a presentation of the qualitative and quantitative research methods and respective data acquisition as well as how the collected data was analysed. The fifth chapter delineates the results of the fieldwork in the ICSS by illustrating the identified essential factors. Subsequently, the assessment of the PCSS regarding those factors and potentially new insights will be addressed in chapter six. In chapter seven the results from chapter five and six will be interpreted and discussed in relation to each other as well as in the context of the consulted literature. Subsequently, recommendations for further outscaling of ICS will be pointed out. Furthermore, a critical reflection on the used methods and the derived data will be given. Chapter eight will present a final conclusion summarizing the thesis' findings and giving an outlook.

2 Literature Review

2.1 Improved Cooking Stoves

Resulting from incomplete combustion and smoke emission from open fire, using a TSF causes several types of health and environment-related problems and is strongly interlinked to socioeconomic challenges:

1) Health: smoke emission leads to indoor air pollution (IAP) which can cause severe health-related problems, e.g. lower respiratory infections, chronic obstructive pulmonary disease, lung cancer or pneumonia. Other health risks are eye infections or even cataract caused by the smoke and burnings from the open fire (ANENBERG ET AL., 2013). IAP is considered to be the fourth largest health risk factor on a global scale. A high number of premature deaths are related to smoke-borne diseases that increase morbidity and mortality (BELTRAMO ET AL., 2015). According to the WORLD HEALTH ORGANIZATION (WHO) (2016) more than four million people die every year as a

consequence of being exposed to smoke from open fire. Furthermore, the exposure to smoke during pregnancy can result in reduced birth weight making the child more averse to illnesses during its later life (BOY ET AL., 2000).

2) Food and nutrition security: Improper cooking of food can decrease its nutrient content and cause malnutrition, often referred to as 'hidden hunger' because the food quantity might be satisfying while the nutrient quality is not (SHETTY, 2010). Children who suffer from malnutrition are more likely to become ill and develop poor cognitive skills which may impact their ability to work in later life. A result of insufficient nutrient uptake during pregnancy by mothers and during early childhood can be stunting, which describes reduced growth of a child during the first five years of its life. Deficiencies in macronutrients result from a poor diet in terms of quality as well as lack of diversity related to the food that is consumed (THOMPSON ET AL., 2011).

3) Climate Change (CC): smoke emissions also cause outdoor air pollution and contribute to CC and global warming, by releasing greenhouse gases (GHG) like methane and carbon monoxide as well as black carbon into the atmosphere. Methane and carbon monoxide have an even higher potential towards global warming than carbon dioxide (CO_2) (LEWIS AND PATTANAYAK, 2012). Black carbon emissions from TSF contribute around 22 percent of global black carbon emissions and is considered to be the second largest contributor to CC after CO_2. (BEYENE et al., 2015).

4) Deforestation: inefficient burning of biomass increases the amount of firewood being consumed and therefore leads to accelerated deforestation and degradation of local forest ecosystems. As trees are important absorbers of CO_2, deforestation contributes to CC. Furthermore, forest degradation is inseparably interlinked with the loss of natural habitats and decreasing biodiversity (KSHIRSAGAR AND KALAMKAR, 2014).

5) Time loss: the collection of firewood is a time-consuming task which is done mostly by women and children. The more firewood is needed and the less trees are available the more time consuming is the collection. Cooking on TSF might also be more time-intensive than on ICS due to inefficient combustion. This means that the collectors cannot fulfil other important tasks during this time, for instance helping at home or with family income-producing activities like farm work or attending school. This has concrete socioeconomic consequences, e.g. less income or low education levels (LEWIS AND PATTANAYAK, 2012).

6) Risk of physical harm: The task of fuelwood collection is physically demanding and can be hazardous. The carrying of heavy loads of fuelwood can cause physical

problems. People might get injured by walking on bad roads, hilly areas or sandy and slippery surfaces They can also face threats by being exposed to animals or insects and especially women and children are endangered of becoming victims of physical violence by other human beings while walking long distances in abundant areas or in conflict regions (ANENBERG ET AL., 2013).

Since around 50 years ago, so-called *improved cooking stoves* are being distributed and installed throughout the world through various national and international programmes and initiatives in the context of development cooperation and research purposes of many disciplines. The term refers to a stove that is more energy efficient, meaning the stove burns solid fuel more efficiently and reduces emissions compared to traditional cooking devices like the TSF (ibid.). The use of ICS therefore entails various potential benefits like the reduction of IAP, less extraction of fuelwood and therefore mitigation of CC and improving livelihoods through less burden and risk of violence to fuelwood collectors and increased income for families (BEYENE ET AL., 2015). The stoves can vary in size, scope, type, technology design and implementation through different dissemination approaches or financial mechanisms. While differing in design most of them share the same main attributes as an enclosed cooking chamber to channel the fire and a chimney which carries the smoke to the outside or at least away from the person who is cooking. This ensures a more efficient combustion and a reduced exposure to smoke. Most ICS can be built with materials that are either directly at hand locally or can easily be afforded and purchased. (HANNA ET AL., 2016).

According to the WORLD BANK (2011) hundreds of millions of ICS have been distributed through numerous initiatives and projects throughout the world with an estimated 166 million still functioning and being in use in 2011. According to RUIZ-MERCADO ET AL. in 2011 over 160 ICS programs were in place at a global scale. There are many national efforts to promote ICS on a large scale e.g. in India or China as well as international programmes (ANENBERG ET AL., 2013). An important international initiative is the Global Alliance for Clean Cookstoves (GACC) which was founded in 2010. It is a private-public network supported by the UN and targets a global distribution and adoption of clean cooking technologies to 100 million HHs by 2020 (BEYENE ET AL., 2015). The GACC cooperates with a variety of stakeholders along the clean cooking sector like national governments, policy-makers, research organizations,

civil society and other global initiatives, e.g. the Roundtable on Sustainable Biomaterials', or 'Every Woman every Child' (GACC, 2017).

RUIZ-MERCADO ET AL. (2011) identified six main goals targeted by recent ICS programs: 1) reduce deforestation, 2) reduce black carbon emission and related to this, 3) combat CC, 4) reduce air pollution indoor as well as outdoor, 5) improve health of HH members and 6) reduce the personal risks which include being burnt by the open fire or getting injured or becoming victim of a crime while collecting fuelwood. The goals concerning the HH level are specially targeted towards women and children, as it is mostly them who cook for the families and collect the firewood.

While the first cook stove improvements for smoke reduction took place in India already in the 1950s, ICS are being studied and implemented in development cooperation and research only since the late 1970s when the 'first wave' on improved stove development took place (KSHIRSAGAR AND KALAMKAR, 2014). The main focus of stove improvements in this phase were fuel savings (reduce amount of burnt biomass to decelerate deforestation) and only secondly, smoke reduction. In the last 15 to 20 years health protection and safety reasons began to play an increasingly important role (RUIZ-MERCADO ET AL., 2011). In the recent past, the mitigation effect of cleaner cooking technologies to combat CC has been become relevant. 'Carbon finance' can be used by countries to finance ICS programmes and take these emission-reducing projects into account for their own CO_2 emissions using the "Clean Development Mechanism"[1] within the framework of the Kyoto Protocol by the United Nations Framework Convention on Climate Change (UNFCCC) (LEWIS AND PATTANAYAK, 2012).

Despite numerous programs and efforts and the multiple benefits of ICS many projects failed to achieve widespread distribution or a continued use of the new stoves in the target communities. According to PINE ET AL. (2011) many studies found ICS to have a positive cost-benefit ratio. Nevertheless, many programs faced problems with implementation, diffusion and dissemination of ICS (LEWIS AND PATTANAYAK, 2012).

2.2 Diffusion and Dissemination Theory

In this part, the theoretical foundation on how and why new technologies are adopted will be presented and broadly discussed. The 'diffusion of innovations' theory by

1 According to BEYENE ET AL. (2015) about 25% of stove programs were part of a Clean Development Mechanism program.

Everett Rogers (2003) and its review by other scientists (DEARING, 2009; ROBINSON, 2009; SAHIN, 2006) serves as a basic concept and will be supplemented by the concept of sustainable livelihoods, dissemination und upscaling theories and research specifically targeting diffusion and dissemination of ICS (PAREEK AND CHATTOPADHYAY, 1966; PINE ET AL., 2011; RUIZ-MERCADO ET AL., 2011).

2.2.1 Diffusion of Innovations

Diffusion theory has a long and rich tradition, as it has evolved since the beginning of the 20th century by being subject to study in multiple disciplines like sociology, public health and education (DEARING, 2008). In the 1940s, diffusion theory became increasingly popular in the field of rural sociology. A crucial milestone of diffusion theory was in 1962, when the rural sociologist Everett Rogers published his book 'Diffusion of Innovations' whose theory is considered as influential concept until nowadays (ROGERS, 2003).

Rogers' concept has been used as a theoretical framework in technology adoption and diffusion in many studies from several disciplines as political science, public health, communication science, history, economics, technology and education (SAHIN, 2006). He emphasized the role of uncertainty in adoption decisions and the importance of social networks and opinion leaders for successful diffusion. The classical diffusion paradigm has been found useful by theorists from various disciplines as well as practitioners like agricultural extension agents who can apply it in their daily work.

Definition of Core Terms and Elements

In this section, the most important terms of Rogers' theory on diffusion of innovation will be introduced and its main concept will be described.

The term *technology*, as used by Rogers in a broader sense, refers to a "design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving a desired outcome" (ROGERS, 2003). *Adoption* describes the process of different stages that an individual experiences from first learning about an innovation until the final uptake of it. *Diffusion* refers to the spread of an innovation within a group of individuals, it is the "process through which an innovation is communicated through certain channels over time among members of a social system" (ROGERS, 2003:5). This definition already mentions the four main elements of diffusion identified by Rogers: the innovation itself, the communication channels, the time aspect

and the social system. The term *innovation* refers to "an idea, practice, or project that is perceived as new by an individual or other unit of adoption" (ROGERS, 2003:12). In this concept, the actual time of existence of a specific technology is not relevant, but the perception of the potential adopter turns it into an innovation if it is new to him or her. An important challenge to adoption is uncertainty. The reduction of uncertainty is therefore important and can be enhanced by supplying extensive information about advantages and disadvantages of the innovation to potential adopters (SAHIN, 2016). Communication refers to knowledge-sharing between individuals or within a social group. Rogers identified two main *communication channels*: mass media like television, radio or newspaper and interpersonal communication between individuals. Diffusion is described as "a very social process that involves interpersonal communication relationships" (ROGERS, 2003:19).

Rogers claimed that the *time dimension* is important to all other elements of a diffusion process and was ignored in most behavioural research (SAHIN, 2006). Accordingly, the inclusion of time in diffusion research poses one of the main strengths of his concept. It refers to the rate of adoption which will be described in the following section.

The structure of a *social system* strongly influences the diffusion of innovations and the nature of the social system has a deep impact on the individuals' innovativeness which is decisive to assign the individuals in adopter categories. ROGERS (2003) divided the individuals of a social system into five adopter categories (innovators, early adopters, early majority, late majority and laggards) that differ in their respective degree of innovativeness, which means their earliness relative to others in adopting an innovation (DEARING, 2009). More broadly adopters can be categorized into early and late adopters which inhibit specific characteristics regarding socioeconomic status, personality variables and communication behaviours and show a different attitude towards the innovation in question (ROBINSON, 2009).

Innovators only represent a small part of the social system and are characterized by curiosity for new ideas and are willing to take certain levels of risk and uncertainty when adopting innovations. Other members of the social system might not fully trust the judgement of these 'visionaries', nevertheless their energy and commitment are important drivers to initially introduce an innovation into the social system (ROBINSON, 2009). The individuals belonging to the group of *early adopters* are well integrated within the social community. They are much more likely to be opinion leaders, i.e. role models, and are being addressed by other members of the social system who seek

information about the innovation because their opinion is considered to be trustworthy. Opinion leaders inhibit a special role and are important at every stage of the innovation-decision process. Their approval and hence adoption of the innovation decreases the uncertainty for the ones to follow (ibid.). Representatives of the *early majority* and the *late majority* represent around one third of the social system, respectively. They are also well included in the social system but usually do not inhibit any leadership roles. The decision of the early majority is being influenced by the earlier adopters because they are less willing to take any risks and need to reduce uncertainty before deciding to adopt an innovation. *Late majority* members adopt subsequently, when most of their social system has already adopted the innovation. They aren't necessarily convinced of the innovation but adopt due to peer pressure or out of economic necessity. Interpersonal communication channels are especially important to them as they only decide to adopt if peers who already adopted help to reduce their uncertainty (SAHIN, 2006). The last ones to adopt are the *laggards* whose individuals are often very traditional and skeptical of change. They are not convinced by the innovation and need certainty that it works and actually leads to improvements before they are willing to adopt it. Therefore, the decision takes place after the rest of the social system has adopted.

Innovation-decision Process, the Rate of Adoption and the Diffusion System

Other key components of the diffusion theory are the innovation-decision process, the rate of adoption and the diffusion system. The *innovation-decision-process* is an "information-seeking and information-processing activity, where an individual is motivated to reduce uncertainty about the advantages and disadvantages of an innovation" (ROGERS, 2003:172). This individual adoption process has five consecutive stages: knowledge, persuasion, decision, implementation and confirmation (see figure 2).

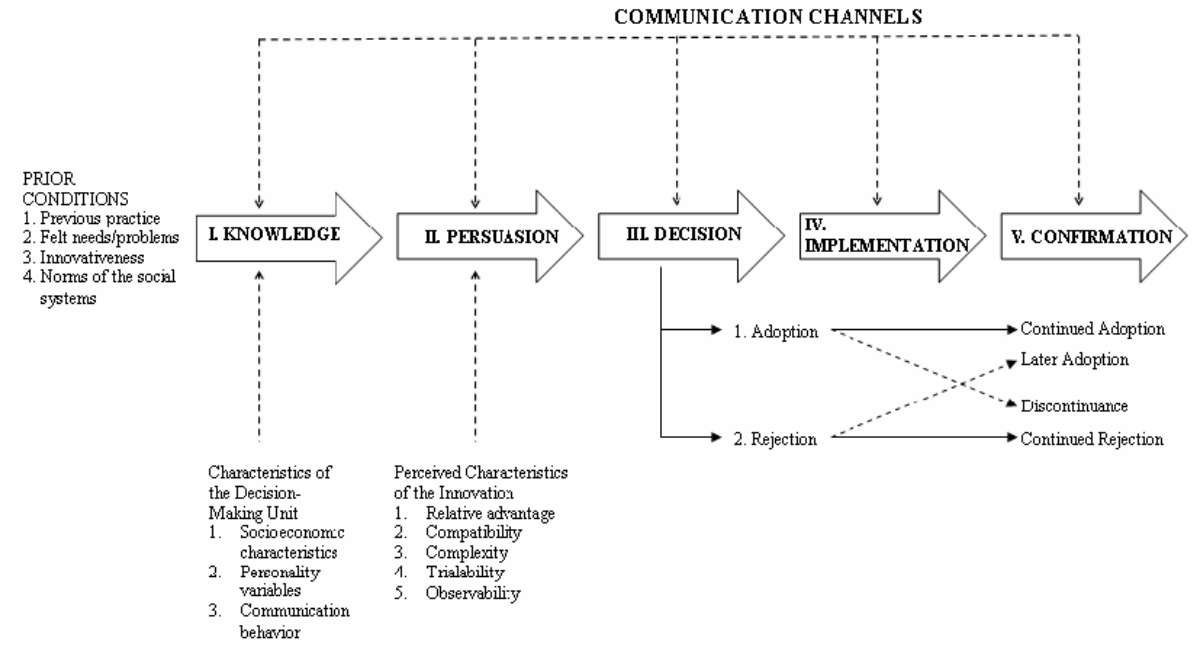


Figure 2 The Innovation-Decision Process (ROGERS, 2003:170)

In the first stage, an individual becomes aware of the innovation and receives information about its purpose, its functioning and possible advantages and disadvantages (*I. Knowledge*). Once the individual has formed an appreciative or dismissive attitude towards the innovation the *persuasion stage (II.)* begins. The degree of uncertainty as well as the social system in form of influence from others are highly decisive in taking a decision. After forming an attitude, the *decision (III.)* of adopting or rejecting the innovation takes place. It is important to mention that the decision to reject may also occur in any other stage of the innovation-decision-process. After the adoption decision has been made, *implementation (IV.)* can take place. Uncertainty can still pose a challenge in this stage and should be reduced with the help of change agents. An important part of the implementation can be *reinvention* which refers to the "degree to which an innovation is changed or modified by a user in the process of its adoption and implementation" (ROGERS, 2003:180). As reinvention enables the adaptation of an innovation to local habits and customs, it can lead to a quicker adoption. At the last stage (*V. Confirmation*), the adopter is looking for support for the adoption decision. If this support is not found the decision to reject can still take place (ibid.).

The *rate of adoption* describes the "relative speed with which an innovation is adopted by members of a social system" (ROGERS, 2003:221) and is shown by the number of individuals who adopt an innovation in a certain period of time. Rogers (2003) described the initial rate of adoption as an S-shaped curve that represents the cumulative

percentage of individual adopters through time. This pattern of adoption has been observed by other studies as well (DEARING, 2008). Factors which influence this rate are the innovation-decision type (optional, collective or authority), communication channels (mass media or interpersonal channels) and the social system (norms or network interconnectedness) (see figure 3). Personal and optional innovations are usually adopted faster than innovations involving an organizational or collective innovation decision (SAHIN, 2006).

The *diffusion system* has an important impact on the adoption rate as well. It refers to the involvement of external change agencies and the role of change agents in the communication with the target group. The inclusion of well trained and competent change agents in diffusion efforts facilitates targeting and approaching of opinion leaders within the social system. As already mentioned, this is especially relevant because opinion leaders play a crucial role for diffusing an innovation within a community (DEARING, 2009).

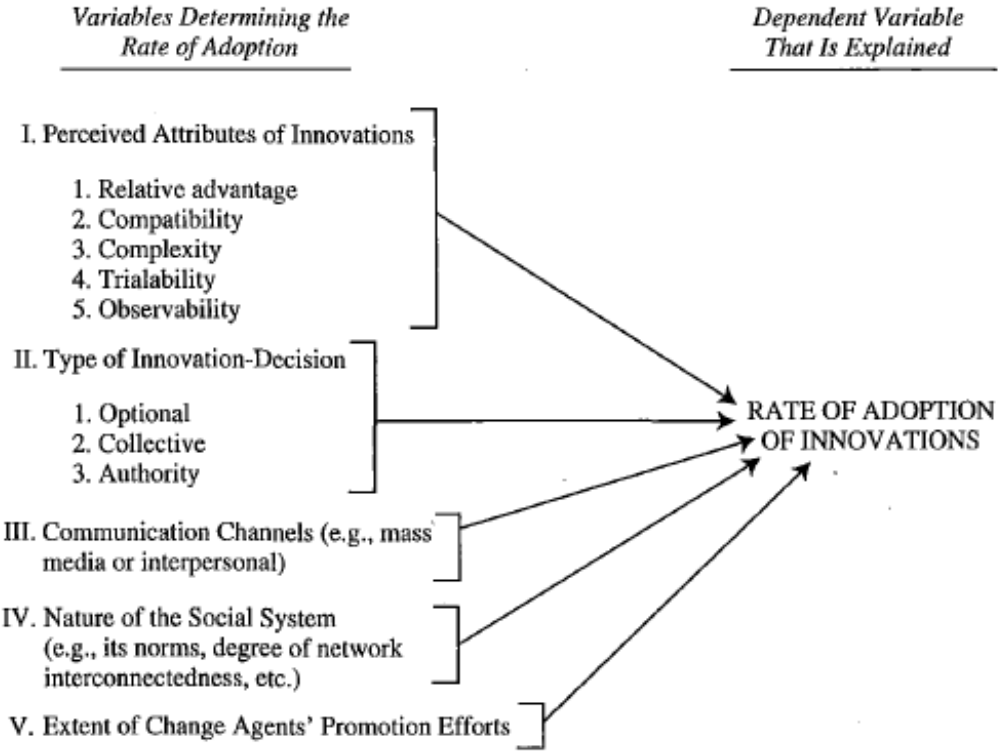


Figure 3 Variables determining the Rate of Adoption (ROGERS, 2003:207)

Attributes of Innovations

ROGERS (2003) identified five main attributes to reduce uncertainty in the innovation-diffusion process whose prevalence predict the rate of adoption to a certain extent (see table 1). The perception of these attributes influences the rate of adoption. According to ROGERS, the strongest predictor for this rate is the relative advantage of an innovation.

Table 1 Definition of Main Attributes of an Innovation by ROGERS (2002:212ff.)

Attribute	Definition by Rogers (2003)	Rate of adoption*
Relative advantage	Degree to which an innovation is perceived as being better than the idea it supersedes	Positive correlation
Compatibility	Degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters	Positive correlation
Complexity	Degree to which an innovation is perceived as relatively difficult to understand and use	Negative correlation
Trialability	Degree to which an innovation may be experimented with on a limited basis	Positive correlation
Observability	Degree to which the results of an innovation are visible to others	Positive correlation

*Correlation between the perceived strength of an attribute and the speed of the adoption rate

Relative advantage refers to the effectiveness and efficiency of the innovation compared to the current object of utility or other alternatives. It is a highly influencing factor for adopting or rejecting an innovation. Elements of relative advantage are those that matter to the potential adopters the most and are highly variable and dependent on particular perceptions of the targeted individuals. These elements are for instance the costs of implementation (and maintenance) and social status or prestige, depending on the adopter category (ROBINSON, 2009). Status seems to be a decisive element for the groups of early adopters while it does not seem of much concern to late adopter groups (SAHIN, 2006). The second main attribute is the *compatibility* of the innovation with existing values, norms and practices and if it is suited its goal without contradicting traditional procedures (DEARING, 2009). Low compatibility increases uncertainty and therefore, reduces the motivation to adopt and use the innovation (SAHIN, 2006). The only attribute being negatively correlated to the rate of adoption, is *complexity* and should therefore be low. An innovation that is easy to understand and use is more likely to be adopted than an innovation for which a potential adopter needs to acquire new knowledge or develop new skills (ROBINSON, 2009). *Trialability* refers to the extent to which the adopter must commit to full adoption (DEARING, 2009). If an innovation can be tried on a partial basis the adoption occurs quicker in most cases. This is because the majority wants to try an innovation in their own home settings and decide to adopt fully afterwards, which reduces uncertainty and increases the speed of the innovation-decision-process (SAHIN, 2006). This attribute is more important to earlier adopters than

to late adopters. The last main attribute *observability* is the extent to which outcomes of the innovation can be seen. Visibility of results decreases uncertainty and facilitates knowledge-sharing about the innovation within the social system (ROBINSON, 2009).

2.2.2 Dissemination Science and Upscaling

Deriving from the study of innovation the field of dissemination research emerged, with many contributions from the fields of public health, communication, marketing, agricultural sciences and social sciences, among others. While for diffusion the adoption of an innovation is the main dependent variable, for dissemination the implementation approach and design is of major concern as well. Dissemination science responds to the problem that well proven practices and projects do not necessarily lead to continued use of those practices. Therefore, the extent and the quality of implementation and the feedback from (potential) adopters towards the process are taken into account. Other important elements are the aforementioned involvement of local change agents and the provision of adequate trainings as well as education on topics related to the innovation (JOHNSON, 2013). Dearing described dissemination science as combination of the ”study and objectives of diffusion intervention with implementation intervention” (DEARING, 2009:505). The overall goal is to spread an innovation via upscaling and outscaling. Upscaling refers to the institutionalization of best practices and the inclusion in policy decision-making at higher levels. Outscaling, which is sometimes referred to as horizontal upscaling, means the adoption and diffusion of an innovation over a wider geographical scale with similar regional settings (PACHICO ET AL., 2004). MENTER ET AL. (2004) addressed the problem of the terms up- and outscaling being widely used and that there were no clear and universally accepted definitions. There are though definitions, prepared at a workshop of the Colsultative Group on International Agricultural Research (CGIAR) in 2000, that were found to be consistent with the consulted literature and will therefore serve as reference in the course of this thesis (see figure 4) (INTERNATIONAL INSTITUTE FOR RURAL RECONSTRUCTION (IIRR), 2000).

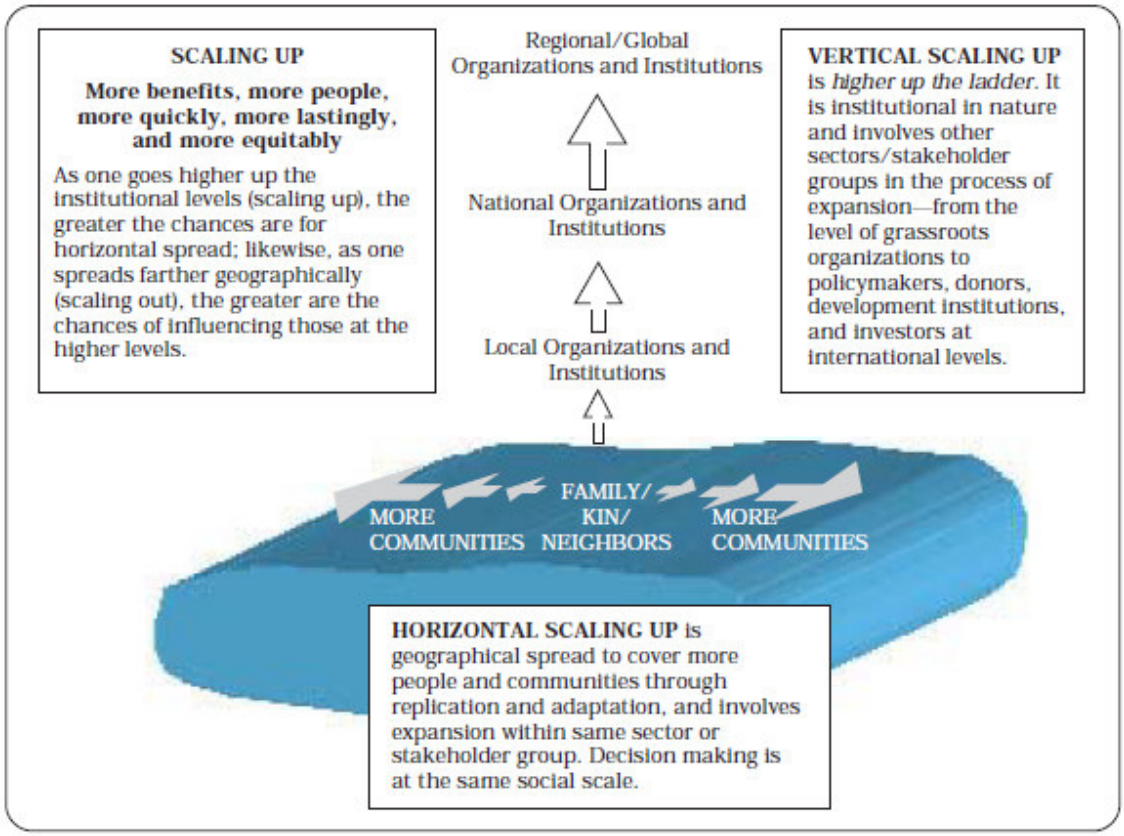


Figure 4 Definitions of scaling up (MENTER et al., 2004)15, adapted from IIRR, 2000).

Besides studying adoption from a researcher's perspective, it is important to take into account the potential adopter's livelihood that influences how an innovation to be introduced is going to be perceived. Only in the recent past, the users' needs have become a focus of study and are being considered adequately in research. As the GACC found "it has become increasingly clear that the benefits of clean cooking cannot be realized unless consumers see technologies as desirable products that deliver an improved cooking experience and add value to their lives" (GACC, 2015). This consideration of adopters' needs can be connected to the Sustainable Livelihood Approach (SLA) which focuses on the various factors and processes that influence livelihood. The SLA framework distinguishes between five different livelihood assets, 1) social capital, 2) human capital, 3) economic capital, 4) natural capital and 5) physical capital (see table 2 for a detailed description). These capitals represent the core of livelihood assessment and refer to the availability of the respective capital elements, i.e. ownership or access to them. The capitals are strongly interlinked with each other and it is important to observe them not isolated but rather as dynamic (MORSE AND MCNAMARA, 2013). Assessing those capitals can serve as important indicator for the needs and expectations regarding an innovation from the potential adopters' perspective.

Table 2 Description Sustainable Livelihood Capitals adapted from DEPARTMENT FOR INTERNATIONAL DEVELOPMENT (DFID), 1998

Social Capital	Social resources: networks, relationships of trust, exchange, affiliations, group membership, associations
Human Capital	Skills, knowledge, ability to labour including health and physical resilience, at HH level amount and quality of available labour, HH size, leadership potential
Economic Capital	Capital base, financial resources that people use to achieve livelihood objectives: cash, credit or debt, savings, economic assets
Natural Capital	Natural resource stocks: soil, water Environmental services: hydrological cycle, pollution sinks
Physical Capital	Basic Infrastructure: buildings, roads Production: tools and equipment, technologies affordable transport, secure shelter, adequate water supply and sanitation, clean and affordable energy, access to information

In this part, the theoretical foundation for this thesis has been presented by addressing Rogers theory of diffusion of innovations, dissemination und upscaling concepts and the SLA framework. The following section shall present insights from studies on the specific aspects of diffusion and dissemination in the case of ICS, that can supplement previously discussed theories.

2.2.3 Diffusion and Dissemination of Improved Cooking Stoves

The previously discussed scientific theories can serve as basic concept to study the adoption of ICS. Nevertheless, there is more research on diffusion and dissemination of ICS that should be considered to allow for a complete assessment of all relevant aspects of stove adoption.

Fuel Stacking

ROGERS (2003) distinguished between adoption and rejection of an innovation, adoption being the decision to make full use of an innovation and rejection being the decision to not adopt it at all. Deriving from this, the 'fuel switching' approach by Hosier and Dowd (1998) was developed in 1998, regarding adoption rates and impacts of cooking innovations in developing countries. This approach assumed that a traditional device might be entirely replaced by the innovation after the decision to adopt takes place and therefore implied that a HH was only using one cooking device (RUIZ-MERCADO ET AL., 2011). In reality, complete substitution has shown to happen rather seldom. Selective adoption of innovations for some specific tasks was already observed by PAREEK AND CHATTOPADHYAY in 1966. In most cases, the introduction of a new cooking device to a

HH leads to a new assessment of all cooking tasks and tools and the ICS was used for the identified 'adoption niche', which includes the tasks for which it is perceived as being more adequate than the traditional stove (RUIZ-MERCADO ET AL., 2011). Consequently, the HH will be using the new device in addition to the old one, each device being used for specific tasks, which is called 'fuel or stove stacking' (PINE ET AL., 2011).

Monitoring of Sustained Use

For a long time, diffusion theorists have mainly targeted the acceptance and the initial distribution and adoption of innovations. The consulted literature implicated a lack of research in the process of stove adoption regarding their sustained long-term use. Those studies addressing the long-term use many researchers found out that ICS were less used or even not at all in the long term. RUIZ-MERCADO ET AL (2011) stated that there was not much systematic information available about the most important factors which influence the adoption and use of ICS: "[P]roviding access to the improved stoves is a necessary but not sufficient condition to achieve any of the goals of ICS programs" (RUIZ MERCADO 2011:7559). Especially in the case of ICS, sustained use is of major concern, because its benefits evolve and develop their real strength over time and can only be effective when ICS are being used in the long term. These findings implied a shift of focus towards the examination of new factors and the dynamics of the use after adoption has occurred (PRINS ET AL., 2009). SHIH AND VENKATESH (2004) identified the timing, variety and consistency of use as essential for sustained adoption of ICS. Their developed Use-Diffusion-Model takes the rate and variety of use into account after an innovation has been initially adopted, i.e. how often a new device is used in the long run and for what tasks. RUIZ-MERCADO ET AL. (2011) and PINE ET AL., (2011) identified different factors which influence the adoption of ICS. They distinguished between factors relevant for HH level adoption and those relevant on community level adoption (diffusion) as well as factors which are important for initial acceptance and other factors which are more influential for a long-time use. According to their findings important factors for initial acceptance are socioeconomic characteristics of the HH, while e.g. the compatibility with cooking practices and routines would be more important for a sustained use. (RUIZ-MERCADO ET AL., 2011)

3 Project and Case Study Site Description

This thesis is embedded within the framework of two research projects, Trans-SEC and Scale-N, that are currently implemented in Tanzania. The following chapter starts with a brief introduction to the scope and main goals of these projects as well as the applied implementation process in the ICSS and describes subsequently the study area and the CSS.

3.1 Project and Implementation Process Description

3.1.1 Trans-SEC and Scale-N

Trans-SEC

Within the framework of the Trans-SEC project 'Innovating Strategies to safeguard Food Security using Technology and Knowledge Transfer: A people-centered Approach' researchers from several German, Tanzanian, Kenyan and US-American institutions[2] are jointly studying food security and agriculture in rural Tanzania. The project is being implemented within a five-year period from 2013-2017 and focuses on rural food security improvement and poverty reduction through upgrading of food value chains (MUTABAZI, 2016). A participatory action research process has been set up from the beginning as integral part of most analytical steps. Multi-stakeholder engagement was ensured by conducting stakeholder mapping across the whole food value chain on local, regional and national level and identifying constraints and strategies by using participatory methods, e.g. focus group discussions (FGDs). From a variety of potential upgrading strategies (UPS) ten were chosen for testing in the ICSS during the project lifetime. The decision-making process included participatory impact assessments of each UPS. As main goal successfully tested UPS shall be outscaled to other villages with similar geographic settings as the CSS within the project regions. The last objective is to upscale the project outcomes to district, regional and national level. In

[2] ZALF: Leibniz Centre for Agricultural Landscape Research as coordinator for German partners PIK:Potsdam Institute for Climate Impact Research, HU:Humboldt-University Berlin, IUW:Leibniz University Hannover, DIE:German Development Institute, DITSL:German Institute for Tropical and Subtropical Agriculture, UHOH:University of Hohenheim, AD-SM and SUA:Sokoine University of Agriculture as coordinator for international partners IFPRI:International Food Policy Research Institute (USA), ICRAF:The International Centre for Research in Agroforestry (Kenya), ACT:Agricultural Councol of Tanzania, MVIWATA:Mtandao wa Vikundi Vya Wakulima (National Network of Scall-Scale Farmers' Groups) (Tanzania), ARI:Agricultural Research Institutes (Tanzania), TFC:Tanzanian Federation of Cooperatives

order to disseminate the generated knowledge different means and communication channels will be used (MAKOKO ET AL., 2017).

Scale-N

The German Federal Ministry for Food and Agriculture has launched a program called 'Nutrition – Diversified Agriculture for a balanced nutrition in Sub-Saharan Africa' under which the 'Scale-N – Scaling Up Nutrition' project in Tanzania takes place. This project is being implemented from the end of 2015 to 2018 by three large German and Tanzanian research organizations[3] and with active involvement of the Tanzanian Ministry of Agriculture, Food Security and Cooperatives. It addresses three of the MDGs while focussing on the first one: 'Halving the percentage of people suffering from hunger'. The other addressed MDGs are to 'promote gender equality and empower women' and 'ensure environmental sustainability' (SCALE-N, 2016). The main objective of Scale-N is to improve food and nutrition security in rural Tanzania. Within this project nutritional gaps and drivers for food insecurity will be identified and analysed to develop integrated UPS along the food value chains. An especial emphasis lies on the empowerment of women and capacity building for vulnerable communities. Selected nutrition-focused innovations and UPS will be tested and, if running successfully, shall be out- and upscaled within rural Tanzania. The use of existing knowledge is of major interest and local stakeholders shall be involved in the process through participatory mechanisms from the beginning (MUTABAZI, 2016).

Interlinkages between Trans-SEC and Scale-N

Trans-SEC and Scale-N benefit strongly from each other. Scale-N can chose successfully tested UPS that are considered to be appropriate for the research focus, i.e. nutritionally promising UPS. Subsequently, these can be and implemented and tested in the new CSS. These PCSS were therefore chosen strategically to ensure their comparability with the ICSS. This is also a great achievement for Trans-SEC because successfully tested UPS are being out-scaled and further assessed. This approach enables high synergies between the two projects but at the same time also allows for independent outcomes in each project.

[3] ZALF; UHUH, SUA; FAO as advisory board

3.1.2 Implementation Process for Improved Cooking Stoves

Description of the Upscaling Strategy 'Using Improved Firewood Cooking Stoves and its Implications for Rural Livelihoods in Tanzania'

The UPS introducing ICS is one of the successfully tested strategies within Trans-SEC that is planned to be implemented within the Scale-N project as ICS target nutrition at the consumption level of the Food Value Chain. The UPS implementation in Trans-SEC was conducted via the formation of farmer groups. In the beginning, 150 HHs were selected by random sampling in each CSS, respectively. After the UPS to be implemented had been chosen, they were presented in an information session to the HH heads or representatives of the selected HHs in each village. Subsequently, the participants could choose in which group to participate. To keep the group at a functioning size, only 25 people were accepted per ICS group (KAHIMBA ET AL., 2015). After receiving trainings on how to construct an ICS and building one in their own houses the group members were supposed to offer construction of ICSs within their communities. The purchasing costs for the construction and the required materials vary between 3-5 USD, i.e. 5.000-10.000 TSH. (GRAEF ET AL., 2017). The ICS are manufactured in the village by using locally available materials as clay, iron, bricks and insulation materials as dried grasses, husks or peels. The group members were encouraged to meet regularly and prepare a group constitution to be able to register as official group, which would allow them to operate officially and manage the group income. Local stakeholders from ARI and MVIWATA were involved during the whole process by giving trainings and assistance on technical issues and group management. This also allowed for a continuous monitoring of the implementation process by ARI and MVIWATA staff on a regular basis. The design of the Trans-SEC ICS was inspired by the 'rocket Lorena mud stove' which means it has a chimney that directs the smoke to the outside, a closed combustion chamber, can be constructed with locally available materials and uses additionally also

Figure 5 Adapted ICS in Changarawe (source: author's own)

locally available insulation materials. It has been adapted to local needs over time through the active participation of the ICS group members, e.g. by lowering of height, and has been named *Salama jiko banifu* to facilitate further advertising (see figure 5). Depending on the HH needs it can be built with one or two pot holes, while most HHs chose the two-pot-hole design (UCKERT ET AL., 2016).

3.2 The Study Area

The project sites are located in Chamwino district in the semi-arid Dodoma region in central Tanzania and in Kilosa district in the sub-humid Morogoro region in east-central Tanzania. Around 70-80 percent of the existing farming system types in Tanzania are represented in those two regions which are being characterized by strongly varying levels of food (in)security. Many parts of Dodoma region are highly food insecure and malnutrition, indicated by child stunting, is a big challenge. Morogoro region is less affected than Dodoma region but also faces differing levels of food insecurity and malnutrition in some areas (GRAEF ET AL., 2017). In total, eight CSS have been selected by Trans-SEC and Scale-N, each project targeting two CSS per region. All CSS have been chosen strategically to enable comparability and facilitate further out- and upscaling of successfully tested upgrading strategies in rural Tanzania (GRAEF ET AL., 2014).

Morogoro Region – Kilosa District

Morogoro region is predominantly sub-humid with 600-800 millimeter of annual precipitation. Its landscape is characterized by flat plains, highlands and dry alluvial valleys. Kilosa district is the most populated district of the six districts within Morogoro region with an estimated 505.181 inhabitants in 2017.[4] The district spans about an area of 1.242.500 hectares with 80.150 hectares covered by forest, including parts of the Mikumi National Park. Due to the prevalence of different agro-ecological zones the climate varies considerably from the highest parts to the central and southern parts. There are two rain periods, one from October to December and one from February to May. Land is generally fertile but the fertility is continuously decreasing due to nutrient mining and low level of fertilizer use (KAHIMBA ET AL., 2015). Around 65 percent of the HHs are engaged in agriculture, mostly in subsistence crop production. The main staple

[4] Estimation according to data from 2012 Population Census (TNBS, 2016a) with 438.175 inhabitants in 2012 and an average annual growth rate of 2,4 percent.

foods are maize, sorghum, legumes and rice. The district is characterized by a high deforestation rate due to shifting cultivation (MUTABAZI, 2016). The use of modern energy sources like electricity or gas for cooking is not common in Morogoro region, especially in rural areas. Around 96 percent of the rural population use fuelwood for cooking, in Kilosa district 71,3 percent rely on firewood and 25,7 percent on charcoal. The district has a young population with around 40 percent being 15 years old or younger. The average HH size in Kilosa is 4,2 and around one third of all HHs are female headed. The adult literacy rate is 75 percent, while men are more literate than women. 62 percent of the inhabitants are living under the poverty line. Objects of value like mobile phones, radios or bicycles are owned by around half of the population in Kilosa district (TNBS, 2016a).

Dodoma Region – Chamwino District

Dodoma region has a semi-arid climate with 350-500 millimetre of annual precipitation and has flat plains and small hills. Chamwino district is one of the six districts within Dodoma region, located in the central plateau of Tanzania. The district has around 381.090 inhabitants[5] living in almost 60.000 HHs and is predominantly rural, with around 94 percent of the population living in rural areas (TNBS, 2016b). Around 50.000 HHs are working in the agricultural sector. The main food sources are sorghum and millet. Livestock is being integrated intensively in agricultural activities (MUTABAZI, 2016). There is a long dry season from late April to early December and one short wet season with unpredictable rainfall patterns from December to April. Chamwino district has a total area of 805.600 hectares. There are six forest reserves, which altogether cover around 107.720 hectares. Forest and woodland has been strongly reduced due to overgrazing, bush fires, shifting cultivation and cutting trees for energy use. The use of modern energy sources like electricity or gas for cooking is almost non-existent. More than 95 percent of the population depend on fuelwood as energy source, with exceptions for seven villages which are connected to the national grid of the Tanzania Electric Supply Company. The high use of charcoal and firewood has led to environmental degradation and forest depletion (KAHIMBA ET AL., 2015). Land availability in Dodoma is abundant with generally nutrient rich soils. However, the local soil fertility differs strongly dependent on the soil types. Chamwino district has a young population

[5] Estimation according to data from 2012 Population Census (TNBS, 2016b) with 330.543 inhabitants in 2012 and an average annual growth rate of 2,4 percent.

structure, with almost half of the population being younger than 15 years. The average HH size is 4,6 and around 32 percent of the HHs are headed by a female. The literacy rate for adult people is 63 percent in rural areas. Dodoma region is the poorest region in Tanzania, with 86 percent of its inhabitants living under the poverty line. Almost half of the children under five years (45,2 percent) are suffering from stunting which is an indicator for high food insecurity (TNBS, 2015).

3.2.1 Implementing Case Study Sites

The ICSS were selected according to four main criteria, being 1) similar climates, 2) differing market access, 3) differing rainfed cropping systems with integration of livestock, if possible and 4) village sizes of 800 to 1.500 HHs. Other influencing criteria were the number of stunted children below five years as indicator for food insecurity, availability of logistics and infrastructure, soil types and population density. Each CSS needed to have a local market place and at least three sub-villages as well as partial access to cash crop markets. Hence, the selected CSS were still comparable but represented different environmental and socioeconomic conditions (see figure 6). Furthermore, if possible the farmer association MVIWATA should already be active in the CSS and no other large research and development (R&D) projects should be currently engaged in the selected villages (GRAEF ET AL., 2014).

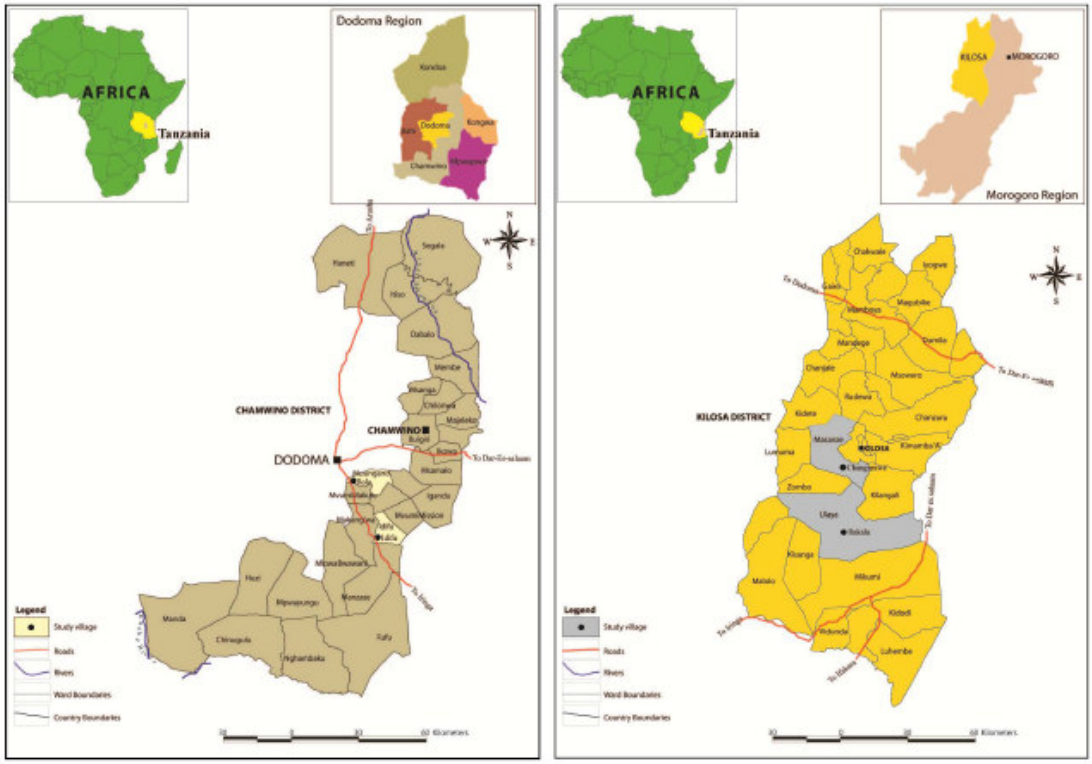


Figure 6 Implementing Case Study Sites in Dodoma and Morogoro regions (KAHIMBA ET AL., 2015)

Ilakala, Kilosa District

Ilakala is located near the main road leading from Kilosa town to Mikumi and has six sub-villages that are close to each other where a total of 4.100 inhabitants live. The infrastructure is moderate and electricity is only available for few HHs. The average HH income is relatively low and there are only a few small shops in the village (SCHULZ ET AL., 2016). Farmers are mostly engaged in subsistence farming growing mainly maize, sesame, sunflower and pigeon peas. During the rainy season two rivers are accessible to the villagers, during the dry season they do not carry water. Water can also be taken from shallow traditional wells. Ilakala has a communally managed forest which is separated into one protected part and one productive part, where it is allowed to extract fuelwood and engage in activities as bee keeping or mushroom collection (KAHIMBA ET AL., 2015).

Changarawe, Kilosa District

Changarawe is only 15 kilometres away from Kilosa town and it benefits from a good infrastructure and transportation system with roads in sound condition. The village is stretched alongside the main road leading to Kilosa town, and public transport is regularly available for its 3.000 inhabitants. There are five sub-villages that are close to the centre. The electricity supply is better than in the other CSS. Changarawe is the wealthiest of the ICSS and comparatively more people have objects of value such as TVs or mobile phones (SCHULZ ET AL., 2016). Most inhabitants are primarily engaged in farming with maize being the main staple food grown by every HH. Furthermore, many people are engaging in additional off-farm income activities and are therefore occupied throughout the year. The village gets its water from one permanent river and shallow wells. Some medium-scale commercial farmers have installed pumps for irrigation. The inhabitants get fuelwood from a nearby unreserved forest (KAHIMBA ET AL., 2015).

Ilolo, Chamwino District

Ilolo can be reached by car from Mvumi mission, the district's economic centre with a farm produce market, in about 20 minutes. The main street for local transport connecting Dodoma town with Mvumi mission passes Ilolo. Overall, infrastructure can be described as rather poor. 4.015 people live in the centre and the 12 sub-villages of which some are widely spread and quite remote. The majority of farmers engage in subsistence farming with pearl millet being the main staple crop. Due to a long dry period and only one short rainy season with unpredictable rainfall Ilolo faces regularly

food shortages. The village has a tap water system and a community water harvesting pond but is having problems with siltation. The village is surrounded by deforested hills serving as rainwater catchment. As the village lies low there is a certain risk of flash floods emerging from water runoff (KAHIMBA ET AL., 2015). For firewood collection, long walking distances to the surrounding Miombo woodlands must be managed. It takes around three and a half hours to go and return, with increasing tendency due to ongoing deforestation (HAFNER, 2016).

Idifu, Chamwino District

Idifu is half an hour's drive away from Mvumi mission. The village infrastructure is in a moderate condition. The 14 sub-villages are widely distributed and some are very remote with HHs being widely scattered. Furthermore, the central village and the other sub-villages are separated by a wetland area which is flooded during rainy season. Idifu is dry and vastly de-vegetated. Idifu has 5.086 inhabitants. As most of its area is covered by sandy soil (75 percent) the average soil fertility is low. The village is the poorest ICSS and faces severe problems with food shortages in the dry season, like Ilolo. Most people engage in small-scale subsistence farming mainly growing pearl millet, sorghum, groundnuts, sunflower and sesame. There are almost no off-farm income-generating activities which means there is no safety net in case of a bad harvest season. The community jointly operates some few deep wells with hand pumps. Additional water sources are shallow wells and rainwater (KAHIMBA ET AL., 2015). Firewood is very scarce. According to the inhabitants there are no forests but only patches of trees left. Firewood has to be collected in Miombo woodlands which takes almost five hours (HAFNER, 2016).

3.2.1 Planning Case Study Sites

The PCSS have been chosen strategically for being comparable to ICSS to facilitate outscaling (see figure 7). Furthermore, four main sets of criteria needed to be fulfilled: 1) market access and service, 2) presence of reproductive and child healthcare, 3) child healthcare and absence of big-impact nutrition and health projects including Trans-SECs impact area and 4) needs for nutrition and health intervention (MUTABAZI, 2016).

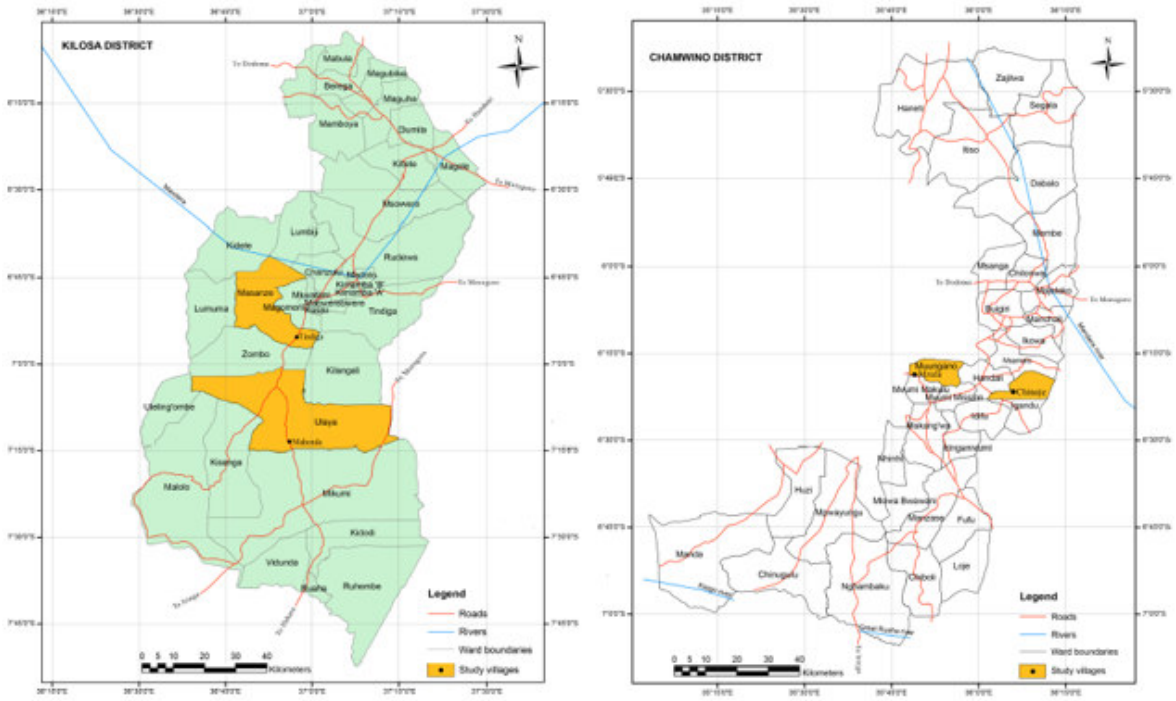


Figure 7 Planning Case Study Sites (MUTABAZI, 2016)

Mzula, Chamwino District

Mzula has been chosen as equivalent to Ilolo, due to its relatively good market access and services. It is located about 30 kilometres from Dodoma town and 10 kilometres from Mvumi mission in a wide depression surrounded by mountains which put limits to land expansion resulting in land scarcity. There are 13 sub-villages, most of them being close to the centre. The infrastructure and transport system is in a poor condition. Mzula is composed of 750 HHs. Most farmers are engaged in subsistence farming with sesame being grown by the majority which is considered to be a big contributor to accelerated deforestation because it is grown in the mountains. Mzula is the only CSS where home gardens for growing vegetables are widely spread. Nevertheless, malnutrition is a major challenge in the village. During times of food shortage, the average HH consumes only one meal per day. Three out of ten children below five years are considered to suffer from malnutrition. Water scarcity is another challenge, because people have to pay 50 TSH for a water bucket of 20 litres at the community tape water points. At additional private water sales points even more is charged. About one third of the HHs cannot afford to buy water, they rely on water from shallow wells in sand rivers which can put their health at risk (MUTABAZI, 2016). Firewood is not easily accessible either and long walks up to six hours to the Miombo woodlands are inevitable (author's own observation).

Chinoje, Chamwino District

Chinoje represents the counterpart to Idifu, due to its limitations in terms of market access and services. It is located around 60 kilometres from Dodoma town and 20 kilometres from Mvumi Mission. The village is relatively remote but still accessible and there is no electricity. In total, Chinoje has 629 HHs with an average HH size of 4,7 persons. Most of them are engaged in agriculture, with pearl millet and sorghum being the main staple foods. The average income is low and there are almost no off-farm income-generating activities. Food availability is characterized by a grace period from February to March when adults can have two meals a day and a lean period from June to February when adults only have one meal a day and children one to two meals. Water scarcity is even more critical than in Mzula. There is one deep well, with buckets of 20 litres of water being sold for 150 TSH. Only around 30 percent of Chinoje's population can afford to pay this price, the majority has to collect water from nearby sand rivers and faces the risk of diseases like dysentery (MUTABAZI, 2016). As there are no forests nearby, firewood collectors have to walk to the surrounding mountains what can take up to five hours (author's own observation).

Tindiga, Kilosa District

Tindiga has been selected as equivalent to Changarawe due to its good market access and services and relatively good production potential. It is located around 12 kilometres from Kilosa town and benefits from a good infrastructure. Tindiga lies within a mango forest, it has fertile plains and a perennial river which flows through the village. All 1.000 HHs are engaged in subsistence farming and some HHs are also producing for sale. The main staple crops are maize and rice, there are even some large-scale rice producers. Many farmers engage in irrigated vegetable production or off-farm season activities. The village can be described as relatively wealthy and benefits from good market integration and regular visits from traders. Electrical power supply is existing and the inhabitants have access to various water sources. There are three deep wells for drinking water and two rivers for washing (MUTABAZI, 2016). Firewood has become scarce in the recent past and collection takes around three to four hours (author's own observation).

Muhenda-Kitunduweta, Kilosa District

The fourth PCSS has been selected for being comparable to Ilakala. This PCSS is composed of two villages, Muhenda and Kitunduweta, which have been one village

until 2015. Muhenda was first chosen but due to its small size of 344 HHs it was decided to include Kitunduweta and treat them as one CSS, resulting in a total amount of 821 HHs. Kitunduweta is still relying on Muhenda's administration and they share one extension agent. The villages are located around 45 kilometres from Kilosa town and can be reached by passing Ilakala and following the road for ten more minutes by car. The sub-villages are very scattered, the farthest one being Majibira on a one hour walking distance from the centre. The road to Muhenda-Kitunduweta is passable throughout the year and the infrastructure is in a good state. Compared with Tindiga it has relatively limited market access and a lower production potential but some HHs also engage in vegetable production and selling. Most of the population is working in agriculture and grows maize as staple crop. In case of bad harvest seasons, food security is strengthened by importing maize. 15 water pumps have been built in the villages under the Tanzania Social Action Fund (TASAF), but around ten of them have broken (MUTABAZI, 2016). Compared to the other PCSS Muhenda-Kitunduweta has relatively good access to firewood. One walk takes around one to two hours, but availability is decreasing since the recent past (author's own observation).

4 Methodology

In this chapter the analytical framework, the research design and approach as well as the qualitative and quantitative research methods used for data acquisition and analysis will be presented.

4.1 Analytical Framework and Research Approach

4.1.1 Development of the Analytical Framework

Based on the theoretical background discussed in chapter two and the analysis of ICS literature the analytical framework for this thesis has been developed applying an inductive and deductive research approach. The application of both inductive and deductive methods can be described as a cycle in which general theories are generated in the beginning of the research and are then being checked against observations and findings from in-depth analysis which are subsequently used to adjust the theoretical framework (DIEKMANN, 2007). The combination of qualitative and quantitative methods allows for a triangulation of the collected data and therefore an assessment of the essential factors for ICS adoption from different angles. Triangulation is especially

beneficial if data is not purely meant to be collected and validated but if the researcher seeks to gain profound understanding of the subject (OLSEN, 2004). The qualitative methods used a review of primary and secondary literature on ICS, the diffusion and dissemination theory, as well as the conduction of FGDs and interviews. Quantitative data was derived from a rating of the essential factors for ICS adoption and subsequently, the statistical analysis of the rating results with Stata.

Following the described approach, the analytical framework was developed. ICS adoption and sustained use is considered to be the dependent variable that is being influenced by independent variables. After attentive consideration of the consulted literature of diffusion theory and its implications for ICS, a number of essential factors for ICS adoption and diffusion were identified which were then checked again the findings from the fieldwork and adjusted accordingly. The final analytical framework comprises of four categories, namely 1) biophysical factors, 2) operational factors, 3) socioeconomic factors and 4) perceived ICS attributes (see figure 8). The categories have been developed by combining elements from ROGERS (2003) theory on diffusion of innovations, the SLA framework and the identification of important elements for implementation and outscaling from the assessment of dissemination and upscaling literature. The two categories biophysical and socioeconomic factors are comprised of the SLA capitals of livelihood and include natural and physical capitals as well as social, human and economic capital, respectively (MORSE AND MCNAMARA, 2013). Firstly, *biophysical factors* such as the access to and availability of firewood and construction materials, as well as the presence and condition of infrastructure and the impact of climate conditions are assessed. Secondly, the implementation and dissemination process is analysed in the *operational factors* category. Operational factors relate to the way an innovation is introduced and spread within a community, with an emphasis on the involvement and the selection of appropriate change agents, the provision of trainings, local capacity building, group management, presence of other projects and potential outscaling approaches (DEARING, 2009; MENTER ET AL., 2004; PACHICO ET AL., 2004). Thirdly, *socioeconomic characteristics* as the gender of the decision-maker, prevalent cooking habits and routines, income and off-farm season activities as well knowledge-sharing and communication will be examined. Fourthly, *perceived ICS attributes* (ROGERS, 2003) from an adopter view are assumed to have a significant influence on the decision to adopt an ICS. The three mentioned factor categories influence how these attributes (relative advantage, compatibility, complexity,

trialability, observability) are being perceived in comparison to the traditional stoves. Referring to ROGERS (2003) identified five stages in the *innovation-decision process* (see figure 2), socioeconomic, biophysical and operational factors play a more important role in the knowledge stage, while the perceived attributes are decisive for the second stage, persuasion, before the decision to adopt or reject takes place. The influence of the mentioned factors on the decision to adopt or reject an ICS will be assessed as well as potential outscaling possibilities to evaluate the potential for further dissemination.

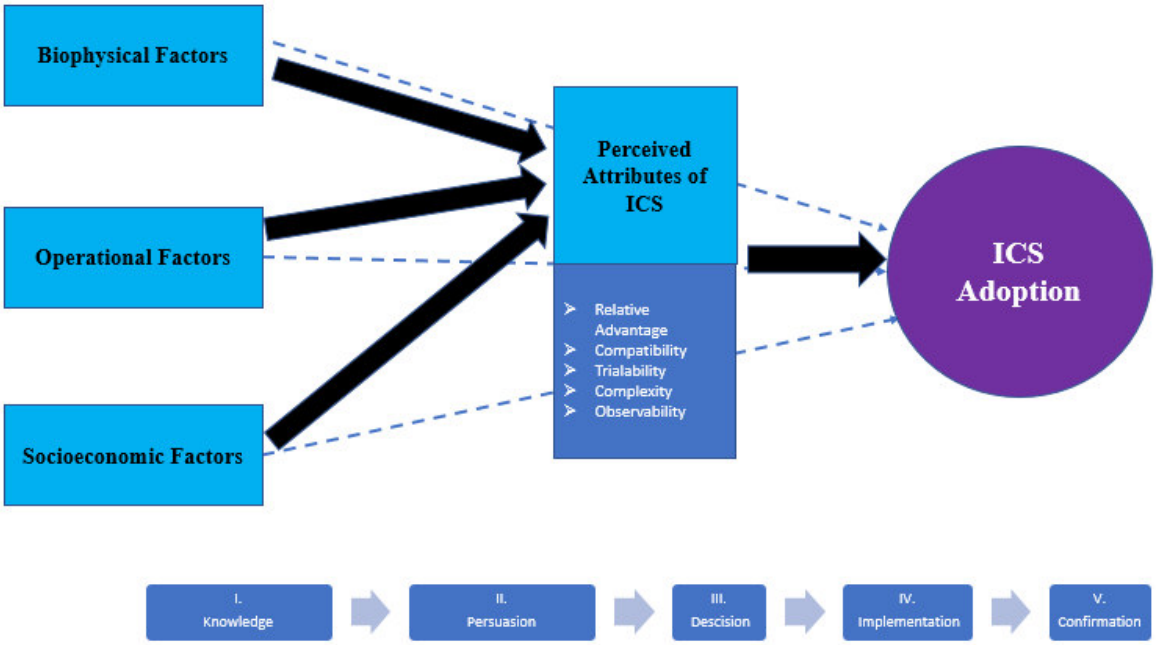


Figure 8 Analytical Framework developed by author based on ROGERS (2003) and DFID SLA assets (1999)

4.1.2 Field Work Procedure

The field work for this thesis was conducted in Tanzania from September 10th to November 18th, 2016. During this time, all eight CSS in Morogoro and Dodoma regions were visited at least once to conduct FGDs, ratings and interviews (appendix 2 and 3). Meetings were arranged in Dodoma town and Morogoro town in order to visit involved partner institutions as SUA, ARI Hombolo/Makutupora, ARI Ilonga and MVIWATA and to perform expert interviews with key informants. The research was realized in collaboration with another student, Antje Räuscher, who was studying adoption and diffusion of kitchen gardens in the same CSS. While the FGDs and ratings were done separately and with different participants, the interviews were mostly carried out together. This was mainly due to time efficiency and moreover, some of the discussed topics were overlapping, e.g. operational factors when interviewing key informants and

general challenges when consulting village leaders or extension agents in the CSS. In the fieldwork and for data analysis, different types of stakeholder groups were distinguished (see table 3):

Table 3 Types of stakeholder groups in fieldwork

Members	Official members of ICS groups in ICSS who have constructed an ICS at their homes
Adopters	Individuals who have adopted the ICS after the stoves had been implemented at the group members houses in ICSS
Potential Adopters	Individuals in PCSS who in most cases had not yet learned about the new device
Key Informants	Project staff involved in ICS implementation in ICSS and PCSS
Village leaders	Village executive officers, village chairpersons, etc. in PCSS

In total 24 FGDs and ratings have been conducted in eight CSS with a total of 202 participants. In each ICSS two FGDs and ratings with members and adopters were organized. In each PCSS two FGDs and ratings with potential adopters were conducted. Interviews were being performed with extension officers in all ICSS and in one PCSS (Muhenda), with 11 village leaders in the PCSS and one community member in Mzula. In the ICSS eight interviews with members or adopters took place. Moreover, interviews were also conducted with 11 key informants from SUA, ARI and MVIWATA. A detailed overview is being shown by figure 8.

CSS	Participants FGDs and ratings		Interviews					
	Members	Adopters	Members/ Adopters	Extension Officers	Village Leaders	ARI	MVIWATA	SUA
Ilakala	15	10	2	1		6	3	2
Changarawe	13	7	3	1				
Idifu	22	18	2	1				
Ilolo	17	17	1	1				
Total ICSS	**67**	**52**	**8**	**4**				
Tindiga	19				3			
Muhenda-Kitunduweta	20			1	4			
Mzula	21		1		1			
Chinoje	23				3			
Total PCSS	**83**		**1**	**1**	**11**			

Figure 9 Overview Conducted Focus Group Discussions, Ratings and Interviews during Fieldwork

The following subsections explain the chosen research design, the structure and main elements of the FGDs and interviews as well as the corresponding data collection, data analysis and the management of quality criteria in the course of this research.

4.2 Qualitative Research

Qualitative data was initially collected before the field work by means of attentive literature review (see chapter 2). During the field work FGDs and interviews were conducted to collect detailed information on the previously identified essential factors for ICS adoption and to cross-validate and adjust the acquired knowledge.

4.2.1 Focus Group Discussions

Qualitative data was acquired by means of FGDs in all CSS. This method was chosen for several reasons. It is a manner of group interview and corresponds to the approach of action research by giving everyone the possibility to participate actively and contribute own knowledge. The input of these discussions is meant to improve services and adjust implementation techniques, if necessary. Other benefits of FGDs are that this method allows to collect a large amount of data within limited time and to assess the opinions and information of a high number of participants. Secondly, in FGDs the challenge of illiteracy can be avoided as individuals who are unable to read or write have the same chance to participate, e.g. compared with a survey. Furthermore, persons who might be reluctant to being personally interviewed have the chance to state their opinions within the security of the social group (KITZINGER, 1995).

Selection of participants

In order to ensure productive discussions, the target group size was ten participants, since very small groups might lead to low involvement and therefore reduced information. On the other hand, very large groups might get impossible to manage (MORGAN, 1997). Due to challenges in communication and availability of participants the actual group size varied between four and 12 persons. In the ICSS, the selection of participants was facilitated by the extension officers. This was necessary because HHs are often scattered across long distances and are not easy to reach as only few of them possess cellphones. Participants for the group member discussions were selected from the existing ICS groups while trying to make sure that one group would not include any group leaders to facilitate a more open communication (ibid.). Yet again, in some cases group leaders were present due to miscommunication with the extension agent. The participants for the adopter discussions were chosen via random sampling from the official list of adopters provided by the extension officer. As the topics of the discussions targeted daily life challenges (cooking, collection of firewood) and did not touch any sensitive issues it was assumed that participants of different ages and sexes

would be able to contribute and feel free to talk to each other. In the PCSS the selection of participants was based on carefully assessing the list of HHs provided by Scale-N. It was planned to form two distinctive groups per CSS, one with women only and one with male and female HH heads and to get relatively mixed groups regarding age and HH size. The segmentation was applied to gain insights whether the manner of discussion would be different from those mostly involved in cooking and firewood collection (female group) and the (financial) decision-makers of a HH (mixed group).

Translation

The inclusion of a translator was necessary, as only very few people in the CSS speak English. In Morogoro Region the discussions were held in Swahili, in Dodoma region some of the participants only spoke the regional dialect Gogo. The Tanzanian translator, Nicky Laizer, spoke Swahili fluently and Gogo at a good level. Therefore, he contributed significantly to the successful realization of the FGDs. As he had already been working with various researchers within the framework of the Trans-SEC project, he already had a broad knowledge of the issues to be discussed. Moreover, he had also been working with some of the groups before. Before the first FGD, the topics of interest and main questions were reviewed in detail to make sure that the translator and the researcher had a common understanding of the goals and relevant information to be acquired in the discussions.

Focus Group Discussion Process

The FGDs started with a brief introduction of the researcher herself in Swahili, followed by the introduction of the topic of the session, the procedure, the time frame and the discussion rules by the translator. The respect of privacy is especially relevant when FGDs are being audio-taped (MORGAN, 1997). In the beginning, the participants were asked to give their consent to audio-tape the session and it was clearly communicated that all data would be anonymized afterwards. The FGDs took place in diverse locations depending on the available resources within the CSS. Due to non-availability of any buildings, some sessions had to be conducted outdoors which was in some cases challenging because of noise and heat. Nevertheless, it was ensured that the atmosphere was friendly and welcoming (KITZINGER, 1995). Water and cookies for the participants were provided and each one received a compensation of 3.000 TSH which was paid afterwards by the extension agent. The discussions lasted around one to two hours. Only in one PCSS (Tindiga) the time over-exceeded three hours due to serious

communication challenges within the group. After the discussion was finished participants had the chance to ask questions or provide feedback before the second part started, the rating of essential factors for ICS adoption.

Focus group structure and discussion guide

Some basic rules for the procedure of FGDs as suggested by MORGAN (1997) were followed. As the goal of the field work was to collect comparable data for all CSS a structured approach was chosen to ensure that all groups discussed the same main topics in a comparable manner. This also implied a relatively high moderator involvement. Main categories were identified and for each category a set of mandatory questions and a selection of possible questions were developed. While making sure that each category was discussed adequately, within the categories a less structured approach was followed. Participants decided in which sub-parts to engage more than in others and hence, questions in response to the discussion were adjusted or dropped.

In the ICSS, four main categories were identified by targeting the groups of essential factors (see figure 8). In the first section, participants were asked to talk about perceived benefits and flaws of the ICS and if they were using other stove types and if so, state the reasons for doing so. Group members were encouraged to mention their motivations for joining the ICS group. In the subsequent part, the current group activities and their experiences were discussed. Participants were asked to give their opinion on the trainings being provided by Trans-SEC and identify hindering factors for participation, if existing. The involvement of project staff was debated and furthermore, how the participants had gained first knowledge about the ICS and how they assessed different outscaling possibilities. In the third section, the form of knowledge-sharing within the community and within the group was discussed. Participants should also value if certain socioeconomic characteristics as gender, age, income or education are influential for the decision to adopt an ICS. Moreover, they were asked for their opinions on why some members in the community might be reluctant to adopt ICS. In the last section, the conditions regarding infrastructure and the transport possibilities as well as challenges of the natural environment were addressed. For the adopters, the same procedure was applied, by adjusting the part of operational factors. In this part, their interest in taking part in any group-related activities was meant to be reviewed. Furthermore, the contact with project staff and the appropriateness of the ICS construction price were subject to discussion. In the PCSS, the FGDs started with a discussion on current cooking tools in

use, concerning what benefits or flaws the participants perceived as well as desirable changes. As most of them used firewood for cooking, their access to it was debated subsequently, followed by the challenges of the biophysical environment. Thereafter, the researcher introduced the participants to the concept of ICS by showing pictures and explaining briefly the main characteristics and benefits. The participants had some time to have a closer look at the pictures and assess the idea before they were asked if they would like to get an ICS. If so, they should state the most important benefits to each of them individually.

Figure 10 Introduction of ICS to FGD Participants in Kitunduweta (source: author's own)

The next part included questions on their interest in receiving trainings on different topics and group formation. Their time schedules regarding daily work and farming seasons were assessed to optimize logistics. In the last part, the community attitude and knowledge-sharing was discussed as well as their perception of socioeconomic characteristics. The corresponding FGD guides can be found in appendices 4 and 5.

Observations

The FGDs have been supplemented by another explorative technique, which is observations made by the researcher. Observations can have an important contribution to deductive research as they can serve as important indicator if they back up or contradict statements made in interviews or FGDs (DIEKMANN, 2007). Observations are especially relevant when assessing social interactions between individuals or within a group and for noticing characteristics related to social status as the condition of

clothing, jewelry, health status or technical devises. There are two kinds of observation, participatory and non-participatory ones. While the first one implies an active involvement of the researcher, the second one requires a mere observing status. The observer has a passive role and stays in the background. Of course, the analysis has to consider intercultural or unfamiliar situations that might cause false interpretations in the first instance but can be understood in the context of the cultural background. Local translators can support interpreting these situations. Observations are also cross-validated with findings from the other empirical methods to ensure scientifically reliable results (DIEKMANN, 2007).

4.2.2 Semi-structured and Unstructured Interviews

There are three types of interviews serving different research designs, namely structured interviews, semi-structured interviews and unstructured interviews (MIKKELSEN, 2005). Depending on the type of interview the questions being asked can vary from standardized open ended to fully open interviews. For the research purpose of this thesis semi-structured interviews as well as unstructured interviews were chosen. Semi-structured interviews allow for spontaneous questions in reaction to answers that might be given by the interviewed individual (WENGRAF, 2001). Some of the questions are pre-determined because they need to be answered. Others can be dropped and many questions are expressed spontaneously during the interviews according to topics of interest regarding the respondent. This approach also allows a less structured but therefore more personal way of communication (BERG AND LUNE, 2012). A questionnaire for the expert interviews with key informants was developed based on the review of secondary literature and the identification of essential factors for ICS adoption. One main draft questionnaire was prepared for all expert interviews, but depending on the respective interviewee not all questions needed to be discussed.

The interviews started with questions on operational factors where the respondent was asked to briefly introduce him- or herself and name the institution they were working for. In the next part, operational factors of the implementation and outscaling activities were discussed with an emphasis on trainings and communication with the target group. In the third section, the perceptions of socioeconomic factors for ICS adoption were discussed, followed by the biophysical factors (see appendix 6: interview guide key informants). Altogether 12 semi-structured interviews were conducted with 15 key

informants from SUA, ARI, MVIWATA and extension agents who are involved in different stages at the implementation process of ICS in the ICSS. The semi-structured interviews with village leaders in the PCSS covered some main focal points as the specific challenges they see for their CSS. Moreover, they were asked how they perceived the potential for ICS implementation within their community and village taking into account socioeconomic and biophysical factors (see appendix 7: interview guide village leaders PCSS). The unstructured interviews with members and adopters in the ICSS started by addressing interesting insights or questions derived from the FGDs but remained flexible towards the course of the conversation. The time frame varied between 30 minutes and maximum two hours. Only for some interviews a translator was necessary. Nevertheless, in many interviews the translator was present to facilitate a better understanding, if necessary.

4.2.3 Qualitative Data Analysis

It was decided to not transcript the FGDs and interviews word for word but rather note as much as could be captured during the conversations without interrupting the interview flow or drawing too much attention from the discussion. All sessions were audio-taped and could be re-listened to which allowed for transcript completion subsequently. Observations were noted within the transcripts and highlighted accordingly. As most of the expert interviews were conducted together with another researcher and therefore entailed a share of questions only related to kitchen gardens, these parts have been cleaned from the attached files for better readability. The original names of the interviewees and have been replaced with generalized indications. The complete transcriptions of the FGDs and interviews can be found in the appendices 11 and 12.

For the analysis of the qualitative data derived from interviews and FGDs the coding software MAXqda was used. MAXqda enables the creation and application of a self-created code system which allows for a systematical analysis of textual information (GODAU ET AL., 2004). The theoretical concept of template analysis (BROOKS AND KING, 2014) was applied which is useful to analyze qualitative data with a self-created template of codes. Hence, these codes were developed and used with MAXqda based on the identified essential factors from the literature review and adjusted with findings from the field work during the whole analyzation process whenever necessary (appendix 8: final coding overview MaxQDA).

4.3 Quantitative Research

Besides qualitative data, also quantitative data was derived from the participants of the FGDs. The rating of essential factors for ICS adoption allowed for a quantification of these factors and the validation of differences between the samples. In the following subsections, the applied rating procedure and the statistical analysis of the results are presented.

4.3.1 Rating Procedure

After a 15 minutes break at the end of the discussion, the participants of the FGDs were asked to rate either the importance of several factors or their agreement on a statement. The measurement scale of the ratings was a bipolar five-category Likert scale (see table 4), which is a common type of measurement used in survey research (WILLITS ET AL., 2016).

Table 4 Applied Likert scale during rating procedure

1	2	3	4	5
Not important at all	Less important	Neither important nor not important	Important	Very important
I do not agree at all	I do not agree	I neither agree nor disagree	I agree	I strongly agree

The questions for the rating had been drafted based on the literature review prior to the fieldwork and targeted the evaluation of the identified essential factors for ICS adoption and diffusion. During the first FGDs, the rating templates were adjusted and completed with the input of the participants. Therefore, it was necessary to repeat a part of the rating with those first groups at a later date. This was considered to be a better approach than excluding insights from the FGDs in the rating and only use the pre-defined questions derived from the consulted literature. There were two types of rating templates, one for each members and adopters in the ICSS and one for potential adopters in the PCSS. A certain set of questions was asked to all groups but some specific questions were developed for the different types as well (see appendices 9 and 10). In the ICSS altogether 17 questions with a total of 48 factors and in the PCSS 16 questions including 49 factors to be rated were created. Group members, adopters and potential adopters where mainly asked the same or comparable questions, because the objective of the rating was to examine differences between the resulting data samples like the projects, the regions, the CSS, the stakeholder groups or gender.

Figure 11 Female Adopters during the Rating in Ilolo (source: author's own)

To outline their answers, the participants were asked to close their eyes after hearing the question and then show the respective number with their fingers. This method was chosen for two reasons: closing the eyes while voting should assure anonymity and prevent people from being influenced by the numbers that other people would show (especially opinion leaders or authority figures as group leaders). All participants voting at the same time allowed for a quick procedure and keeping the timeframe within a reasonable length. It also ensured that illiterate people were not excluded. The translator explained the method in detail before starting and made sure that everyone had understood the procedure by asking some simple example questions. After each question, the results were directly copied into a prepared excel-sheet. An additional benefit of conducting the ratings was that statements from the FGDs could be cross-checked and if contradicting, were discussed again. In some cases, this allowed for new insights.

4.3.2 Quantitative Data Analysis

The collected data from all ratings were combined into one digital template before further data procession took place. The process included consolidating all data sets of ICSS and PCSS, cleaning the data, coding the questions and creating dummy and grouping variables to enable the statistical analysis and subsequent comparison of results with the statistical software 'Stata'.

Table 5 Overview of groups to be compared

CRITERIA	GROUP 1	GROUP 2
DISTRICT	Kilosa	Chamwino
PROJECT	ICSS	PCSS
KILOSA ICSS	Ilakala	Changarawe
CHAMWINO ICSS	Idifu	Ilolo
KILOSA PCSS	Tindiga	Muhenda-Kitunduweta
CHAMWINO PCSS	Mzula	Chinoje
GROUP CATEGORY ICSS	Group Members	Adopters
GENDER	Female	Male

The objective of the statistical analysis was to compare the rating results and assess whether there had been significant differences in the responses between the projects, the regions, the CSS within the regions and between men and women (see table 5). The corresponding null hypothesis stated, that there was no systematic correlation between the groups of respondents, implicating that there were no differences between the groups with respect to their calculated mean values on the response variables (LEHMAN, 2005).

A Likert scale is characterized by ordinally scaled data (i.e. ranks) as the differences in scale levels do not equal quantitative differences. Additionally, it fails to meet the statistical assumptions of normal distribution due to small sample sizes and homoscedasticity because the variances are heterogenous. Therefore, Likert-scaled data cannot be analyzed with a standard parametric statistical tool like the t-test (WILLITS ET AL., 2016). To analyze ordinally scaled variables dealing with ranks, the Mann-Whitney U test (M-W U test) represents an appropriate non-parametric equivalent to the t test. Non-parametric test methods have lower requirements regarding the distribution of the measured values within the statistical populations. The M-W U test is also called the "two-sample Wilcoxon rank-sum" test indicating its ability to work with rank scales when comparing two samples. It is a test for independent samples that checks if central tendencies of the independent samples are different. This test has several advantages as it only has very few constraints for being applicable, it can be used for small samples and is less at risk to give wrongfully significant results in case some extreme values are included in the sample, compared to the t-test (NACHAR, 2008).

For the corresponding analysis of derived data, the statistical software tool 'Stata' was used. The calculated *p* value indicated whether the null hypothesis could be rejected, i.e. whether there were statistically significant differences between the groups of respondents. Values equal or smaller than the threshold value of p=0.05 were considered as statistically significant which would mean that the null hypothesis would be rejected. A *p* value of 0.05 indicates a level of significance of five percent, meaning there is only a five percent possibility that the null hypothesis is wrongfully rejected. The lower the value of *p* is, the higher is the level of significance (LEHMAN, 2005). If significant, the results were marked accordingly in the comparison tables (see table 6).

Table 6 Marking of p value in data sets

p value	Level of significance	Marking
0.05	5 percent	*
0.01	1 percent	**
0.001	0,1 percent	***

The following chapters present the results derived from the analysis of the conducted FGDs, interviews and ratings during the fieldwork. In chapter 5, identified essential factors which influenced ICS adoption in the ICSS are described in detail. Subsequently, the situation in the PCSS regarding those essential factors will be examined in chapter 6.

5 Results Implementing Case Study Sites

The ICS adoption rates varied strongly within the four ICSS whereby the number of adopters in Chamwino region were higher than in Kilosa region. Ilakala had the lowest number of adopters (30) while in Changarawe 47 new stoves had been constructed. In Ilolo 60 stoves were adopted and Idifu had by far the highest adoption rate with more than 100 newly constructed stoves. These differing adoption rates resulted from the prevalence of several factors that influenced the adoption and diffusion of ICS. In the following sub-sections, the essential factors identified from the fieldwork associated with the adoption rates will be presented. They are organized in the four categories biophysical factors, operational factor, socioeconomic factors and perceived ICS attributes. The results from the ratings, which are a substantial part of this chapter, can be found in appendix 1.

5.1 Biophysical Factors

The analysis of biophysical factors identified four distinctive factors influencing the adoption rate for ICS. The access to firewood and the condition of infrastructure were found to be negatively associated with ICS adoption. Access to construction materials was positively associated. Climate effects were found to have an impact on firewood collection patterns and pose an additional constraint to the success of ICS through floods.

5.1.1 Access to Firewood

One of the first and most mentioned benefits of the *Salama jiko banifu* during the FGDs was the reduction of firewood consumption which was also the highest rated benefit in all CSS. Group members and adopters confirmed that the ICS adoption had changed their collection patterns for firewood and that they had to go collect less often. Especially in Chamwino district, which is characterized by serious constraints regarding access to firewood, ICS adoption rates were high. According to Ilolo group members, even the trees at the far-distanced Miombo mountains where they collect firewood are becoming increasingly scarce. In both villages, Ifidu and Ilolo, participants of the FGDs stated that the long walking distances were a major constraint and therefore a high incentive for adopting the ICS. While low availability of firewood can foster the diffusion of ICS, high availability can also display a hindering factor as can be seen by the low adoption rates in Kilosa district, especially in Changarawe. This point was

stressed by the extension officer of Changarawe as well as by the ARI key informant involved in the implementation process, who both claimed that people in Changarawe were more careless with the use of firewood due to abundancy and proximity of firewood resources.

5.1.2 Infrastructure

The collection of firewood is not only challenging due to the long walking distances and related time losses but is also affected by the condition of infrastructure and the surrounding environment. In Chamwino, there are almost no supporting roads and most of the distance has to be walked over rough areas or paths crossing vegetation. Walking over hilly or slippery surfaces is physically more demanding and can also be dangerous. Idifu people have to cross the dried water streams which are sandy surfaces during dry season. Many participants of the FGDs mentioned the risk of getting hurt by slipping or falling, especially when carrying heavy loads, and also pointed out the danger of being bitten or stung by animals like snakes or insects. For those using bikes, the transportation is also challenging, because it is difficult to move the bike through hilly or sandy areas and protect it from damage by plant thorns when crossing vegetation. In Ilakala group members stated the infrastructure did not pose a challenge to them when collecting firewood during dry season. Many of the participants had bikes which they used for firewood collection. In Changarawe, the assessment varied strongly. Some people said the infrastructure was not problematic and firewood easily accessible, which might be related to the possibility of purchasing fuelwood from sellers. This is done by many people in Changarawe, who consequently are not dependent on supporting infrastructure for the collection of firewood. Other participants identified the situation to be challenging:

> „There is not even roads for collecting firewood, only paths. Paths have to be made, […] problems with thorns which can hurt people or cause damage on bikes, and insects.“ *[female adopter Changarawe, FGD#7]*

Charcoal stoves as an alternative to the ICS only seem to play a considerable role in Changarawe, where multiple participants stated they had a charcoal stove and were using it frequently. The good connection to Kilosa town is an advantage as traders come regularly. In Ilakala only few people possessed a charcoal stove. Moreover, adopters stated that charcoal is either to be purchased legally at a very high price or illegally from vendors without official license, i.e. people that extract from the woods for commercial

purposes without having an official permission. In Chamwino district, charcoal stoves are owned by very few people and cannot serve as alternative to the ICS.

Within the regions, the rating confirmed significant differences between the villages. Ilakala and Idifu both rated the importance of supporting infrastructure much higher than Changarawe and Ilolo. It is noticeable that Ilolo rated it comparably low despite its access to firewood being so limited and contradicting the statements during the FGDs that the collection was challenging due to infrastructure.

5.1.3 Climate

In rainy season, it is difficult to collect firewood, especially in Chamwino district. Nevertheless, the coping mechanisms vary between the villages and regions. In Chamwino district, people collected more firewood during the dry season and stored it at their houses. In Kilosa district, some people did the same but others collected wet wood and used it nevertheless. In Ilakala some people mentioned it was not possible to collect firewood during rainy season because they would have to use boats. Others said they could collect and used the wet firewood. The access to dry wood in rainy season also posed a challenge to Changarawe participants. Group members mostly stated they would just use the charcoal stove instead, while adopters said they were using wet wood and letting it dry in the fire.

In Kilosa district, floods happen irregularly and destroyed most of the previously constructed ICS in Changarawe in the beginning of 2016. Changarawe adopters estimated to have floods around every three to five years in their village. If high rainfall leads to the flooding of kitchens, the ICS is destroyed because it is made out of claysoil. This has been a challenge to ICS adoption because after the flood people faced economic challenges and were not interested in acquiring new devices at the time. Those who already had an ICS before were reluctant to pay for the construction of a new one.

5.1.4 Access to Construction Materials

To construct an ICS several materials are required: for the construction of bricks people need claysoil and water. The chimney was initially shaped with polyvinyl chloride (PVC) pipes, but banana stems or similar items can also be used. Depending on the location, dried grass, maize dust or groundnut peels serve as insulation materials.

At the start of the project, initial inputs were provided to the new groups, e.g. a certain amount of PVC pipes and bricks. Ilakala members did not see any challenges in getting those materials. They stated that in dry season access to water could be difficult and therefore hinder the preparation of bricks, but that they also could buy them at nearby shops. In Changarawe, people said it is not possible to make bricks on their own because it is a very time-consuming burning process but that instead they could buy the bricks from the brick stations. Idifu members explained that after all PVC pipes provided had been used, the group started to use wood as a replacement and found it to be a good alternative offering a permanent solution instead of using pipes. Banana stems seemed to be an adequate alternative to them as well, but the access to banana stems in Chamwino villages is highly limited. Adopters in Idifu identified the access to bricks as challenging because they were not commonly used in the village and were therefore hard to find. Though, the extension officer of Idifu contradicted them by stating bricks were not really a challenge because everyone could make them on their own. One interviewed adopter also said he had no problems with making the bricks by himself. Although Ilolo members still had some of the PVC pipes left, they were already planning for the time afterwards saying they would use whatever is available, like tree stems or pals.

5.2 Operational Factors

The way how the ICS were implemented in the ICSS had a strong impact on the further diffusion and outscaling. The most important factors identified in the FGDs and ratings were the involvement of the project staff, the provided trainings, local capacity building through the formation of income-generating groups and the corresponding group dynamics, the presence of other projects and (potential) outscaling approaches.

5.2.1 Involvement of Project Staff

The project employed change agents from ARI and MVIWATA as well as extension agents within each CSS who were highly involved in the implementation process. ARI and MVIWATA staff members provided trainings for the group members on technical implementation as well as group management. They were also performing monitoring tasks via individual and group data collection. ARI researchers visited the HHs with ICS frequently to check their stoves and provide advise if required. Every three months a

more detailed monitoring and evaluation procedure addressed the progress of adoption and of the groups, e.g. by assessing the number of new adopters or drop outs.

In Ilakala and Changarawe the project employed its own extension agents, in Idifu and Ilolo they were partially employed by the government and partially by the project. The extension officers in Kilosa district were strongly involved in the ICS implementation process. They visited the HHs with ICS regularly, provided assistance and facilitated organization of project activities for other key informants and researchers. In Chamwino district, the extension officers seemed to be less involved in the ICS implementation process, while being stronger involved in other UPS groups. Participants in Idifu said the contact to the extension agent was rather limited, while in Ilolo he was sometimes helping with technical issues.

In Kilosa district, stakeholders from ARI Ilonga and MVIWATA were cooperating closely in all their activities and engaged jointly in the monitoring of group management and technical issues. According to the interviewed key informants this strengthened their authority and facilitated the work with the group members because they acted unitedly and assisted each other with their respective tasks. ARI and MVIWATA staff in Kilosa district were also in close contact with the extension agents in Ilkala and Changaraw. In Chamwino district, there was much less cooperation between ARI Makutupora and MVIWATA. On the one hand, this might be connected to the distance between Mvumi mission where the MVIWATA researcher was located and Dodoma town where the ARI researchers were staying. On the other hand, key informants on both sides stated they saw more differences than overlapping between their tasks of technical guidance and group management. Nevertheless, they expressed the wish for a closer cooperation in future.

The ratings reflected the impressions gained through the FGDs and interviews. There were significant differences in the importance attributed to the extension officers within the regions. While overall Kilosa participants rated the importance of their extension officers very highly, in Chamwino district the result was much lower, especially for adopters. Ilakala rated higher than Changarawe but the difference was not found to be significant. However, in Chamwino, there were much stronger differences between group members and adopters than between the overall means of the villages. Group members in Idifu rated the importance of the extension officer significantly higher than

group members in Ilolo. However, adopters in Ilolo rated him to be very important significantly differing in their answer from adopters in Idifu, who rated it very low.

5.2.2 Trainings

The project provided a number of trainings on technical topics and group management to the ICS group members as well as trainings on entrepreneurship and firewood management (see table 8).

Table 7 Overview Trainings Implementing Case Study Sites

Group Trainings	Group Management	How to create and manage a group, election of group leaders, write constitution, manage group income
	Leadership Training	Qualities of a chairperson, treasurer, secretary
Technical Trainings	ICS construction	
	Guided Learning Session	Self-construction of ICS
Economic Trainings	Entrepreneurship	
Firewood Management		

Figure 12 shows the ranking of the rating results on the importance of all trainings by group members in the four ICSS. The technical training was rated as most important in all CSS with Ilakala and Ilolo members unanimously voting 5 and Idifu and Changarawe also showing a high mean average of 4,96 and 4,92 respectively.

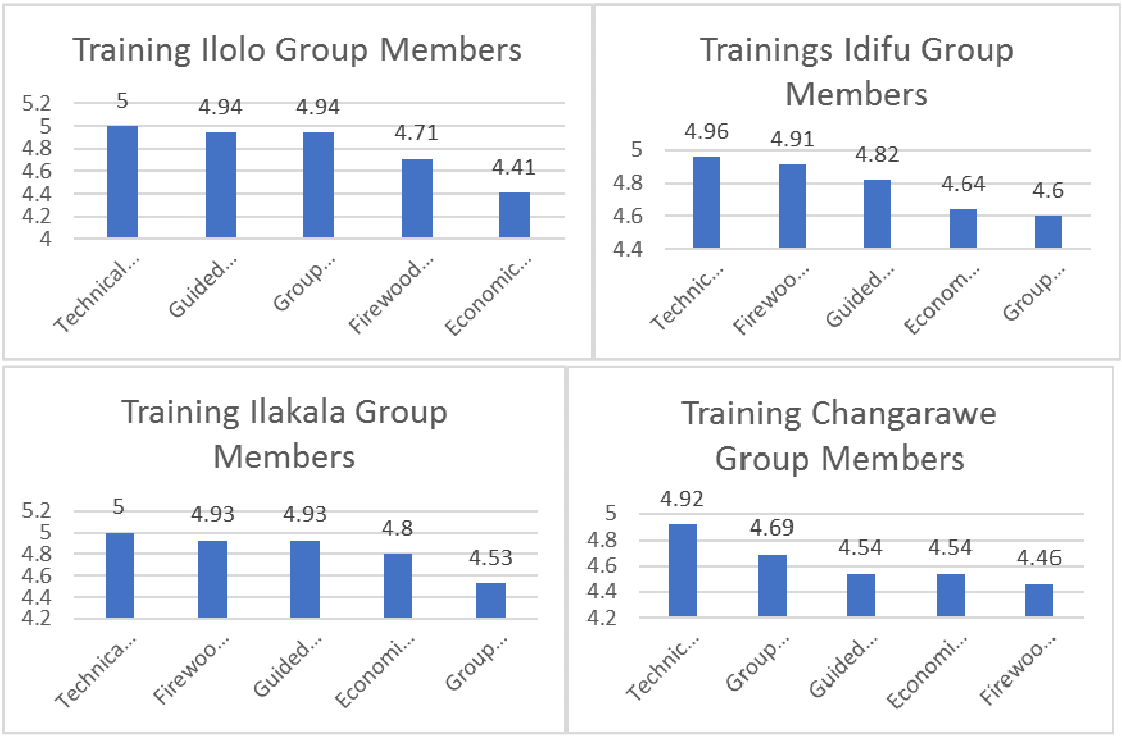


Figure 12 Ranking Trainings by Group Members

Group members said in the discussions that they always participated in trainings what contradicted the statements of the key informants who said participation was usually high but not complete. Potential reasons for non-attendance were field activities, responsibilities in family work (HH, farming), and the duration of the trainings (morning till afternoon). Inadequate timing of trainings was a problem in the initial phase of the project implementation and was therefore adapted according to the farmers' schedules. Some participants wished for more frequent and shorter trainings. The MVIWATA key informant for Kilosa said that though attendance was often not complete, there were usually only a few people missing and different ones each time. They might not come because of the distance to walk or farm activities. In general, she assessed the participation in group activities for Kilosa ICSS to be very good and referred to them as active groups.

5.2.3 Local Capacity Building

ICS group as income-generating activity

One of the main benefits of the ICS group for their members was that the joint ICS construction for other HHs is an income-generating activity which was valued very highly. When asked about their motivations for joining the ICS group, income-generation through ICS construction, acquiring new knowledge and skills, improve the social status within the community and the mere appeal of being part of a group were

mentioned during the FGDs. The payment for the participation in project-related activities and the provision of free materials were rarely mentioned. While differing in the mean score, the ranking order of those motivations were similar across the ICSS and did not display significant differences when applying the M-W U test. Men and women ranked the motivations in the same order, but women tend to rank payment and material higher than male group members.

Sense of ownership

In most CSS, a distinct sense of ownership for the ICS could be detected. The implementation approach of providing initial assistance for the ICS construction and offering trainings, resulted gradually in groups starting to construct them self-dependently, hence assuming responsibility for the stoves they constructed. This was observable in the case of ICS in need of repair. In Ilakala, Changarawe and Idifu, adopters stated that group members would come and repair their stoves, if necessary. Furthermore, group members were visiting regularly to check the stoves. This implies that ownership has been created because group members see the stoves as their responsibility and not the project's one anymore. In Ilolo however, many group members did not want or could not repair stoves if something is broken. According to the MVIWATA key informant, they even call for the help of active group members or project staff to do repairing. This expectation for project staff to come and help indicates no or a low sense of ownership for the stoves. In the rating, all participants rated the importance of ownership with 5.

'Training of Trainers'

The project applied the 'Training of Trainers' concept during the implementation process. In the beginning, a few farmers from every ICSS were invited to Changarawe and participated in a first training on ICS construction. Afterwards, those group members trained the rest of their groups under the supervision of the researchers. These farmer-to-farmer visits were perceived very positively in all ICSS and the desire for more of these visits was frequently mentioned. Furthermore, in all ICSS the groups accepted new members and these were trained on ICS construction by group members self-dependently. In Idifu, interested individuals were invited by group members to accompany them during construction tasks and to observe and learn. Adopters also mentioned in some cases, they would just repair the stoves on their own, because group members had shown them how to do it. The incentive of becoming a trainer for other

community members was a frequently mentioned reason for joining the group or wanting to do so. 'Training of trainers' brings along several benefits as it strengthens local capacity building via knowledge transfer to individuals, facilitates broader application of this knowledge (in this case ICS constructions) and the trained person increases his or her social status within the community.

5.2.4 Group Management Capacity and Group Dynamics

The observed group dynamics were very different in the four CSS and mostly related to group management, leadership problems and joint construction activities which influenced the adoption rates within the villages.

New Members and 'Drop Outs'

In all ICSS, the original ICS groups accepted adopters as new group members, in most cases as replacement for 'drop outs', i.e. original group members who had left the group or by extending the group size to a certain limit. The new group members usually did not participate in official project trainings but received technical trainings on ICS construction from the original group members.

Especially in Changarawe, there had been problems in the beginning because many original members did not attend any more trainings after the ICS had been constructed. According to the group secretary this was in some cases due to busy schedules or family problems but also that some people only participated to get the allowances and stopped coming to group meetings because there was no payment. The group implemented the rule that members who did not come to attend meetings three times without giving notice were considered to be 'drop outs' and their spot was given to an interested adopter. Consequently, there was a high turnover from original to new group members in this initial phase.

Key informants from ARI and MVIWATA, who were involved in group activities in the field, generally attested the group members in Kilosa district a good spirit and that there was always high participation during the meetings. This was confirmed by the extension agents who stated for both groups that they were usually meeting on a regular basis. Due to various reasons like the floods in Changarawe and economic difficulties in Ilakala, there had been less meetings in the recent past, but group members and key informants were confident that regular meetings were about to start again.

Implementation activities in Ilakala were also strongly influenced by the introduction of a new project in the village, which will be discussed in detail in chapter 5.2.5.

In Idifu, the group was very active and the adoption rate was high and spreading across the village, its sub-villages and to neighbor villages like Miganga, Ikombolinga and Iringa-Mvumi. In the beginning, the group started to accept adopters as new group members until the group size was perceived as large enough. But still, it occurred that group members took along interested adopters with them when they constructed at new places and showed them how to do it. In the interview, the chairperson stressed that in the recent past the members had met every Saturday to finalize the constitution and subsequently register as an official group. As some group members stated during the discussion there had been no regular meetings in the past, it appeared that different dynamics inside the group were occurring with some very active members and rather passive members who waited to be called for meetings but did not approach the group leaders on their own.

In Ilolo, the adoption rate was high but lower than in Idifu and did not spread outside the village. The ICS group secretary was very active and had constructed a big share of the ICS (around 40). The group dynamics appeared to be complicated and conflict-laden. The group had not met for several months but only for official meetings and trainings with the project staff. When asked during the FGD why they had not held any meetings in the past, the participants answered they had been too busy with farming activities. When challenging them on this issue as the last months had been dry season, they admitted quickly that they had just not been very committed. One group member said there was no specific reason but there were just no real reasons for meetings. This was affirmed by the key informant from MVIWATA who mentioned it to be a problem that every member already had their own ICS and therefore there were no collective activities required that would enforce regular meetings.

Joint construction

In all villages, the group divided itself in sub-groups connected to the different sub-villages. Though it was the official idea that the members from the sub-groups constructed ICS for adopters in the respective sub-villages, this was only the case in Kilosa district. In Chamwino district, there were both in Idifu and Ilolo a few very active group members who constructed the majority of the ICS throughout the villages

and a large part of the group members not constructing at all. Another difference between the regions was that in Kilosa district, group members went to construction activities together in small groups. In Idifu and Ilolo members usually went alone to construct ICS for adopters. The interviewed key informant from MVIWATA accredited the high adoption rate in Idifu mainly to the group secretary whom he attributed to be very innovative and actively visiting other villages to recruit new customers.

Group Leaders

Problems with the elected group leaders appeared in most of the groups at some point, mostly because some of the initial leaders were criticized for a lack of commitment. While in Changarawe and Idifu this problem was solved through the appointment of new leaders, in Ilolo it seemed to be a serious problem. During the second FGD the group members made it clear that they did not appreciate the current group leaders. Those members identified the leaders to be the main reason for the non-occurrence of meetings because they did not care about it.

> „The group leaders are supposed to plan meetings, and are supposed to give people notice, but they are not doing it" *[female group member Ilolo, FGD#14]*

Registration and constitution

While the group in Ilakala was already officially registered, groups in Changarawe and Idifu were still in process of finalizing the constitution before being able to register, but seemed to be in the final phase. However, in Ilolo the constitution appeared to be a highly disputed problem which seemed to strongly affect the group work because it was pending since several months and no meetings had taken place since then. The statements regarding the constitution problem varied considerably between the FGDs and interviews as every stakeholder group and every key informant told a different story what caused the delay and who was to blame. While some group members attributed it partially to the key informant from MVIWATA and partially to another group member, key informants identified the group leaders to be problematic what was also mentioned during the second FGD where no group leaders were present.

5.2.5 Presence of Other Projects

In two cases, other ICS projects started activities in an ICSS and had different impacts on group activities and adoption rates:

World Vision stoves in Ilakala

During the conduction of fieldwork in Ilakala, the impact of other projects on intervention efforts could be directly observed. Another international organization (World Vision e.V.) started a short intervention of ICS construction in the village without the Trans-SEC project staff being aware of it. Some few farmers were given a one day training on how to construct the stoves and the first stoves were constructed in some HHs for free. One ICS group member, who was trained by World Vision was interviewed about the process. According to him, the village executive officer (VEO) of Ilakala appointed community members to participate in the World Vision training and deliberately chose people with ICS experience. The stove design differed slightly from the *Salama jiko banifu* by being shorter and having a smaller fire chamber. However, it was constructed with cement what made it much more expensive. The first eight stoves were constructed for free but afterwards the price for a new stove amounted to 25.000 TSH (interview#25).

During the first visit to Ilakala in September, World Vision stoves had just been constructed. When talking to the ICS group members, the participants had a rather positive impression of these stoves saying they were more creative, smaller, and had two holes for cooking with one being small and the other one in a more flexible size where different pot sizes could fit. At the second visit to Ilakala in November, the disadvantages of the World Vision stoves had become apparent. When talking to the same people, they criticized the cement cracking easily and that their pots did not fit well inside the pot holes.

This example shows perfectly two main problems that can emerge when different projects are operating within the same region and why such events can cause severe damage to implementation efforts like Trans-SEC. Firstly, people get used to new projects coming and by receiving the same or a similar innovation for free, they learn that there is no need for them to contribute any own efforts. Some HHs receiving a World Vision stove even had a Trans-SEC stove already. Secondly, efforts to support local capacity building and income-generating activities might get hampered if another project brings a similar innovation for free while local individuals just started offering it for purchase. Group members indicated the problems they faced when the new stoves were brought into the community. The ICS group chairperson told us that the World Vision interference had first led to problems for the group because nobody wanted to

pay them to construct an ICS anymore. For some time, they feared this would mean the end of their group because people cancelled their arrangements for having an ICS constructed at their homes. But as people realized the World Vision stoves did not meet their needs and expectations, the demand for the ICS started to grow again and the cancelled constructions were mostly rescheduled. This was confirmed by an ARI key informant who stated that in the beginning everyone wanted a World Vision stove because it was free and new, but in the long run farmers realized the quality of *Salama majiko banifu*.

TOAM stove, Idifu

In one of Idifu's neighbor villages, Miganga, there was a project by TOAM (Tanzania Organic Agriculture Movement, Tanzanian NGO) also introducing ICS, that started some activities in Idifu in in the recent past. Adopters did not know much about it, just that some people from Idifu had participated in trainings. One of the adopters had participated three times in such trainings and said those were just practical, going to HHs and watching the construction. The differences between the stoves were rather marginal with a very similar design and construction process, but the chimney was different as it was not built to the outside like the *Salama jiko banifu* but merely directed the smoke to the outside through a hole. This caused the outside walls to get dirty and with strong winds, that are quite frequent in Chamwino district, smoke could re-enter the house though those holes. The interviewed group leader also said he was not worried for competition because people did not like the TOAM stoves due to poorly constructed chimneys and the related smoke entering the house.

5.2.6 Outscaling

Within the scope of the implementation process various means were already applied that could serve for further outscaling activities. These were public demonstration sessions in villages, farmer field days (FFDs), farmer-to-farmer visits, merchandise (caps, T-Shirts), information spreading through communication assets like radio or television and knowledge-transfer via neighbours or friends.

Demonstration session

Scientists and researchers from the project conducted public cooking demonstrations in all CSS where they cooked the same meals simultaneously on an ICS and a TSF to

demonstrate the benefits like less use of firewood, faster cooking time and the prevention of smoke.

Farmer field day

In 2016, two FFDs were organized in Idifu and Ilolo by Trans-SEC for the whole village and a few interested persons from neighbour villages. During these days, four of the UPS recently being implemented, including ICS, were presented. The four UPS were visited at different locations with a team of experts giving detailed explanations. The presentation of ICS was combined with a demonstration session to practically show how the stove was working and point out observable benefits. ICS group members told the other participants about further benefits. Participants were the farmers from the villages, extension officers, village and ward executive officers, village chairpersons and ARI and MVIWATA project staff. Despite early announcement, attendance was rather low because some farmers were still engaged in farming activities. Most of the participants were women. When discussing the FFDs during the FGDs in Ilolo and Idifu, the common agreement was that it had been a good opportunity to present the group (for the members) and get to know who is group member (for the potential adopters). Yet, most adopters said it would not be sufficient to trigger the decision to adopt an ICS because there were several UPS presented resulting in too much information. Some recommended to organize an ICS field day instead to make people fully aware of it. Another recommendation entailed to invite more people from other villages, especially to facilitate outscaling. The extension officer from Idifu also mentioned the size being too small, because only 15 people from neighbour villages were invited.

Farmer to farmer visits

The already mentioned farmer-to-farmer visits were perceived very positively in all ICSS and the desire for more of these visits was frequently mentioned. These farmer-to-farmer visits made an impression as it has been mentioned in the FGDs as important outscaling activity.

Merchandise: caps and T-Shirts

In some CSS, project staff had distributed caps and T-shirts with the name *Salama jiko banifu* printed upon which group members were meant to wear to increase visibility of the group and spark conversations about it with other community members. In Idifu, group members did not agree whether they were effective or not, while one women said

it was not of great help because the information had already spread through the village another women said it helped to get a lot of customers.

Information spreading through media

Media assets like radios or television can serve for spreading knowledge but their impact is limited by the coverage of those assets in the target villages. The distribution of such devices was very different across the ICSS. In Chamwino, less people have access to media than in Kilosa district. Changarawe has the best access, where many people have mobile phones, radios or TVs. In the adopter groups in Changarawe all of the participants owned a radio and two of them a TV. There was no wide-ranging possession of media devices in Chamwino district where only few participants said they had radios and no HH owned a television.

> „Media: maybe radio could be effective to reach many people but certainly not enough to mobilize farmers" *[extension officer Idifu, interview#8]*

Social relationships (knowledge-transfer via neighbours or friends)

A very important communication channel to spread ICS seemed to be the communication between friends and neighbours. Almost all adopters had either been addressed by group members directly or had seen an ICS construction or use at a friends' or neighbour's place and decide to adopt after hearing their experience. One female adopter in Ilakala had told her friends in one of the neighbor villages, Mzula, about the ICS and stated that these women had reacted enthusiastically and were very interested in adopting such a stove, if the ICS group would offer it to them.

Rating

The overall rating of outscaling possibilities showed high results with an average above 4 in both regions for all options besides media, which was the lowest rated outscaling option in both regions with an average of 3,82 in Kilosa district and 3,80 in Chamwino district. This matched the observations from the qualitative research as the other options were all frequently mentioned by the participants during discussions on how they learned about the ICS and why they decided to adopt it.

5.3 Socioeconomic Factors

The analysis of the collected qualitative and quantitative data also led to the identification of several socioeconomic factors that were influencing the adoption and diffusion of ICS in the ICSS. While gender, knowledge-sharing, income and off-farm

season activities could display a fostering or hindering factor, cooking habits and routines rather influenced the use of the ICS and did not seem to have an impact on the decision to adopt.

5.3.1 Gender

The data collection in FGDs and ratings was characterized by a high imbalance regarding the gender of the participants. The large majority were women who represented around three-quarter of the total participants. While this was more balanced, though no equal share either, in the group member discussions, the adopter discussions often included all-female groups. Overall, there were only four male adopters present and 48 female adopters. This confirmed the assumption that women were more likely to adopt ICS than men because they were usually the firewood collectors and cooks in the HHs. In most FGDs, the participants agreed that the gender did play a role for the decision to adopt an ICS because kitchen-related activities were mostly the concern of women. Therefore, they would be more likely to adopt an ICS than man. In Changarawe, participants stated that men did see the benefits but did not value them as important as women do. This was illustrated by the example of one male adopter and new group member in Changarawe who had not yet constructed a chimney for the ICS, despite having the stove for several months already. When asked if his wife was not bothered by the smoke he responded, that it was indeed disturbing her but that it was "not too bad" (Interview#19). Participants in Idifu considered the husbands to be supportive in the decision to get an ICS and female participants stated men would not hinder the implementation because they also saw the benefits. In general, participants in Chamwino district often mentioned that women had to consult with their husbands before adopting an ICS, but that the women had the decision-making power for kitchen-related issues. However, the extension officer of Idifu mentioned during the interview that he did not think all husbands wanted the new stoves and were especially critical regarding their wives taking part in project activities. According to him, there had been problems in the past with the attendance of trainings because in some cases husbands had not allowed their wives to participate.

Interestingly, one ARI Ilonga key informant involved in the technical implementation process did not think gender was playing an important role in the case of ICS adoption due to the low price. He said a man would not care and might not even be involved in the decision to purchase an ICS:

> "Regarding the decision making for ICS […] a man doesn't care because it is not in his sphere. Also it is very little money, a woman can just sell a chicken to take money for stove. Man won't notice even."
> *[ARI Ilonga key informant, Interview#26]*

The researcher indicated the closer a village is to a town the more gender equality is to be found in the HH decision-making. While in Ilakala men are still dominating the decision-making within the HHs, he identified the situation in Changaware to be better. Some male group members in Changarawe also mentioned they were sometimes cooking for their families when their wives were sick, travelling or tired.

5.3.2 Cooking Habits and Routines

The traditional ways of cooking did not seem to be interfering with the use of ICS, except for a few examples. When asked if the ICS caused any problems with their cooking traditions or habits or led to any changes, participants in all CSS responded that it did not, but only led to improvements. The time gains resulting from less time spent on firewood collection were often mentioned as beneficial. Nevertheless, immobility was identified by many participants to be a flaw because in some occasions mobile stoves were needed. During harvest time, farmers sometimes stay in the fields and will use a mobile stove (TSF) there. Furthermore, the pot and pan size did limit the use in some occasions. All participants agreed that the ICS could not be used for big gatherings or ceremonies because the ICS was too small to carry the big pots and pans being used. In these occasions which only take place a few times a year, people also used the TSF. There was some disagreement whether every meal could be cooked with an ICS or not. Some farmers in Ilakala and Idifu said traditional dishes like Chapatti or Kande could not be cooked on the ICS. During further discussions, it became apparent that the problem was again the required pot or pan size, because those meals are usually prepared in bigger tools than those fitting on the *Salama jiko banifu*. Another 'meal' that required a big pot for preparation is 'pombe', which refers to self-brewed alcoholic drinks. Therefore, most people continue using the TSF for the preparation of aforementioned meals and drinks. Those living in smaller HHs can use the ICS for any food preparation.

> „It is not about special food, it is about special pans. ICS can cook every food but sometimes you need bigger pans, for example for Makande [plural for Kande – author's note], in ceremonies or big gatherings."

[female adopter Changarawe, FGD#8]

5.3.3 Income and Off-Farm Season Activities

The costs to purchase an ICS varied between the regions and CSS reflecting the economic differences. The mere construction price in Changarawe was 5.000 TSH, in Ilakala 3.000 TSH, in Idifu 2.000 TSH and in Ilolo 3.000 TSH. Additionally, the materials for the construction had to be provided by the adopters which increased the costs marginally: According to the key informants, ICS were therefore affordable for everyone within the communities.

> "Improved Cooking Stoves and Kitchen Gardens are affordable to everyone who is interested […] and the running costs are very low."
> *[key informants ARI and MVIWATA, Interview#2]*

Nevertheless, Ilakala group members identified the price as too high and said people were reluctant to adopt because they did not want to pay the price. Therefore, they were considering tooffer construction for loans and give adopters more time to pay the complete amount. Adopters in Ilakala stated that the price was reasonable. This was not surprising, because those individuals had already assessed the price when deciding to adopt and concluded that it was not too expensive. In the other ICSS, group members and adopters agreed that the price was adequate, especially because an ICS was a tool to be used on a daily basis. Group members and adopters did not think income mattered in ICS adoption decision-making because the amount was very low.

This perception was displayed in the ratings for Ilakala having the highest average rating result of 2,88 for the importance of income on the decision to adopt. In the other ICSS, the average rating of income as an important factor for ICS adoption was below 1,50. Ilakala showed some differences in the rating behavior compared to the other ICSS. Besides voting comparably high in total, adopters also voted much higher than group members contradicting their statements made during the discussion. In the other villages, the opposite was the case, with adopters voting lower than group members. By applying the M-W U test the differences were not found to be significant (appendix 1).

In Kilosa district, many people engaged in additional off-farm season activities, especially in Changarawe. This resulted in an increased income and also provided them with some financial security in case of a bad harvest season. The higher income allowed many farmers in Changarawe to buy firewood instead of collecting it and a lot of people

had additional charcoal stoves. The price for one load during dry season was about 2.500 TSH which lasted around one week for an average HH. In Chamwino district, only very few people had additional income-generating tasks besides farming and were therefore very dependent on the agricultural output. Income-generation through the ICS group could therefore be assumed as more relevant in those communities where no or only few additional job opportunities besides farming exist.

5.3.4 Knowledge-Sharing and Communication

Knowledge-sharing and communication seemed to be functioning well in the Kilosa ICSS. The group members appeared to communicate openly with each other and relevant information did usually reach all members. This was confirmed by the interviewed key informants. In Chamwino district, communication within the ICS group seemed to be more problematic. In Ilolo, there did not seem to be a lot of trust and companionship within the ICS group. This became clear by 1) the differing statements regarding the constitution problem (see chapter 5.2.4.) and 2) during the second FGD when the members complained strongly about the group leaders but made it clear that they did not have the courage to address the problem within the group. When being asked if they could not turn for help to one of the researchers one participant said she had raised the issue during a meeting with the MVIWATA researcher. Thereupon, the other members had opposed her and taken the group leaders' side, and after the meeting the leaders had confronted her and accused her of lying. When asked why the other members present in the FGD had not supported her in this moment, nobody answered. In general, people kept contradicting each other during the FGDs and accused other participants of not saying the truth. Group members further stated that they never communicated directly with the researchers but only with the group leaders who serve as intermediary. Similar communication behaviour could be observed within the community with people appearing to be communicating openly about the ICS with other community members and in one case even with members of another village: „Members were very active, promoting and educating interested people." *[extension officer Idifu; interview#8]*

5.4 Perceived Attributes of Improved Cooking Stoves

Relative Advantage

In the rating, the participants were asked to rate the importance of a number of ICS benefits and flaws compared with the traditional device they used before or were still sometimes using. Frequently mentioned benefits during the FGDs were the reduction of firewood, the time savings due to the two-pot-design, that it was more secure especially with children being around, health benefits related to less smoke, and that it only needs to be ignited once and stays lit for as long as one needed as well as financial savings (by adopters). The protection of the environment by cutting less trees was mentioned a few times, interestingly only by male respondents. The mentioned flaws concerned mostly the ICS not being mobile and the hole size for the pots being limited to a certain size. Other flaws that were mentioned were that the ICS could not be used as a bonfire to gather around and that it was necessary to use dry wood to prevent smoke.

The results of the rating of benefits displayed a much stronger difference between the villages within the regions than between the regions themselves. Faster cooking was found to be significantly more important in Ilakala than in Changarawe, while it was perceived highly important in both Chamwino ICSS. Ilakala and Idifu participants perceived it as very important that the ICS only needed to be ignited once and kept the fire strong. In both ICSS, all participants rated this benefit with 5. In Ilolo and Changarawe, the mean rating result was 4,50, which was significantly different from both Idifu and Ilakala results. Regarding flaws, the ICSS in Chamwino district rated rather similar compared to each other while the results in Kilosa district were found to be quite different. Especially the limited hole size was perceived as a much stronger flaw in Changarawe (4,70) than in Ilakala (3,48) whereby the difference was found to be highly significant. Overall, the results for bonfire use were moderate with results between 3,35 and 3,82 The dependency on dry wood was assessed as significantly stronger in Chamwino district than in Kilosa district, as well as by female participants than male participants (see appendix 1).

Trialability, Compatibility, Complexity and Observability

Trialability during the project implementation was very high. Group members could construct the ICS at their homes for free without having to sacrifice the traditional device as s a TSF can be set up anywhere. Therefore, people could trial cooking on the ICS and get accustomed to it. The *Salama majiko banifu* was found to have a high compatibility with the traditional habits of cooking as has already been addressed in 5.3.2 ‘Cooking Habits and Routines’. Overall, the ICS did not require any changes in

routines but only led to more time available for the firewood collectors and cooks. There were few occasions when the ICS could not be used and the traditional TSF was used instead. Complexity was very low because the ICS is easy to use and understand. When asking if education was an important factor for the decision to adopt an ICS, most participants disagreed strongly. One adopter in Changarawe stated that "it is unimportant if you were educated or not, it is so easy to understand." *[female adopter Changarawe, FGD#7]*. Group members in Idifu formulated the impression that rather practical skills were required. Observability was increased by the demonstration sessions within the communities to make the use of ICS and its observable benefits (less use of firewood, cooks faster, no smoke) visible to everyone interested. Moreover, many adopters said they had seen ICS construction and use at their neighbours' and friends' houses and then decided to adopt themselves.

Rating

The importance of the ICS attributes were rated very high throughout all regions and CSS. Kilosa participants rated compatibility, trialability and observability slighly higher, while participants in Chamwino ICSS rated complexity slightly higher but those differences were not found to be significant. Ilakala attendants assessed all attributes to be very strong and rated unanimously 5 for compatibility, trialability and complexity, with significant differences for complexity (4,80) and very significant differences for compatibility (4.70) and trialability (4.45) compared to Changarawe. In Chamwino there were significant differences for compatibility and observability, which were rated higher in Idifu than in Ilolo. The only attribute rated higher in Ilolo was trialability.

The only significant difference to be found for gender was how women and men perceived trialability of the ICS. While women voted it to be the lowest of the four attributes, but still on a high average of 4.64, male participants rated it only with 4.19

6 Results Planning Case Study Sites

This chapter presents the results from the assessment of conditions for ICS adoption in the four PCSS of Kilosa and Chamwino region. The situation of each village regarding its adoption potential for ICS will be described by following the structure of identified essential factors. First, general conditions that were found to be similar in the PCSS of one region are described and subsequently, specific conditions identified in each village

are presented. As each CSS has been checked for the most influential factors prevalent for ICS adoption not all the factors will be mentioned for each village but the focus lies upon the decisive factors.

6.1 Assessment of Conditions in Chamwino Disitrict

The access to firewood is similar in both Chamino PCSS, Mzula and Chinoje. The farmers in both villages need to spend around five hours on firewood collection at the far distanced mountains. As it is a common practice in Chamwino district and has been observed in the ICSS as well, more firewood is collected during dry season and saved for rainy season, hence the farmers collect from two to three times a week (Chinoje) to almost once a day (Mzula). However, the perception of Chinoje participants regarding the access to firewood varied strongly from the one of Mzula participants. In the FGDs in Chinoje attendants stated their access to firewood to be good, while in Mzula it was assessed to be very difficult. This difference also reflected in the rating, with Chinoje rating the access to firewood as much higher than the other PCSS (4,17), and significantly higher than Mzula (2,19).

The walk to the mountains was described to be exhausting because the area is hilly and sometimes very steep, so people can fall and hurt themselves, especially when carrying heavy headloads. The wood was said to drop often due to bad walking conditions. Furthermore, the collection of the wood from the mountains is time consuming because

> „[…] on hills or mountains you cannot collect them in one bundle, you have to take them one by one downhill, tie them down there together because you cannot go down the hill with the whole bundle“
> *[female potential adopter Chinoje, FDG#19]*

In both villages, the people do not engage in many off-farm season activities during dry season, lasting from August to October or November. Participants and interviewed village leaders in both CSS stated that the months during the dry season were well suited for project activities but during rainy season it would be challenging to get people to participate. Chinoje and Mzula participants rated the desire to join an ICS group very high.

In the recent past, there were no extensions agents responsible for the villages. While participants in Chinoje said there had never been one, in Mzula the last extension agent left three years ago. Participants of FGDs and interviewed village leaders stressed the importance of having an extension officer:

> „For activities and development of the village […] lacking someone like an extension officer, people are missing someone they can bring their problems to, therefore it takes more time sometimes to solve problems“
> *[VEO Chinoje, Interview#16]*

6.1.1 Insights from Mzula

During the FGDs participants reacted with interest towards the presentation of the ICS and to the idea of a group formation which was also displayed in the results of the rating. The benefits regarding health and reduced cooking time were rated as most important ones, followed by reduction of firewood and security (see figure 13).

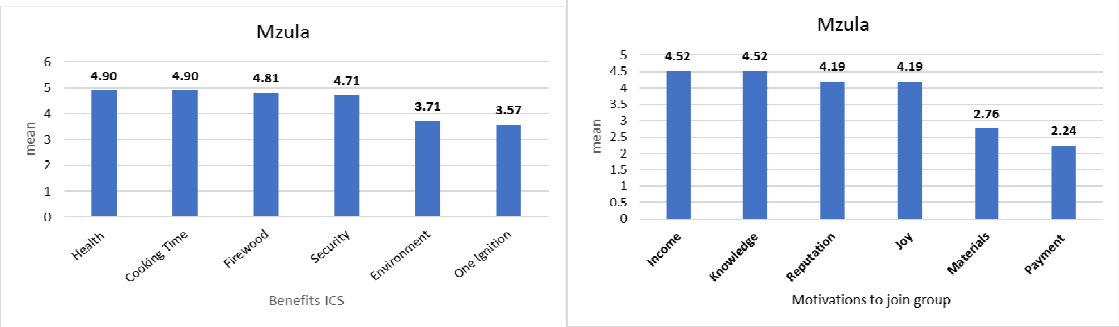


Figure 13 Rating ICS Benefits and Motivations Mzula

There were differing opinions whether women were more likely to adopt an ICS. While some women did think so, others said men would also see the benefits:

> „Men can also be interested in ICS when they get to know that there won't be smoke with this stove, they like to have conversations in the kitchen"
> *[female potential adopter Mzula, FGD#17]*

When asked about their preferences regarding the group composition most of the women said a female group would be more appealing to them but some also spoke out in favour of mixed groups:

"Women are easy to understand, trust and work together, with man sometimes you plan or agree on something and then they go to club in the next day. Also men might think ICS are women stuff as kitchen is women topic“ *[female potential adopter Mzula, FGD#18]*

"There are tasks that they cannot do as women as carrying soil. It is good to have a man in the operation of constructing ICS as technical issues are involved and men are good in technical stuff. Having a man there is a good mix“ *[female potential adopter Mzula, FGD#18]*

It was pointed out by participants of the FGDs as well as by the VEO during the interview that there had been an ICS project around three years, which seemed to have followed a similar approach as Trans-SEC but there was no long-term follow-up and monitoring:

> „There was a project some years ago, that was implementing a form of ICS. It didn’t work well because the NGO just came for a short time and left quickly. They constructed ICS in some HHs, trained some people and wanted them to become trainers for other community members, there might be some people still using it" *[VEO Mzula, Interview#15]*

None of the participants remembered the name of the implementing organization but an interview with one of the participants in this previous project could be conducted to gain insights from her experiences (Interview#17). According to her, the stoves were of a similar design as *SALAMA jiko banifu* and they also had an official ICS group that was supposed to construct for other HHs in the community. Nevertheless, they were not successful and only constructed eight stoves because people were reluctant to pay the price of 1.000 to 2.000 TSH. The interviewee made it very clear that she did not think people in Mzula be willing to pay for an ICS.

Participants in the FGDs said people had usually a lot of free time during dry season from August to November, therefore many would be interested in joining groups or attending trainings. People felt very neglected by the government and would therefore welcome any project coming to their village. Only few people were engaged in additional income-generating activities as selling livestock or local beer. The VEO mentioned that free time during dry season posed a challenge to the village because many people would just get drunk as there was not much to do. Therefore, it would be a good incentive if a project would offer activities like trainings or groups to keep people busy. Participants thought people would generally be interested in project activities but that they still had to be motivated, e.g. by public demonstrations of ICS construction. Female participants expressed their concerns that some men might show up for information meetings but would afterwards not be very committed during the implementation process.

Figure 14 Former ICS Constructor with ICS in Mzula

6.1.2 Insights from Chinoje

In Chinoje, people used to cook with clay pots because according to the participants in the FGDs “modern pans don’t stand still on fire” *[female potential adopter Chinoje, FGD#19]*. Traditionally, they use two bricks to set up their fire with a comparable design like the TSF causing the same problems:

> „[…] needs a lot of firewood, lot of smoke, needs you to be around when you cook because the fire goes quick and you have to keep putting firewood to keep fire active"*[female potential adopter Chinoje, FGD#20]*

Furthermore, it was mentioned that sometimes the bricks from the stoves break the clay plots. Their stoves are fixed within their houses but in summer they prefer to cook outside by setting up another brick stove due to the high temperatures. The participants seemed very interested in the ICS and expressed the preference for having it built inside their houses for varying reasons like protecting it from rain and sand as well as from destruction by children. Most benefits

Figure 15 Three-Brick-Stove with Clay Pot in Chinoje

were rated highly, especially the reduction of firewood was rated unanimously with 5 (see figure 16).

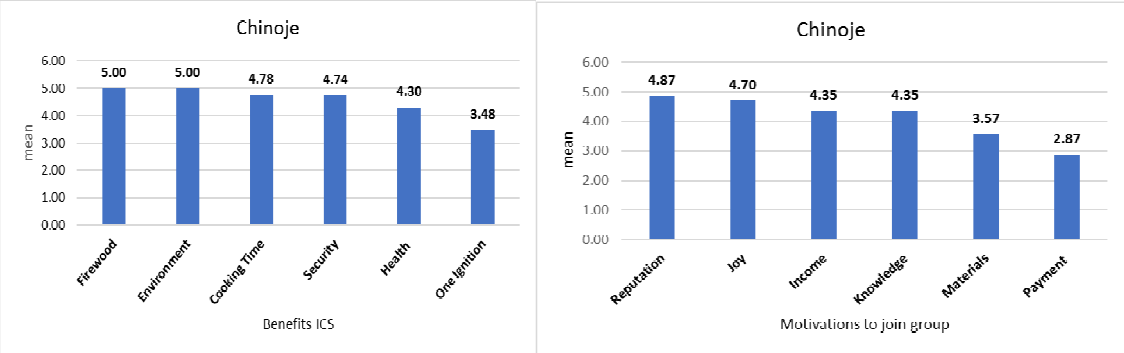


Figure 16 Rating of ICS Benefits and Motivations Chinoje

Access to construction materials was discussed and not found to be a serious challenge. This was displayed in the rating results, where the access to all materials was rated relatively high. Only banana stems, as possible alternative for PVC pipes, were identified to be difficult to get. Six women had their own brick makers, they said most of them could make bricks on their own and if not, it was possible to buy them.

> „The village has some challenges: poor roads, poor infrastructure, not enough water, poor nutrition intake of people, no nutrition education, no electricity […] people and community have no negative attitude towards new people, they are good people, help each other, good cooperation“ [*VEO Chinoje, Interview#16*]

There were no projects in the village at the time of the research and respondents said the last one had been the WFP programme that ended in 2014. But several years ago, there had been numerous programmes who came to let people form groups, noted the names and never returned but conducted activities in other villages. This was very frustrating for many people and shaped a rather suspicious attitude towards new projects:

> „[…] taking into account village's project history: people are kind of fed up with projects because project people were not showing up a lot, were not serious because they didn't not come often and/or didn't fulfil promises"
> *[Chairperson Chinoje, Interview#16]*

6.2 Assessment of Conditions in Kilosa District

The PCSS in Kilosa district have a comparably better access to firewood than the villages in Chamwino district. Farmers from Muhenda-Kitunduweta have the best access of all PCSS ('very available') with walking distances between one and two hours. Farmers from Tindiga need around three hours for the firewood collection. This

was displayed in the rating results, with Muhenda-Kitunduweta rating the availability of firewood much higher (3,20) than Tindiga participants (2,26). One load lasts for an average HH size around one week, the majority of the people goes to collect wood once or twice a week. As has been observed in the Kilosa ICSS, people do not collect more firewood during dry season to save it but also collect wood during rainy season and use the wet wood. In all villages, the participants in the FGDs said there was no supporting infrastructure to collect firewood. The roads are not in a good condition and for the collection of firewood they have to make their own paths. Especially in rainy season, this can be dangerous because the grasses on the floor are wet and slippery so the collectors can fall or drop their headloads. They also have to take care because of thorns and there are threats by snakes and insects. In Kitunduweta, participants even mentioned the threat of being attacked by elephants which come close to the settlements during rainy season. Furthermore, women in Tindiga expressed their fear of getting raped by men during the collection of firewood.

In both PCSS, people stated to be very busy throughout the year and to engage in various additional income-generating activities besides farming, like burning charcoal, brew local beer, sell food, making mats, also during dry season. Therefore, they do not have much free time and are not really looking for activities to keep them busy or additional income possibilities. Trainings and project activities would need to be announced in time so people could arrange it with their schedules. Nevertheless, they rated the desire to become part of an ICS group high, with Tindiga showing the highest result (4,79) and Kitunduweta (4,3) the lowest of all PCSS.

6.2.1 Insights from Tindiga

The possibility to use charcoal when people run out of (dry) firewood was mentioned frequently despite being perceived as very expensive (25.000 TSH for one bag which lasts around one month). When asked why they did not go collect more often and save firewood for rainy season, most participants answered that they were too busy and did not have time to go more frequently. They used to cook inside because of rain and sun, only one participant had a ‘banda’ (constructed open shelter outside the house with a roof to protect the inside from rain) and stove outside. Bigger pans were used by them for the same reasons than in the other CSS but there was another distinctive reason: the majority of the population are Muslims, so during Ramadan they use to gather at night and cook for large groups which requires big and mobile stoves.

A major challenge in Tindiga was the frequent prevalence of floods and water entering the kitchen due to heavy rains. Many of participants claimed to have lost their houses in the last flood in the beginning of 2016, so they had to build new houses in a safer location. During the interview with the Tindiga village leaders they also mentioned the floods as first important challenge for their village: "[t]he frequent floods are really affecting the lives of this community, it destroys houses and fields" *[village leaders Tindiga, Interview#18].* This is an important factor to consider for a potential implementation of ICS in this village. As has been learned from the example of Changarawe, the destruction of ICS through floods was a serious challenge to the ICS implementation because people were not willing to pay for construction again. A possible implementation approach should consider this and adjust the design of the ICS accordingly to local needs, i.e. protection from floods.

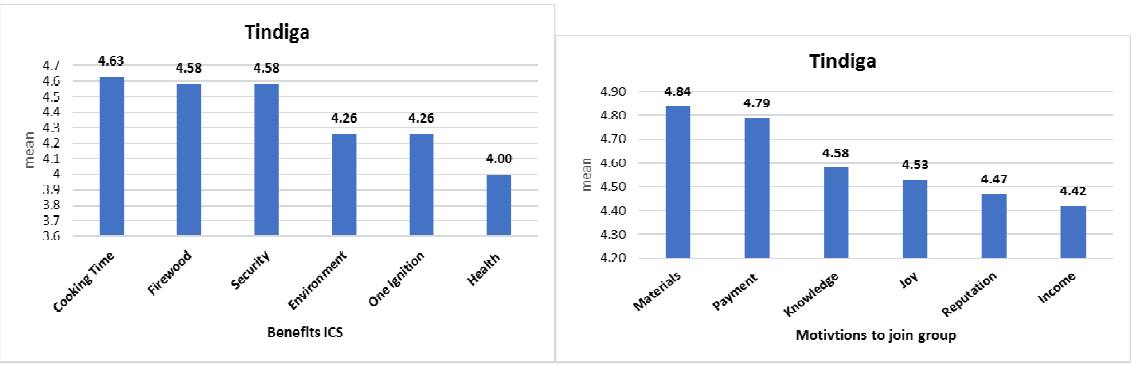


Figure 17 Rating of Benefits and Motivations Tindiga

6.2.2 Insights from Muhenda-Kitunduweta

An important information obtained during the FGDs and interviews was the presence of ICS projects within both villages. One of those projects was World Vision that also started activities in Ilakala (see chapter 5.2.5). When presenting the ICS and discussing its attributes with the participants in Kitunduweta, all of them said they did not know this design and had never heard of it. However, one participant arrived very late (after the ICS had been presented) and turned out to be the village ICS constructor, trained by World Vision. He had constructed ICS for 18 HHs in the village including the HHs of two present women. When asked why they had not said they already knew and had such stoves, they answered they had feared it would close some opportunities for them. Subsequently to the rating, a brief interview with the ICS constructor was conducted. He told us about the training process, which confirmed the information obtained during the interview with the Ilakala chairperson (interview#24), and said he was the only one in the village who had been trained. He assessed it to be good if more people were

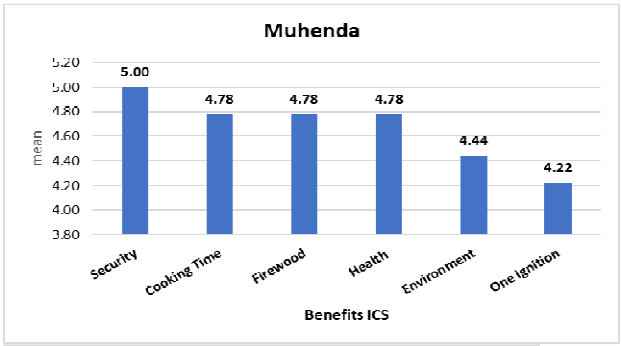
trained because it would facilitate spreading the new stoves. According to him, there might be another training round offered by World Vision to include more people from Muhenda but he was not sure if it was actually going to happen. The village leaders of Kitunduweta also stated there seemed to be more activities planned by World Vision and that the project should go on for several years but did not know any details. The deputy of the chairman criticized that the World Vision stoves had the flaw of being built with cement, which was hard to get and expensive. Therefore, people might be more interested in Scale-N ICS and more people would like to get trained. There had also been another ICS project some time ago implementing ICS with one plate for some HHs, but he did not remember the name. According to the extension officer of Muhenda „[t]here are already a lot of ICS in the area, but they don't have a chimney to direct smoke out of house […] People are aware of the smoke problem, World Vision had their program here, trained two people to train others, unfortunately both did not attend the trainings in Kilosa […] because they mistook the dates" *[Extension Officer Muhenda, Interview#22]*.

Muhenda

The women (all-female group) stated relatively early in the discussion that they wished for better stoves that used less firewood. According to them, most of the people in Muhenda used a TSF and some have also charcoal stoves but they did not know anyone who had an ICS. The smoke was perceived as especially disturbing and the TSF as being unsafe to be around, especially when there were children in the HH. Furthermore, the stones used for the TSF were sometimes not strong enough to carry the pans causing them to slide and wasting the food.

Figure 18 Focus Group Discussion in Muhenda

When the ICS was presented to them they did not show any strong reactions compared to the other PCSS where participants had responded more enthusiastically to the pictures and the design. This impression was confirmed during the rating as the participants rated their desire to adopt an ICS comparably low (3,82). Around half of the group was cooking inside their houses and the other half outside under constructed 'bandas'. All participants said they would prefer to have a new stove outside the house because there was not enough space inside and most of them had already 'bandas' or could easily build them.



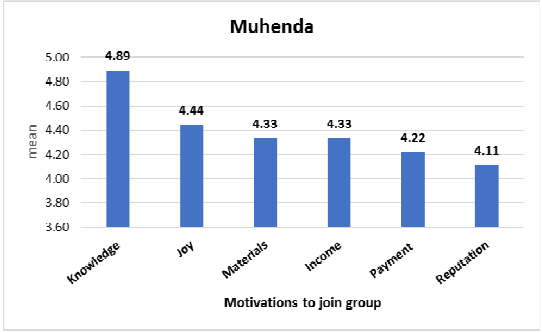


Figure 19 Rating of Motivation and Benefits Muhenda

The extension officer was only responsible for Muhenda and not involved in Kitunduweta because it is an independent village now. He said it would be a challenge if he is supposed to attend Kitunduweta in the course of the Scale-N project as well because he has his boundaries in reaching people there. Therefore, it would be challenging to establish the project in Kitunduweta. He identified the relationship between the two villages generally as a very good one with high cooperation between the inhabitants, who frequently met for social gatherings and helped each other in farming peak times.

Kitunduweta

During the FGD in Kitunduweta it was noticeable that participants were rather inattentive, especially in the beginning of the discussion. Almost all participants had cellphones, which kept ringing and people left the discussion to answer their phones. During the process of the discussion, the attitude improved and people started to pay attention.

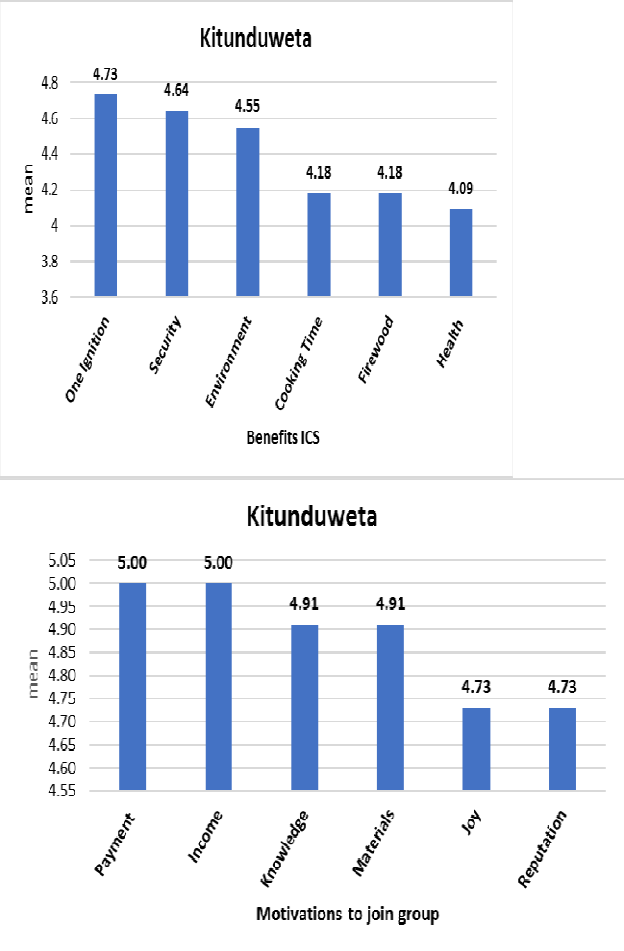


Figure 20 Rating of ICS Benefits and Motivations Kitunduweta

When asked if they wished for any improvements regarding the stoves they were currently using and what bothered them the participants engaged actively in the discussion. They wished especially for a reduction of firewood and to have less smoke. The smoke was said to strongly influence the quality of the food taste. Furthermore, during windy conditions the fire would “go everywhere” and this delayed cooking. All participants cooked outside their houses because of the smoke. Most of them preferred to have one fixed stove and not move it. Ceremonies where bigger pans are needed happen around two to three times a year.

Figure 21 Rating in Kitunduweta

7 Discussion and Recommendations

This chapter presents the interpretation and discussion of the results from the fieldwork in ICSS and PCSS. The impact of distinctive essential factors on each other and their corresponding dynamics will be assessed and discussed within the context of the reviewed literature. Subsequently, the chosen research approach and the methodology used will be critically assessed and limitations of this research will be addressed. Eventually, a number of general recommendations for further outscaling activities of ICS derived from the discussion will be presented.

7.1 Discussion of Results and Recommendations

Socioeconomic, biophysical and operational factors do not occur independently in a vacuum but influence each other strongly on several levels and to a varying extent.

While several factors were identified to have an impact on the adoption of ICS, some showed to be more influential than others.

The analysis of qualitative and quantitative data identified the access to firewood as main driving factor for ICS adoption in the study area, which seems to be more influential than all other factors. In Chamwino region, where firewood is very scarce, there are high adoption rates in both villages. At the same time in Kilosa ICSS, where there is comparably good access to firewood, the adoption rates are much lower. The access to firewood is inseparably interlinked with the existing infrastructure and transportation facilities, which can be of supporting or hindering condition. The larger the distance and the poorer the infrastructure, the stronger the incentive to adopt an ICS and vice versa. Furthermore, Changarawe benefits from good market access to the nearby town of Kilosa. Many inhabitants from Changarawe do not rely on the collection of firewood but instead buy it from sellers that frequently visit the village. A lot of HHs in Changarawe also own charcoal stoves, that in contrast play a limited to non-existing role in the other ICSS. Ownership of charcoal stoves reduces the demand for ICS in Changarawe strongly, since the reduced firewood consumption is perceived less valuable than in the other villages. The availability of firewood is dependent on the prevalent climate and environmental conditions as well as the local fuelwood consumption patterns. Reduced consumption of firewood results in less firewood collection, increasing the spare time to be used for other activities such as income generation and education. The findings from the fieldwork can be confirmed by the consulted literature on ICS diffusion and dissemination. Several studies show that the reduction of fuelwood is the main and most important benefit of ICS perceived by adopters (GACC, 2015). BARNES (1994) also observed that scarcity of fuelwood led to a higher demand for ICS while abundant availability of fuelwood could cause low adoption rates..

The second factor found to be more influential than other factors, is the economic situation in the villages. Financial resources and security are shaped by the agricultural opportunities dictated by the prevalent local climate as well as access to land, and are related to reliable and regular harvests. Furthermore, the possibility to engage in additional income-generating activities besides farming strengthens the HHs' financial security. These economic conditions appear to highly influence the engagement in ICS construction activities by the ICS groups. In Ilakala and Changarawe, the local

population is wealthier than in Chamwino district, and many HHs have a second income complementary to their farming activities. As a result of their economic situation, people in Changarawe and Ilakala depend less on additional income-generation through ICS construction and unlike people in Ilolo and Idifu have less free time to spare. The quantitative data did not entirely support this finding as respondents from Ilolo rated 'income' as a motivation to join the ICS group lower compared to the other ICSS. However, during the FGDs in Chanwino villages the additional income generation aspect through ICS construction was frequently mentioned as motivational while people in Changarawe and Ilakala often named the improvement of their social status within the community as well as the acquisition of new knowledge and skills as motivation. This was especially noticeable in the group construction activities, as they were much more active in Chamwino district. While ICS group members in Ilolo and Idifu actively inform other community members about the benefits of ICS to convince them to adopt. Group members in Ilakala and Changarawe usually do not actively approach other community members but wait for interested people to address them. Even though the economic conditions were negatively associated with the reliance on construction for additional income, it was observed that despite having more financial means, HHs in Kilosa district and especially in Ilakala were more reluctant to pay the low price for an ICS, compared to people in Chamwino district where most people have less financial security. On this basis, it can be concluded that the availability of firewood has such a strong influence on the overall interest to adopt an ICS that there is only a very low willingness to pay any price for ICS as long as the access to firewood is good, like in Kilosa district. Likewise, people in Chamwino might even be willing to pay more for it (not to be set equal with the ability to pay more) despite gaining less income. BELTRAMO ET AL. (2014) observed in their study that the financial situation did have an important impact on the decision to adopt. The study empathized to not only consider financial constraints to afford an innovation but to note the potential of financial incentives for a higher rate of adoption as well. The possibility of combining ICS dissemination and outscaling with microfinance interventions or by forming saving-groups was also addressed by LEWIS AND PATTANAYAK (2012) and the GACC (2015).

The involvement of the project staff and group dynamics were also found to considerably influence the adoption patterns in the ICSS, but to a lesser extent than the availability of firewood and the incentive of additional income-generation. This became apparent because despite the lower involvement of project staff and complicated group

dynamics in Chamwino, especially in Ilolo, the adoption rates are still higher than in Kilosa and Changarawe where the project staff is highly involved and key informants described the group dynamics as good. While the involvement of the project staff is not a decisive factor for the rate of ICS adoption, the analysis of the qualitative data led to the assumption that the adoption rates in Kilosa district would be even lower without the high involvement. At the same time, the adoption rates in Chamwino district might be even higher if the project staff was more involved in resolving the problematic group dynamics. Many studies have highlighted the relevance of involving change agents in the interaction with the target group (e.g. DEARING, 2009). Furthermore, local operatives, like extension officers or health workers, should be employed as it is expected that they have a better stand within the community than foreign researchers (GACC, 2015). This was confirmed by the results for the implementation process in Kilosa district, where local researchers cooperate strongly with each other and interact frequently with the target population by providing trainings but also by visiting their houses to check the ICS. Especially the extension officers in Ilakala and Changarawe are strongly appreciated by the ICS group members and adopters. During the whole process of implementation and dissemination, the project staff is recommended to visit the community regularly, to make sure that the ICS are functioning and to provide further support. The extent of involvement is also affected by the infrastructure in the two regions. In Kilosa, ARI Ilonga and MVIWATA key informants are all stationed in Kilosa town, which facilitates joint activity planning and makes it possible to travel relatively fast to the ICSS. The key informants from ARI Makutupora are positioned in Dodoma town, which is a one hour drive to Ilolo and Idifu on poor roads. The MVIWATA stakeholder is living in Mvumi mission and is therefore closer to the extension agents.

Group dynamics influence the efficiency of ICS construction and can be assessed similarly to the involvement of project staff. In Kilosa ICSS, the group dynamics and internal communication seem to function well since some group members also participated in the groups for simple enjoyment of attending group activities as they engage in joint construction activities. However, the groups in Chamwino district seem to be segregated into a very active and a rather passive part regarding the construction activities. While the internal communication in the group in Idifu seems to be rather uncomplicated, the group dynamics in Ilolo were highly conflict-laden. Neither in Idifu nor in Ilolo do group members engage in joint construction activities, but go on their

own to construct for adopters. In both villages, there are some very active group members (Idifu: group chairperson, Ilolo: group secretary) who construct the majority of all new stoves. While those individuals undeniably push the adoption rates, even higher rates might be possible if the groups acted in unison and all members participated in construction activities. This situation also strongly influences the extent of local capacity building to be achieved. The less people are involved in construction activities, the less people gain additional income and develop a sense of ownership for the stoves. Nevertheless, the transfer of knowledge within the local population is facilitated by the acceptance of new group members into the ICS groups who are on ICS construction which in in turn increases capacity building at the local level.

One distinctive factor that shall be emphasized is the presence of other R&D projects in the area that strongly influences the overall mindset of a community and can have a distinct impact on other project activities. On the one hand, the mere presence of projects in the past or present can affect how the local population perceives the possibility to participate in any project activities. The GACC (2015) emphasized the problematic social dynamics related to the abundant presence of interventions in the past and present, which could hinder the success of any ICS project. In many regions people are used to the implementation of new projects since many generations. This has influenced the mindset of community members and how they perceive themselves, from being consumers to being beneficiaries. Hence, new products are often expected to be 'free' or are not even valued in some cases because people know that there will be more projects in the near future. The MVIWATA key informant in Kilosa region addressed this issue unprompted by saying there were too many projects in Kilosa district which has changed the attitude of people towards project activities in general. She claimed "when they see a project it is all about taking. You need to give more and more trainings to change the mind. In Kilosa, there are too many projects […] people are less patient, quick to change to other projects […] farmers sometimes participating in several projects" *[MVIWATA key informant, interview#2]*. Indeed, it was noticeable in the Kilosa PCSS that people were used to projects visiting their village to implement activities or introduce (new) technologies. Depending on the village, the participants in the FGDs showed a certain level of interest to varying extent, but were much less enthusiastic than participants in Chamwino PCSS. Another important impact of numerous projects being present, is that the presence of another project implementing the same or similar innovation at the same time can seriously hamper the own

implementation efforts. This also depends on the approach the other project is applying. The introduction of ICS by World Vision to Ilakala seemed to seriously harm the ICS groups functioning and the adoption of *Salama jiko banifu* because the other project implemented the first ICS for free and people reacted by cancelling their appointment to construct ICS with the groups. The efforts to sustainably contribute to local capacity building through the formation of income-generating farmer groups could easily be disturbed in such cases. Another factor to consider is 'survey fatigue', which refers to people being unwilling to repeatedly participate in research or project activities. In general, it is recommendable to carefully assess the prevalence of other projects when selecting new CSS and choose locations with low project interference. If this is not feasible, project staff from those other projects should be contacted and a coordinated approach should be developed and implemented. This could subsequently increase synergies and bank on pre-existing structures and knowledge.

Cooking habits and routines can be perceived as exclusion criterion for ICS adoption, meaning that the compatibility with traditions and habits might not necessarily accelerate adoption but that incompatibility would hinder the diffusion of such stoves. The success of the *Salama jiko banifu* can be attributed to its design according to local needs. It was already adequate in the beginning, but it has been adapted during the implementation period by integrating the feedback from group members, i.e. the height was lowered and the size of the combustion chamber was reduced. This adaptation was highly valued by the farmers and frequently mentioned during the discussions. The most important factor for using the TSF instead of the ICS was that it was not mobile and that the pot size fitting on the ICS was restricted and could therefore not be used for cooking larger quantities, as necessary for social gatherings or when preparing some local dishes. This confirms the findings from the literature, which also stated that in most cases a new stove is being used supplementary to the old cooking device(s) ('fuel stacking'). Instead of replacing the traditional stove completely, the new one is rather used for some specific tasks. This "'adoption niche' has to do with the compatibility and comparative effectiveness with regards to the different cooking practices" (RUIZ-MERCADO ET AL., 2011:7652). This has been observed by many researchers studying the adoption and diffusion of ICS in Africa, Asia and Latin America (MASERA ET AL., 2005; RUIZ-MERCADO ET AL., 2011). This implies that when planning to introduce an ICS in a new community, it is advisable to gather information and insights into the main cooking practices, regular meals and their requirements to make sure the new device is better

suited and more efficient for these tasks than the traditional one (GACC, 2015). The analysis of the qualitative and quantitative data did not lead to the conclusion that the rate of adoption was affected by the flaws of immobility and restricted pot hole size. As it did not impact daily cooking practices but merely concerned cooking for special occasions, most participants were not very concerned and instead valued the benefits of the ICS much stronger.

By considering the feedback from the local population and adapting elements of the implementation process or the innovation, the farmers feel respected and heard. This is important as they often feel neglected by local governments or institutions. In the case of *Salama jiko banifu*, the innovation has been adapted as previously described and the timing of trainings has also been adapted to match the farmers' schedules. Adapting the innovation in reaction to their input also increases their sense of ownership for the innovation. It is important that local needs are assessed before starting ICS implementation activities in any new villages. The case of Chinoje serves as good example. People in Chinoje cook with big clay pots that are put on brick stoves. A potential ICS implementation should consider this and if possible adapt the design accordingly. Some women mentioned during the discussions that the brick stoves sometimes broke the clay pot, so it would be recommendable to clearly communicate the benefit of ICS in comparison to this stove. Furthermore, site-specific factors should always be carefully assessed and considered during the planning of implementation or outscaling, e.g. for villages that are threatened by floods like Changarawe or Tindiga. As has been learned from Changarawe, the destruction of ICS by floods can seriously harm the adoption process because people might be reluctant to pay again for construction. If ICS are going to be implemented in Tindiga, it would be recommendable to either adapt the design in such a way that it can withstand the flooding of kitchens or develop a strategy for what will be done in case a flood destroys constructed ICS. The more adapted the design and approach is to local needs, the less uncertainty will remain and therefore the probability for adoption increases. This follows ROGERS' (2003) idea that the reduction of uncertainty is an especially important factor for accelerated adoption.

In general, the implementation approach via the formation of income-generating ICS groups, who receive trainings on practical skills as well as education on related topics facilitated a strong local capacity building positively influencing the adoption of ICS.

ICS-related trainings as well as supplementary trainings on entrepreneurship were valued highly by the farmers. During the interviews, the combination of innovation-related trainings with other useful trainings as an important feature of the project was mentioned several times by key informants. Recommended topics included additional trainings on sanitation and hygiene as well as the repetition of trainings addressing the long-term effects on health to ensure that people internalized the knowledge in the long-term. More trainings on group management were recommended by some key informants as well, especially for group leaders. HANNA ET AL. (2016) mentioned the importance of not only distributing ICS but also training the adopters in how to use the new stoves and especially how to maintain them, e.g. regular cleaning of the chimney. People should also be trained on how to repair the new stoves. CORDES (2011) emphasized the importance of these trainings being provided locally and recommended to combine these trainings with further trainings on entrepreneurship, marketing and financing to enable local capacity building, especially for women. An important possibility is also the combination of ICS construction with tree nursery and afforestation activities, as is already being done in the ICSS. This can help to increase awareness about the environmental consequences of deforestation and improve access to firewood over the long-term.

Strategical selection of communities and individuals to accelerate the rate of adoption has been addressed by many researchers and it was possible to gain practical insights by observing the impact of a few active individuals in Ilolo and Idifu. As has already been mentioned, both villages have a few highly active members that construct nearly all ICS and in Idifu this has already succeeded in outscaling the ICS to neighbor villages. Nevertheless, when also aiming to strengthen local capacity building, a more inclusive approach should be pursued. As an outsider, it is not possible to assess whether the situation in those villages is a result of a part of the group not being interested in construction and the active members simply taking over the tasks in reaction or if those active members took over all tasks by suppressing the passive members, who maybe did not have the courage or authority to claim their rights as group members. In such a case, high involvement of local change agents who know the people and are able to assess the situation, can help to establish more productive group dynamics and a more inclusive local capacity building. When selecting opinion leaders within a community it is also important to clearly distinguish between authority and influence. A person holding an important official position is not necessarily a person who is approached by community

members for advice and opinion, although this is often the case (DEARING, 2009). In the case of ICS, women should be targeted because they are the persons affected by cooking-related issues and are more likely to adopt an ICS than men. This also became observable by the distribution of gender in ICS adopters, which is highly imbalanced. Nevertheless, it is also recommendable to design messages directed to men to emphasize the benefits of ICS they care about, because in most cases it is them who are holding the decision-making power within the HHs (GACC, 2015). The analysis of quantitative and qualitative data indicated that women cared most about the benefits related to cooking such as reduced firewood and shorter cooking time, while men seemed to care especially about the reduced firewood consumption and the ICS being more secure. The protection of the environment was also mentioned several times but only by male participants. To ensure a quick uptake of ICS in new project villages, clear messages communicating the benefits should be developed. Another important factor for the selection of participants in the case of ICS should be the physical resilience of participants to ensure that they can fulfill the construction tasks including the transportation of materials. During the fieldwork, it was observed in some cases, that group members appeared to be physically weak and not very mobile due to their age or injuries. Even though inclusion is important, in the case of ICS construction groups it could lead to a decelerated rate of adoption if a certain share of group members is physically not able to construct the new stoves.

Communication and knowledge-sharing turned out to be highly influential means for the diffusion of ICS. Most of the adopters in the FGDs stated that they had heard about ICS from their neighbours and friends or had seen the new stoves at their houses. While appreciating other outscaling means like the FFDs, demonstration sessions or media, many participants said those events would not have triggered the decision to adopt, but hearing about it from a socially close person did. This also included being approached by group members. This confirms ROGERS (2003) statement that interpersonal communication has a particularly important impact on the decision to adopt or reject. Many adopters also mentioned that they had first observed the new stoves at other houses until they were convinced of the benefits and had therefore reduced uncertainty before they decided to adopt (ROGERS, 2003). This is related to ROGERS (2003) identification of different adopter categories, whereby the group members represent the early adopters. The concept of early adopters is particularly important in the case of ICS because the new stoves are often unknown and many people want to reduce uncertainty

by observing it in action before deciding whether to adopt or reject (DEARING, 2009). In the case of this thesis, the project approach facilitated this process by offering incentives to the first ones to adopt, i.e. the group members. The provision of free materials reduces financial risk and the premise of income generation as well as acquiring knowledge and skills serving as additional incentives.

It was noticed during the fieldwork that knowledge about health problems related to smoke does not seem to have a strong impact on people's behaviour. In Kilosa district, most participants reported that they are using wet firewood during rainy season, which causes strong smoke emission when burned. This leads to the conclusion that knowledge on health-related problems from smoke inhalation is not a decisive factor for the adoption of ICS. Many studies discovered that a better knowledge of the stove and its benefits did not have a great influence on the decision to adopt an ICS. In general, knowledge was found to play a rather marginal role for the uptake of health-related innovations and has been addressed by many researchers (BELTRAMO ET AL., 2015; MEREDITH ET AL., 2012). LEWIS AND PATTANAYAK (2012) stated that results from several studies suggest that especially health-related innovations (e.g. water filter, mosquito nets, ICS) are often not adopted or continuously used, even if health benefits are clearly communicated. The conclusions are backed by other studies in Kenya, Guatemala, India and Uganda, which also demonstrated that information and knowledge sharing of health improving innovations or products did not affect the decision of potential adopters, while liquidity constraints did have a strong impact (MEREDITH ET AL., 2012). Many studies discovered that a better knowledge of the stove and its benefits did not have a great influence on the decision to adopt an ICS. In another study, BELTRAMO ET AL. (2014) observed that free trial and time payments led to a much higher likelihood of purchasing an ICS. This brings forth the conclusion that trialability has a much higher value in convincing people to purchase an ICS than knowledge about its benefits.

Recommendations

Deriving from the analysis of the collected data and the preceding discussion of the results a set of recommendations for further implementation and outscaling of ICS in rural Tanzania was developed:

1. Target areas with low access to fuelwood

2. Target areas with similar socioeconomic and biophysical condition
3. Target opinion leaders within the communities and villages that are likely to adopt quickly and select participants (early adopters) according to skills and abilities to facilitate an accelerated adoption rate
4. Make sure that there are no other projects present in the target villages or use pre-existing structures from similar projects for synergies
5. Emphasize local capacity building through income-generating activities, creation of ownership, training of trainers and community development (group formation)
6. Involve local change agents, especially extension officers, and support close cooperation between the different stakeholders
7. Offer trainings on innovation-related issues but also on group management and entrepreneurship and plan training schedule according to time schedule of farmers
8. Apply participatory mechanisms and integrate feedback from the target group by adapting elements of the implementation process or the ICS
9. Assess closely traditions and prevalent habits associated with the innovation and site-specific factors, no one size fits all approach
10. Use demonstration sessions and farmer field days for outscaling

7.3 Critical Reflection

The strength of this thesis derived from the assessment of essential factors for ICS adoption and outscaling from an adopter perspective as well as from a researcher perspective. The characteristics of the adopters' livelihoods that influence their attitude and expectations towards an innovation were analyzed in depth through FGDs, ratings and interviews. Furthermore, the implementation process was examined by interviews with key informants and during FGDs. The triangulation of data via the collection of qualitative and quantitative data enabled the verification of statements made in discussions or interviews and furthermore, allowed for a quantification of the identified factors that influenced the adoption of ICS.

However, there were certain limitations regarding the scope of the study and the used methods for data collection and analysis which will be addressed in this section. Qualitative methods used in the fieldwork are always subject to biases and can therefore

never be completely objective which affects the data collection and interpretation. The researchers' subjective impression determines the classification of obtained data. Interviews and FGDs are therefore always influenced by the personal situation of the researcher, hopes and fears, specific interests, gender, age and the cultural background (WENGRAF, 2001). The obtained knowledge is also influenced by the social relations between the researcher, the translator (if included) and the researched, therefore the analysis of collected data should always be reflected upon in this context (CARETTA, 2015).

Conducting research in a cross-cultural context is always challenging, especially when the native language of the informants is not spoken by the researcher and when both parties do not share the same cultural background (MOLLINGA, 2008). The FGDs and interviews were held in English, as the researcher did not speak the national language Swahili. The inclusion of a translator was necessary because almost none of the farmers spoke English. Translators might not only serve the purpose of merely translating the spoken word but can also act as 'cultural brokers' and minimize cultural biases during the process of research (MOLLINGA, 2008). The translator is aware of customs, social circumstances and etiquette and may serve as interpreter. In the case of this study, the researcher was highly experienced and had translated for European researchers several times before. Despite the high qualification of the translator, the process of translation is inevitably connected to the loss of meaning and content. There are words that cannot be translated adequately in other languages or have different meanings relating to the cultural context.

Furthermore, answers might have been influenced by the fact that the researcher was seen as representative of the project implementing the ICS and were therefore less critical. In the PCSS, answers might have been biased because the participants had an interest for the new project to implement ICS in their villages as could be observed by the example of Kitunduweta.

By only including groups in the ICSS that had adopted ICS, it can be assumed that the majority had a positive attitude towards the innovation. When planning the fieldwork, it was foreseen to include 'drop outs' into the data collection to gain understanding for the reasons people might not adopt ICS, stop using it or did no longer participate in project activities. Throughout the first sessions, it became clear that this was not feasible because the respective individuals were reluctant to talk to any researcher. After some

unsuccessful efforts, it was decided to not include this stakeholder group in the fieldwork. By excluding this group, a more critical perspective on ICS and the implementation process from an adopters' perspective could not be obtained.

The rating was a challenging task to some of the respondents, that strongly influenced the quality of the derived data in some cases. The rating on a 5-point Likert scale resulted to be difficult to many participants who were not always capable or willing to distinguish between varying levels of disagreement or agreement. This problem has also been addressed in the literature (WILLITS ET AL., 2016).

8 Conclusion

This thesis has assessed essential biophysical, socioeconomic and operational factors for the adoption, diffusion and outscaling of ICS within the context of rural Tanzania. This was achieved by collecting data through qualitative methods from (potential) adopters and key informants involved in the implementation process and quantifying the identified factors through rating by the adopters. Driving factors for a high adoption rate are the access to firewood influenced by climate and infrastructure as well as the economic status of the potential adopters, i.e. income and additional income generating activities that influence the activism of ICS constructing groups. Resulting from the analysis of the obtained data during the fieldwork some general recommendations for further outscaling activities were derived such as the strategical targeting of project villages according to similar socioeconomic and biophysical conditions, especially scarcity of firewood, as well as targeting individuals within the community who are likely to be opinion leaders. Moreover, it should be avoided to start project activities in a region where other R&D projects are already implementing a similar innovation or if not feasible, cooperate with those projects to maximize efficiency and synergies. The formation of income-generating farmer groups for ICS construction is recommended to accelerate the ICS adoption rate and support local capacity building. Projects applying action research by participatory mechanisms are likely to be more successful in ICS adoption because the integration of feedback from the target group enables the adaptation of methods and innovations to farmers' needs. Site-specific factors as local cooking habits or climatic constraints like floods should be carefully assessed and considered accordingly before starting project activities in new villages. A 'one size fits all' approach is unlikely to be successful in the case of ICS. Approaches to integrate the

issue of cooking energy and cooking tools in a nutrition-focused intervention, like in the case of Scale-N, reflect the importance of cooking for food and nutrition security and can serve as role model to future rural development projects.

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Appendices

Appendix 1 Rating Results

n = number of respondents; sd = standard deviation;
ratings: 1 = not important at all/strongly disagree, 2 = not important/disagree, 3 = neutral, 4 = important/agree, 5 = very important/strongly agree

1. Infrastructure

District ICSS					
Kilosa			Chamwino		
n	mean	sd	N	mean	sd
45	4.20	1.18	74	4.23	1.13

District PCSS					
Chamwino			Kilosa		
N	mean	sd	n	mean	sd
44	2.07*	1.07	39	1.59*	0.60

Kilosa ICSS					
Changarawe			Ilakala		
n	mean	sd	N	mean	sd
20	3.65**	1.23	25	4.64**	0.95

Chamwino ICSS					
Idifu			Ilolo		
N	mean	sd	n	mean	sd
40	4.65**	0.74	34	3.74**	1.31

Kilosa PCSS					
Tindiga			Muhenda-Kitunduweta		
n	mean	sd	N	mean	sd
19	1.63	0.60	20	1.55	0.61

Chamwino PCSS					
Chinoje			Mzula		
N	mean	sd	n	mean	sd
23	1.87	1.06	21	2.29	1.06

Gender ICSS					
Female			Male		
n	Mean	sd	N	mean	sd
92	4.23	1.12	27	4.19	1.24

Status					
Group Member			Adopter		
n	mean	sd	n	mean	sd
67	4.30	1.19	52	4.12	1.08

2. Socioeconomic Factors

Socioeconomic Factors

	Projects					
	ICSS			PCSS		
	n	mean	sd	n	mean	sd
Gender	119	4.56***	1.01	83	3.54***	1.46
Age	119	2.17***	1.72	83	1.20***	0.73
Education	119	1.89***	1.57	83	1.12***	0.53
Income	119	1.59**	1.30	83	1.17**	0.76

	Region All						Gender All					
	Kilosa			Chamwino			Female			Male		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Gender	84	4.42*	1.13	118	3.95*	1.40	160	4.14	1.33	42	4.14	1.28
Age	84	2.43**	1.85	118	1.31***	0.89	160	1.70	1.42	42	2.05	1.65
Education	84	1.86**	1.51	118	1.37**	1.09	160	1.57	1.28	42	1.60	1.42
Income	84	1.75**	1.46	118	1.18***	0.74	160	1.44	1.20	42	1.31	0.84

	Kilosa ICSS						Chamwino ICSS					
	Changarawe			Ilakala			Idifu			Ilolo		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Gender	20	4.45	0.83	25	4.04	1.62	40	5.00***	0.0	34	4.50***	0.96
Age	20	3.15	1.81	25	3.80	1.80	40	1.65	1.29	34	1.00	0.00
Education	20	1.60*	1.23	25	3.28*	1.86	40	1.78	1.54	34	1.18	0.72
Income	20	1.20**	0.52	25	2.88**	1.86	40	1.48	1.20	34	1.00	0.00

Socioeconomic Factors

	Kilosa PCSS						Chamwino PCSS					
	Tindiga			Muhenda-Kitunduweta			Chinoje			Mzula		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Gender	19	4.68	0.58	20	4.60	1.00	23	2.48	0.73	21	2.67	1.56
Age	19	1.00	0.00	20	1.35	1.09	23	1.26	0.75	21	1.19	0.60
Education	19	1.00	0.00	20	1.15	0.37	23	1.00	0.00	21	1.33	0.97
Income	19	1.00	0.00	20	1.60	1.47	23	1.00	0.00	21	1.10	0.30

3. Knowledge-Sharing

Knowledge-Sharing

	PCSS ICSS						Gender ICSS					
	ICSS			PCSS			Female			Male		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Group	119	4.67	0.70				92	4.64	0.74	27	4.78	0.58
Community	119	4.66	0.82	83	4.49	0.72	92	4.66	0.80	27	4.63	0.88

	ICSS Status						District ICSS					
	Group Members			Adopters			Chamwino			Kilosa		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Group	67	4.84***	0.57	52	4.47***	0.80	74	4.55*	0.80	45	4.87*	0.46
Community	67	4.72	0.83	52	4.58	0.80	74	4.55	0.95	45	4.82	0.49

	Kilosa District ICSS						Chamwino District ICSS					
	Changarawe			Ilakala			Idifu			Ilolo		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Group	20	4.95	0.22	25	4.80	0.58	40	4.78***	0.62	34	4.29***	0.91
Community	20	4.95	0.22	25	4.72	0.61	40	4.95***	0.22	34	4.09***	1.24

Knowledge-Sharing

	Kilosa District PCSS						Chamwino District PCSS					
	Tindiga			Muhenda-Kitunduweta			Mzula			Chinoje		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Community	19	4.37	0.76	20	4.50	0.69	21	4.71	0.64	23	4.39	0.78

4. Trainings

Trainings ICSS

	District Comparison						Kilosa ICSS Comparison					
	Kilosa			Chamwino			Changarawe			Ilakala		
	n	mean	Sd	n	mean	sd	n	mean	sd	n	mean	sd
Group Training	45	4.74	0.66	74	4.73	0.60	20	4.70	0.66	25	4.64	0.70
Technical Training	45	4.96	0.20	74	4.88	0.47	20	4.90	0.31	25	5.00	0.00
Economic Training	45	4.76	0.50	74	4.49	0.80	20	4.70	0.57	25	4.80	0.50
Guided Learning	45	4.67	0.70	74	4.76	0.64	20	4.50	0.83	25	4.80	0.58
Firewood Management	45	4.73	0.60	74	4.70	0.78	20	4.55	0.83	25	4.88	0.44

	Chamwino ICSS Comparison						Status ICSS Comparison					
	Idifu			Ilolo			Group Members			Adopters		
	n	mean	Sd	n	mean	sd	n	mean	sd	n	mean	sd
Group Training	40	4.98	0.16	34	4.76	0.65	67	4.89	0.66	52	4.73	0.60
Technical Training	40	4.75	0.59	34	4.18	0.90	67	4.97	0.17	52	4.83	0.55
Economic Training	40	4.95	0.22	34	4.38	1.13	67	4.60	068	52	4.58	0.78
Guided Learning	40	4.93	0.27	34	4.44	1.05	67	4.82	0.42	52	4.60	0.87
Firewood Management	40	4.93	0.27	34	4.44	0.77	67	4.78	0.69	52	4.64	0.77

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Trainings PCSS

	Kilosa PCSS Comparison						Chamwino PCSS Comparison					
	Muhenda-Kitunduweta			Tindiga			Chinoje			Mzula		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Group Training	20	4.10	0,97	19	4.68	0.48	23	4.74	0.69	21	4.67	0.73
Technical Training	20	4.10	1,02	19	4.68	0.58	23	4.70	0.63	21	6.71	0.56
Economic Training	20	4.35	0,88	19	4.84	0.37	23	4.61	0.66	21	6.48	0.87
Guided Learning	20	4.15	1,04	19	4.58	0.51	23	4.52	0.79	21	4.24	1.26
Firewood Management	20	4.70	1,17	19	4.63	0.60	23	4.00	0.95	21	4.52	0.68

5. Reasons for Non-Attendance at Trainings

Reasons for Non-Attendance at Trainings

	District ICSS Comparison						Gender					
	Chamwino			Kilosa			Female			Male		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Personal	39	3.74***	1.27	28	2.57***	1.27	15	2.80	1.61	13	2.31	1.11
Distance	39	2.90**	1.25	28	2.11**	1.25	15	2.27	1.53	13	1.92	1.19
Time	39	2.23	1.60	28	2.71	1.60	15	2.87	1.46	13	2.54	1.51

	Kilosa ICSS Comparison						Chamwino ICSS Comparison					
	Changarawe			Ilakala			Idifu			Ilolo		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Personal	13	2.92	1.66	15	2.27	1.10	22	4.14*	1.04	17	3.24*	1.39
Distance	13	2.92**	1.51	15	1.40**	0.51	22	3.27*	1.12	17	2.41*	1.28
Time	13	3.46*	1.39	15	2.07*	1.22	22	2.27	1.55	17	2.18	1.71

6. Operational Factors

Operational Factors

	ICSS			District ICSS					
				Kilosa			Chamwino		
	n	mean	sd	n	mean	sd	n	mean	sd
Extension Officer	119	3.63	1.60	45	4.84***	0.48	74	2.89***	1.60
Feedback	67	4.78	0.49	28	4.75	0.52	39	4.80	0.47
Adaptability	119	4.56	0.85	45	4.56	0.81	74	4.55	0.88
Ownership	67	5.00	0.00	28	5.00	0.00	39	5.00	0.00

	Kilosa ICSS						Chamwino ICSS					
	Changarawe			Ilakala			Idifu			Ilolo		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Extension Officer	20	4.70	0.66	25	4.96	020	40	2.68	1.61	34	3.15	1.58
Feedback	13	4.62	0.65	15	4.87	0.35	22	4.82	0.40	17	4.77	0.56
Adaptability	20	4.45	0.69	25	4.64	0.91	40	4.75	0.59	34	4.32	1.09
Ownership	13	5.00	0.00	15	5.00	0.00	22	5.00	0.00	17	5.00	0.00

	Gender						Status					
	Female			Male			Group Member			Adopter		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Extension Officer	92	3.62	1.63	27	3.67	1.57	67	3.82	1.41	52	3.39	1.81
Feedback	44	4.84	0.37	23	4.65	0.65	67	4.78	0.49	0		
Adaptability	92	4.52	0.93	27	4.67	0.48	67	4.51	0.93	52	4.62	0.75
Ownership	44	5.00	0.00	23	5.00	0.00	67	5.00	0.00	0		

7. Reasons to join ICS Group

Motivations all

	ICSS PCSS						Gender all					
	ICSS			PCSS			Female			Male		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Payment	67	2.21***	1.57	83	3.58***	1.7	112	3.29***	1.76	38	2.00***	1.45
Material	67	3.07**	1.84	83	3.92**	1.44	112	3.83***	1.57	38	2.68***	1.71
Income	78	3.64***	1.55	83	4.49***	0.85	44	3.55	1.81	23	3.91	1.31
Knowledge	119	4.61	0.89	83	4.58	0.78	160	4.58	0.88	42	4.69	0.85
Reputation	119	3.44***	1.74	83	4.51***	0.89	160	3.80	1.59	42	4.17	1.55
Joy	78	4.53	0.86	83	4.51	0.82	160	4.49	0.84	38	4.61	0.84

Motivations ICSS

	District Comparison						Gender ICSS Comparison					
	Kilosa			Chamwino			Female			Male		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Payment	28	2.43	1.45	39	2.05	1.65	44	2.41	1.65	23	1.83	1.30
Material	28	3.11	1.71	39	3.05	1.95	44	3.27	1.81	23	2.70	1.87
Income	28	3.86	1.21	39	3.54	1.79	44	3.55	1.81	23	3.91	1.31
Knowledge	45	4.82	0.49	74	4.49	1.05	92	4.55	0.98	27	4.81	0.48
Reputation	45	3.78	1.48	74	3.23	1.87	92	3.28	1.80	27	3.96	1.45
Joy	28	4.61	0.83	39	4.72	0.72	44	4.66	0.81	23	4.70	0.70

	Kilosa ICSS Comparison						Chamwino ICSS Comparison					
	Changarawe			Ilakala			Idifu			Ilolo		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Payment	13	2.54	1.33	15	2.33	1.59	22	2.10	1.60	17	2.00	1.70
Material	13	2.23*	1.30	15	3.87*	1.68	22	3.00	2.00	17	3.20	1.90
Income	13	3.92	1.19	15	3.80	1.26	22	4.00	1.50	17	3.10	1.80
Knowledge	20	4.80	0.52	25	4.84	0.47	40	4.80	0.70	34	4.10	1.30
Reputation	20	3.75	1.33	25	3.80	1.61	40	3.10	2.00	34	3.40	1.80
Joy	13	4.54	0.78	15	4.67	0.90	22	4.90	0.50	17	4.50	0.90

Motivations PCSS

	District Comparison						Gender PCSS Comparison					
	Chamwino			Kilosa			Female			Male		
	n	mean	sd	n	Mean	sd	n	mean	sd	n	mean	sd
Payment	44	2.57***	1.71	39	4.71***	0.65	68	3.87***	1.58	15	2.27***	1.67
Material	44	3.18***	1.56	39	4.74***	0.64	68	4.19***	1.28	15	2.67***	1.50
Income	44	4.43	0.50	39	4.56	0.72	68	4.57	0.70	15	4.13	1.30
Knowledge	44	4.43	0.95	39	4.74	0.50	68	4.60	0.74	15	4.47	1.00
Reputation	44	4.55	0.90	39	4.46	0.88	68	4.50	0.87	15	4.53	1.00
Joy	44	4.45	0.88	39	4.56	0.75	68	4.52	0.78	15	4.67	1.00

	Chamwino PCSS Comparison						Kilosa PCSS Comparison					
	Chinoje			Mzula			Muhenda-Kitunduweta			Tindiga		
	n	mean	sd	n	Mean	sd	n	mean	sd	n	mean	sd
Payment	23	2.87	1.89	21	2.24	1.48	20	4.65	0.81	19	4.79	0.42
Material	23	3.57	1.20	21	2.76	1.81	20	4.65	0.75	19	4.84	0.50
Income	23	4.35	0.93	21	4.52	0.98	20	4.75	0.66	19	4.42	0.77
Knowledge	23	4.35	0.93	21	4.52	0.98	20	4.90	0.31	19	4.58	0.61
Reputation	23	4.87	0.63	21	4.19	1.03	20	4.45	1.00	19	4.47	0.77
Joy	23	4.70	0.63	21	4.19	1.03	20	4.60	0.82	19	4.53	0.70

8. Outscaling

Outscaling ICSS

	District Comparison					
	Kilosa			Chamwino		
	n	mean	sd	n	mean	sd
Demonstration Session	17	5.00*	0.00	35	4.54*	0.92
Merchandise	17	4.35*	0.86	35	4.80*	0.58
Farmer Field Day	17	4.53	0.72	35	4.80	0.53
Farmer to Farmer Visit	17	4.24	1.03	35	4.31	0.96
Neighbours/Friends	17	4.24	1.15	35	4.49	0.82
Media	17	3.82	1.33	35	3.80	1.71

	Kilosa ICSS Comparison						Chamwino ICSS Comparison					
	Changarawe			Ilakala			Idifu			Ilolo		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Demonstration Session	20	4.85	0.37	25	4.84	0.47	34	4.62	0.85	40	4.88	0.33
Merchandise	7	4.29	0.49	10	4.40	1.07	18	5.00	0.00	17	4.59	0.80
Farmer Field Day	7	4.86	0.38	10	4.30	0.82	18	4.94	0.24	17	4.65	0.70
Farmer to Farmer Visit	7	4.14	0.90	10	4.30	1.16	18	4.83	0.38	17	3.76	1.09
Neighbours/Friends	7	3.43	1.40	10	4.80	0.42	18	4.89	0.32	17	4.06	0.97
Media	7	4.14	0.90	10	3.60	1.58	18	4.94	0.24	17	2.59	1.77

Outscaling PCSS

	Chamwino PCSS Comparison						Kilosa PCSS Comparison					
	Chinoje			Mzula			Muhenda-Kitunduweta			Tindiga		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Merchandise	0			0			0			0		
Farmer Field Day	23	4.39	1.03	21	4.48	0.87	20	4.25	0.97	19	4.68	0.60
Farmer to Farmer Visit	23	4.30	0.93	21	3.86	1.15	20	3.65	1.27	19	3.95	0.80
Neighbours/Friends	23	4.61	0.72	21	4.67	0.73	20	3.90	1.25	19	4.16	0.80
Media	23	3.52	1.12	21	3.71	1.35	20	4.35	0.99	19	4.53	0.80

9. Benefits of ICS

Benefits all

	ICSS PCSS						Gender all					
	ICSS			PCSS			Female			Male		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Wood Savings	119	4.92**	0.33	83	4.72**	0.67	160	4.81	0.54	42	4.91	0.37
Cooking Time Savings	119	4.87**	0.45	83	4.70**	0.62	160	4.8	0.55	42	4.76	0.47
Health	119	4.93***	0.31	83	4.41***	0.88	160	4.73	0.65	42	4.67	0.72
Security	119	4.90**	0.38	83	4.71**	0.6	160	4.79	0.53	42	4.93	0.26
One Ignition	119	4.76***	0.63	83	3.89***	1.16	160	4.41	0.95	42	4.38	1.13
Environment	119	4.73***	0.63	83	4.39***	0.87	160	4.56	0.77	42	4.69	0.72

Benefits ICSS

	District Comparison						Gender ICSS Comparison					
	Kilosa			Chamwino			Female			Male		
	n	mean	sd	n	mean	Sd	n	mean	sd	n	mean	sd
Wood Savings	45	4.96	0.21	74	4.89	0.39	92	4.90	0.37	27	4.96	0.19
Cooking Time Savings	45	4.80	0.51	74	4.91	0.41	92	4.87	0.45	27	4.85	0.46
Health	45	4.91	0.36	74	4.95	0.28	92	4.95	0.27	27	4.89	0.42
Security	45	4.89	0.44	74	4.91	0.34	92	4.87	0.43	27	5.00	0.00
One Ignition	45	4.78	0.64	74	4.76	0.64	92	4.74	0.69	27	4.85	0.36
Environment	45	4.71	0.59	74	4.74	0.66	92	4.69	0.68	27	4.89	0.42

	Kilosa ICSS Comparison						Chamwino ICSS Comparison					
	Changarawe			Ilakala			Idifu			Ilolo		
	n	mean	sd	n	mean	Sd	n	mean	sd	n	mean	sd
Wood Savings	20	4.90	0.31	25	5.00	0.00	40	4.90	0.30	34	4.90	0.50
Cooking Time Savings	20	4.60*	0.68	25	4.96*	0.20	40	5.00	0.20	34	4.90	0.60
Health	20	4.85	0.49	25	4.96	0.20	40	4.90	0.40	34	5.00	0.00
Security	20	4.95	0.22	25	4.84	0.55	40	5.00**	0.00	34	4.80**	0.50
One Ignition	20	4.50**	0.89	25	5.00**	0.00	40	5.00**	0.20	34	4.50**	0.90
Environment	20	4.75	0.44	25	4.68	0.69	40	4.90	0.60	34	4.60	0.70

Benefits PCSS

	District Comparison						Gender PCSS Comparison					
	Chamwino			Kilosa			Female			Male		
	n	mean	sd	N	mean	sd	n	mean	sd	n	mean	sd
Wood Savings	44	4.90**	0.36	39	4.51**	0.85	68	4.71	0.69	15	4.80	0.56
Cooking Time Savings	44	4.84*	0.43	39	4.54*	0.76	68	4.71	0.65	15	4.67	0.49
Health	44	4.59	0.76	39	4.21	0.98	68	4.41	0.87	15	4.27	0.96
Security	44	4.73	0.62	39	4.69	0.57	68	4.69	0.63	15	4.80	0.41
One Ignition	44	3.52***	1.11	39	4.31***	1.08	68	3.97	1.07	15	3.53	1.51
Environment	44	4.39	1.02	39	4.38	0.67	68	4.34	0.85	15	4.33	0.98

	Chamwino PCSS Comparison						Kilosa PCSS Comparison					
	Chinoje			Mzula			Muhenda-Kitunduweta			Tindiga		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Wood Savings	23	5.00	0.00	21	4.81	0.51	20	4.45	0.89	19	4.58	0.84
Cooking Time Savings	23	4.78	0.42	21	4.90	0.44	20	4.45	0.69	19	4.63	0.83
Health	23	4.30**	0.88	21	4.90**	0.44	20	4.40	0.88	19	4.00	1.05
Security	23	4.74	0.62	21	4.71	0.64	20	4.80	0.52	19	4.58	0.61
One Ignition	23	3.48	1.08	21	3.57	1.16	20	4.35	0.88	19	4.26	1.28
Environment	23	5.00***	0.00	21	3.71***	1.15	20	4.50	0.69	19	4.26	0.65

10. Flaws of ICS

Flaws ICSS

	District Comparison						Gender ICSS Comparison					
	Kilosa			Chamwino			Female			Male		
	n	mean	sd	n	Mean	sd	n	mean	sd	n	mean	sd
Immobility	45	4.04	1.40	74	4.14	1.40	92	4.11	1.40	27	4.07	1.33
Hole Size	45	4.02	1.22	74	4.11	1.22	92	4.05	1.36	27	4.15	1.29
Bonfire	45	3.47	1.34	74	3.69	1.34	92	3.60	1.44	27	3.63	1.33
Dry Wood	45	3.82*	1.42	74	4.28	1.42	92	4.36**	1.08	27	3.26**	1.66

	Kilosa ICSS Comparison						Chamwino ICSS Comparison					
	Ilakala			Changarawe			Idifu			Ilolo		
	n	mean	sd	n	Mean	sd	n	mean	sd	n	mean	sd
Immobility	25	3.60	1.66	20	4.60	0.68	40	4.25	1.39	34	4.00	1.37
Hole Size	25	3.48***	1.23	20	4.70***	0.80	40	4.03	1.49	34	4.21	1.32
Bonfire	25	3.56	1.08	20	3.35	1.63	40	3.58	1.58	34	3.82	1.29
Dry Wood	25	3.64	1.25	20	4.05	1.61	40	4.45	1.04	34	4.09	1.38

Flaws PCSS

	Chamwino PCSS Comparison						Kilosa PCSS Comparison					
	Chinoje			Mzula			Muhenda-Kitunduweta			Tindiga		
	n	mean	sd	n	mean	sd	n	mean	sd	n	mean	sd
Immobility	23	2.83	1.53	21	2.38	1.63	20	1.85	1.18	19	2.53	1.74
Hole Size	23	3.17	0.83	21	3.33	1.28	20	2.05	1.50	19	2.00	1.15
Bonfire	23	2.65	1.50	21	3.00	1.34	20	1.60	1.23	19	1.53	1.07

11. Perceived Attributes of ICS

Attributes ICSS

	Kilosa ICSS Comparison						Chamwino ICSS Comparison					
	Changarawe			Ilakala			Idifu			Ilolo		
	n	mean	sd	n	mean	Sd	n	mean	sd	n	mean	sd
Compatibility	20	4.70***	0.47	25	5.00***	0.00	40	4.88*	0.46	34	4.65*	0.65
Trialability	20	4.45***	0.76	25	5.00***	0.00	40	4.15	1.37	34	4.71	0.76
Complexity	20	4.80*	0.52	25	5.00*	0.00	40	4.98	0.16	34	4.88	0.33
Observability	20	4.95	0.22	25	4.96	0.20	40	4.93*	0.35	34	4.76*	0.50

	Gender ICSS Comparison						Status ICSS Comparison					
	Female			Male			Group Members			Adopters		
	n	mean	sd	n	mean	Sd	n	mean	sd	n	mean	sd
Compatibility	92	4.82	0.49	27	4.78	0.51	67	4.78	0.52	52	4.85	0.46
Trialability	92	4.64*	0.90	27	4.19*	1.21	67	4.46	1.15	52	4.64	0.74
Complexity	92	4.91	0.32	27	4.96	0.19	67	4.90	0.35	52	4.92	0.19
Observability	92	4.88	0.39	27	4.93	0.27	67	4.91	0.34	52	4.87	0.40

	District Comparison ICSS						District Comparison PCSS					
	Kilosa			Chamwino			Chamwino			Kilosa		
	n	mean	sd	n	mean	sd	N	mean	sd	n	mean	sd
Compatibility	45	4.87	0.34	74	4.77	0.56	44	4.30	0.85	39	4.08	1.09
Trialability	45	4.76	0.57	74	4.41	1.16	44	4.78**	0.82	39	3.85**	1.04
Complexity	45	4.91	0.36	74	4.93	0.25	44	4.30	0.88	39	4.25	0.80
Observability	45	4.96	0.21	74	4.85	0.43	44	4.25	0.87	39	4.28	1.03

Attributes PCSS

	Chamwino PCSS Comparison						Kilosa PCSS Comparison					
	Chinoje			Mzula			Muhenda-Kitunduweta			Tindiga		
	n	mean	sd	n	mean	sd	N	mean	sd	n	mean	sd
Compatibility	23	4.22*	0.80	21	4.38*	0.92	20	3.60**	1.14	19	4.58**	0.77
Trialability	23	4.52	0.90	21	4.43	0.75	20	3.80	1.28	19	3.89	0.74
Complexity	23	4.35	0.71	21	4.24	1.04	20	4.40	0.76	19	4.00	0.82
Observability	23	4.30*	0.93	21	4.19*	0.81	20	3.85	1.23	19	4.74	0.45

12. Desire to adopt ICS and join ICS group

Desire to adopt an ICS or join Group

	District Comparison						Gender					
	Chamwino			Kilosa			female			male		
	N	mean	sd	n	mean	sd	N	mean	sd	n	mean	sd
ICS	44	4.82**	0.69	39	4.36**	1.06	68	4.62	0.88	15	4.53	4.87
Group	44	4.71	0.67	39	4.59	0.72	68	4.60	0.74	15	4.87	0.35

Desire to adopt an ICS or join Group

	Kilosa PCSS						Chamwino PCSS					
	Muhenda-Kitunduweta			Tindiga			Chinoje			Mzula		
	N	mean	sd	n	mean	sd	N	mean	sd	n	mean	sd
ICS	20	4.15	1.14	19	458	0.91	23	5.00	0.00	21	4.62	0.97
Group	20	4.40	0.88	19	4.79	0.42	23	4.70	0.77	21	4.71	0.56

Desire to adopt an ICS or join Group

	Muhenda-Kitunduweta					
	Muhenda			Kitunduweta		
	n	mean	sd	n	mean	sd
ICS	11	3.82	1.17	9	4.56	1.01
Group	11	4.46	0.82	9	4.33	1.00

13. Access to Construction Materials

Access to Construction Materials PCSS

	District Comparison					
	Chamwino			Kilosa		
	n	mean	sd	n	mean	Sd
Cloysoil	44	4.48***	0.82	39	3.44***	1.57
Water	44	4.00	1.34	39	3.74	1.68
Bricks	44	4.75***	0.58	39	3.87***	1.13
Shells/Husks	44	4.55	0.82	39	4.26	1.07
Dried Grass	44	4.82***	0.63	39	3.92***	1.33
Banan Stems	44	1.14***	0.63	39	3.72***	1.30
Firewood???	44	3.23	1.36	39	2.74	1.44

	Chamwino PCSS Comparison						Kilosa PCSS Comparison					
	Chinoje			Mzula			Muhenda-Kitunduweta			Tindiga		
	n	mean	sd	n	Mean	sd	n	mean	sd	n	mean	sd
Claysoil	23	4.26*	0.81	21	4.71*	0.78	20	4.00	0.97	19	2.84	1.86
Water	23	3.30**	1.49	21	4.76**	0.54	20	2.70	1.78	19	4.84***	0.38
Bricks	23	4.61*	0.66	21	4.91*	0.44	20	3.25	1.02	19	4.53***	0.84
Shells/Husks	23	4.26**	0.96	21	4.86**	0.48	20	3.75	1.21	19	4.79**	0.54
Dried Grass	23	4.74	0.75	21	4.91	0.44	20	4.25	0.85	19	3.58	1.64
Banana Stems	23	1.26	0.86	21	1.00	0.00	20	4.50	0.76	19	2.90***	1.15
Firewood	23	4.17**	1.11	21	2.19**	0.68	20	3.20	1.58	19	2.26	1.15

Appendix 2 Time Schedule Focus Group Discussions

Date	Project	Place	Participants	FGD #
26.09.2016	ICSS	Ilakala	Group Members	**1**
27.09.2016	ICSS	Ilakala	Group Members	**2**
29.09.2016	ICSS	Ilakala	Adopters	**3**
30.09.2016	ICSS	Ilakala	Adopters	**4**
01.10.2016	ICSS	Changarawe	Group Members	**5**
03.10.2016	ICSS	Changarawe	Group Members	**6**
05.10.2016	ICSS	Changarawe	Adopters	**7**
01.11.2016	ICSS	Changarawe	Adopters	**8**
08.10.2016	ICSS	Idifu	Group Members	**9**
10.10.2016	ICSS	Idifu	Group Members	**10**
11.10.2016	ICSS	Idifu	Adopters	**11**
12.10.2016	ICSS	Idifu	Adopters	**12**
14.10.2016	ICSS	Ilolo	Group Members	**13**
15.10.2016	ICSS	Ilolo	Group Members	**14**
18.10.2016	ICSS	Ilolo	Adopters	**15**
19.10.2016	ICSS	Ilolo	Adopters	**16**
28.10.2016	PCSS	Mzula	Potential Adopters	**17**
28.10.2016	PCSS	Mzula	Potential Adopters	**18**
29.10.2016	PCSS	Chinoje	Potential Adopters	**19**
31.10.2016	PCSS	Chinoje	Potential Adopters	**20**
02.11.2016	PCSS	Tindiga	Potential Adopters	**21**
03.11.2016	PCSS	Tindiga	Potential Adopters	**22**
07.11.2016	PCSS	Muhenda	Potential Adopters	**23**
08.11.2016	PCSS	Kitunduweta	Potential Adopters	**24**

Appendix 3 Time Schedule Interviews

Date	Place	Participants	Interview #
16.09.2016	Morogoro Town	SUA Student, Technical Implementation ICS	1
29.09.2016	Ilakala	MVIWATA Kilosa: Key Informant Group Management ARI Ilonga: 2 Key Informants Technical Implementation ICS and KG	2
30.09.2016	Ilakala	Extension Officer	3
06.10.2016	Changarawe	Extension Officer	4
11.10.2016	Ididu	ICS Group Secretary	5
13.10.2016	Idifu	ICS Adopter	6
13.10.2016	Idifu	ICS Group Member	7
16.10.2016	Idifu	Extension Officer	8
17.10.2016	Ilolo	ICS Group Member	9
17.10.2016	Ilolo	MVIWATA Chamwino	10
18.10.2016	Ilolo	Extension Officer	11
24.10.2016	Dodoma Town	ARI Makutupora/Hombolo: Coordinator Technical Implementation	12
24.10.2016	Dodoma town	ARI Makutupora/Hombolo: Key Informant Technical Implementation ICS	13
24.10.2016	ARI Ilonga	ARI Ilonga: Coordinator Technical Implementation	14
27.10.2016	Mzula	Village Executive Officer	15
29.10.2016	Chinoje	Chairperson Village Executive Officer Teacher	16
31.10.2016	Mzula	Former ICS group member	17
02.11.2017	Tindiga	Chairperson Village Executive Officer Member of Village Council	18
05.11.2016	Changarawe	New Group Member	19
05.11.2016	Changarawe	ICS Group Secretary	20
07.11.2016	Muhenda	Chairperson Village Executive Officer	21
07.11.2016	Muhenda	Extension Officer	22
08.11.2016	Kitunduweta	Village Executive Officer Deputy of Chairperson	23
10.11.2016	Ilakala	ICS Group Chairperson	24
10.11.2016	Ilakala	ICS Group Member	25
13.11.2016	Morogoro	ARI Ilonga: Key Informant Technical Implementation	26
17.11.2016	Morogoro	SUA: Coordinator Implementation Activities Trans-SEC and Scale-N	27

Appendix 4 Focus Group Discussion Guide ICSS

Motivations to join group (only Group Members)

- What were reasons for participating in this ICS group?
- How did you get interested?

Perceived Attributes of ICS

- Why did you decide to implement/adopt an ICS?
- How did you learn about the ICS initially?
- What expectations did you have about the ICS itself?
- What kind of improvements did you expect from using the ICS?
- What are the main benefits of the ICS?
- And what do you consider as main flaws of the ICS?
- Do you still use the TSF or other stoves instead of the ICS sometimes?
- If yes, when (in which occasions) and why?

Operational Factors

- Which trainings did you receive?
- Were those trainings (content, frequency) satisfying?
- Would you wish for any changes/other topcis?
- Are there hindering factors for the participation in session or trainings?
- How were project researchers involved in the implementation process?
- How is the communication with researchers?
- Was the involvement satisfying/helpful?
- Would you wish for improvements/changes?
- Did you have the opportunity to give feedback on ICS, trainings and sessions? How was is perceived?

Socioeconomic Factors

- Do you think gender/age/income/education play an important role for ICS adoption?
- How do you manage the group? (construction, group savings, leadership, drop outs)
- How do you share knowledge on the ICS with other group members?
- Do you share knowledge on ICS with people outside the UPS group?
- Do you consider the following means as adequate to spread information about the ICS (farmer field day, demonstration sessions, merchandise, media)
- Do you feel personally responsible for your ICS? Or do you rather feel it is still part of the project?

Biophysical Factors

- Which agro-ecological factors are affecting the UPS implementation mostly and how?
- In your village are the roads and the transportation infrastructure satisfying to get firewood?

- Which inputs are needed for the ICS implementation and usage? (PVC pipes to shape chambers/Banana stems, bricks/mud, insulating material (rice husk), dried grass)
- Are they easy to access? Do you see problems in purchasing them after project end?

Appendix 5 Focus Group Discussion Guide PCSS

Status Quo Cooking

- Which stove do you use at the moment?
- Would you wish for improvements of the stove you are using? What is bothering you about it?
- What is important to you while cooking (location, height, number of meals that should be simultaneously cooked)?
- Do you often need a mobile stove?
- How often do you need to prepare meals for bigger or smaller groups than usually?
- Do you agree that for meals like Chapatti or Kande bigger pans are needed and do you cook it often?
- Are there any other meals for which you need special equipment?

Biophysical Factors

- How is the access to firewood?
- How often do you have to collect per week, how long does it take, which family member is going?
- Are all carrying by headload?
- How is the situation for roads and transportation?
- How is the access to water?

***Presentation ICS*:**

Pictures from ICSS are shown to participants and benefits briefly explained (reduction of firewood, faster cooking process, health improvements through less smoke emissions, safer to be around, protection of environment, financial savings)

ICS

- Would you like to try this ICS out? Which of its benefits are most appealing to you?
- Is it a problem that you need big pans every afternoon?
- Do you have the possibility to build an ICS inside your house or outside (place for Banda)? Preferably inside or outside?
- How much would you be willing to pay for an ICS?

Operational Factors

- Are you very busy throughout the year or are there times when they have free time on their hand?
- Would you like to get trained on how to construct an ICS? Why?

- What about other trainings? Why?
- What about the community general?
- How long do they have to walk to get here (school)? Distance a problem?
- At which times trainings would fit well in their schedule? (Day time, season)
- Would you be interested in joining a group with other community members? Why?
- Prefer women group or mixed group? Why?
- Would they be willing to participate money to this group?
- Who would like to construct ICS to other HH for additional income?

Socioeconomic Factors

- How is communication with other community members?
- How if flow of information within the community? Does information always reach them or do they miss out on things sometimes?
- How important is their village executive officer for them? How important is village chairperson?
- How important is the gender of the decision-maker? Are husbands hindering factors for participation/getting new stove?
- Who do they turn for when facing problems?
- Are they/Have they been part of any other projects?

Appendix 6 Interview Guide Key Informants

Introduction to organization and own role

- Could you illustrate the organizational structure of XXX and what is your role in it?
- In your opinion what is your organization's contribution to the implementation? Do you think your organization has a strong impact and influence on the project outcome and can you tell me, which assets account for that?
- Do you have strategic partnerships to public institutions that are helpful for the work? if yes, which ones? How did they help you?
- What previous experience with the farmers do you have?
- Did you receive trainings, if so how often and what kind?

Reporting+ Monitoring + evaluation

- How do you report work in the project?
- Who has access to the reports on UPS implementation?
- Is there any kind of platform for collecting and sharing all reports on UPS implementation?
- Which methods/means /tools do you use to evaluate the Ups groups activity? Ask for monitoring
- How do these evaluations influence future work planning?

Communication

- How often do you meet with other implementing staff? Who is/are your most important contact/cooperator for implementing UPS?
- What kind of communication channels do you use to communicate with other scientific staff? Do you think there are better possibilities to communicate which are not yet available?
- Is there a sharing of experiences and lessons learning?
- On which levels and in which links could decision-making and information flows on adaptations between you and coordination be improved? (ZALF-SUAMVIWATA/ ARI-Ext Agents-Farmers)

Methods of Implementation UPS

- Which kinds of trainings/sessions did you offer and how often?
- Where do you see need for more training?
- Which factors hinder access to these activities + How could the access to training be improved?
- Was the UPS technology adapted during the implementation process? If yes, why and how?
- Did the implementation go according to plan? If not, in which steps and why?
- What do you consider as main constraints for a successful implementation?

Communication to farmers (feedback mechanism, exchange of experience)

- How did you communicate with the farmers and how often?
- What kind of feedback did you get on the implementation methods mentioned above?

Outscaling activities

- Please tell us about current outscaling activities. Do you have any ideas for new activities?
- What in your opinion is a good incentive to get farmers to participate ensure a long-term commitment?
- Can you think of any incentives that would work well?
- How do you plan the exit strategy from the CSS?

Knowledge sharing

- What mechanisms of knowledge sharing are dominant in the CSS? Do they exchange helpful information with other farmers? How well does it work?
- Why do/don't they exchange information with other farmers? (Reasons)

UPS group dynamic

- How are group dynamics (just general, most important issues, differences)? What are joint activities in the groups (apart from meetings)?
- Who are the people they turn to for help when facing problems? Inside society or project staff? Why inside society or why with project staff?

- What are the biggest obstacles or chances for the UPS group? What is your outlook on this UPS group?

Creation of ownership

- Do you think farmers have a sense of ownership for their UPS?

Political/ institutional frame

- Can you tell me about any government programs that support the project activities? If yes, what kind of support?
- What about institutional structures, are there administrative structures hindering your project activities?

Agro-ecological factors

- Which agro-ecological factors are important for the UPS?

Economic conditions on local level

- Do you think the villages have adequate infrastructure?
- How do you see the potential for Market integration /generate additional income?
- In your opinion which inputs are most important and do farmers have access to them?

New Adopters

- What do you think is the difference between the implementers and new adopters?
- Is there an effort made by members to promote UPS in their villages?
- What do you think were the main causes for participants to stop using the UPS?
- What do you think motivates new adopters?

Appendix 7 Interview Guide Village Leaders PCSS

Basic structure and main questions

- What are specific challenges for your village?
- How do you assess the potential for ICS in your village?
- How the access to firewood in your village?
- How is the access to water in your village?
- What do farmers do during dry season?
- Do many inhabitants of your village engage in off-farm season activities for additional income generation?
- How do you assess the general interest to participate in groups or trainings?
- How is knowledge-sharing and communication in your village?
- Have there been or are there any projects in your village?

Appendix 8 Coding System MaxQDA

Appendix 9 Rating Questions ICSS

1.	***How important do you consider the used methods?***
a	Group training
b	Technical training (how to build ICS)
c	Economic training (entrepreneurship)
d	Demonstration session
e	Guided Learning session
f	Training on firewood management
2.	***How important were following hindering factors for participating and access to sessions/trainings for yourself? (only Group Members)***
a	Family activities
b	Distance
c	Time constraints
3.	***The following means are good to spread ICS implementation (only Adopters)***
a	***Promotion through neighbours/friends***
b	Demonstration Sessions
c	Promotion through media
d	Merchandise (T-Shirts/Caps)
e	Farmer field day
f	Farmer to farmer visit
4.	***How important do you consider the involvement of the extension agent in project implementation?***
5.	***How important do you consider giving feedback on the implementation activities? (only Group Members)***
6.	***How important do you consider the flexibility of the ICS for improvements according to your needs?***
7.	***How important do you consider a good road and transportation system for a successful ICS implementation?***

8.	***The following socioeconomic factors are important for the implementation of ICS***
a	Gender of HH head/decision-maker
b	Age
c	Education
d	Income
9.	***How important were following motivations to initially participate in the ICS group? (only Group Members)***
a	Payment for participation in project activities
b	Easy/Free access to construction materials
c	Increase income
e	Gain knowledge/learn new skills
f	Social status/reputation
g	Be part of a group
10.	***How important were following benefits for the decision to adopt an ICS?***
a	Save money (only Adopters)
b	Reduce firewood
c	Save cooking time
d	Improve health (less smoke emission)
e	Safer to be around
f	Only needs to be ignited once
g	Protect environment
11.	***Because of the following flaws I use other stoves***
a	ICS not mobile
b	Hole size for pots can't be reduced/enlarged (not flexible for more or less persons)
c	Can't be used as bonfire
d	Access to dry firewood
12.	***The ICS fits my everyday habits and routines (doesn't cause problems)***
13.	***The ICS can be tried out/can be experimented with before regularly starting to use it***
14.	***The ICS is easy to understand and use***

15.	***The benefits of the ICS can be observed immediately***
16.	***How important do you consider knowledge-sharing with other ICS group members?***
17.	***How important do you consider knowledge-sharing inside the community?***
18.	***How important do you consider feeling personally responsible for the ICS? (sense of ownership)***

Appendix 10 Rating Questions PCSS

1.	***I would like to have an ICS at my house***
2.	***How important would you consider following motivations to adopt an ICS?***
a	Save money
b	Reduce firewood
c	Save cooking time
d	Improve health (less smoke emission)
e	Safer to be around
f	Only needs to be ignited once
g	Protect environment
3.	***I would like to become a member of an ICS group***
4.	***How important would you consider following motivations to become a member of an ICS group?***
a	Payment for participation
b	Easy/Free access to construction materials
c	Increase income
d	Gain knowledge/learn new skills
e	Social status/reputation
f	Be part of a group
5.	***How important would you consider to get the following trainings?***
a	Group training

b	Technical training (how to build ICS)
c	Economic training (entrepreneurship)
d	Demonstration session
e	Guided Learning session
f	Training on firewood management
6.	***Following flaws would prevent using an ICS***
a	ICS not mobile
b	Hole size for pots can't be reduced/enlarged (not flexible for more or less persons)
c	Can't be used as bonfire
d	Dependence on (availability) of dry firewood
7.	***It is important that ICS fits my everyday habits and routines (does not cause any changes)***
8.	***It is important that I can be try out/experiment with the ICS before I start to use it regularly***
9.	***It is important that the ICS is easy to understand and use***
10.	***It is important that the benefits of the ICS can be observed immediatel***
11.	***How important do you consider the involvement of the extension agent in project implementation?***
12.	***How important do you consider knowledge-sharing with other community members?***
13.	***The following means are good to spread ICS implementation***
a	Promotion through neighbours/friends
b	Promotion through media
c	Farmer field day
d	Farmer to farmer visit
14.	***The following socioeconomic factors are important for the implementation of ICS***
a	Gender of HH/decision-maker
b	Age

c	Education
d	Income
15.	***The current road and transportation situation for firewood is satisfying***
16.	***The access to following materials is good/easy***
a	Claysoil
b	Water
c	Bricks
d	Groundnut husks/peels (other CSS)
e	Rice husk (Ilakala)
f	Maize dust (Ilakala)
g	Dried grass
h	Banana stems
i	Firewood

Appendix 11 Transcripts Focus Group Discussions

Focus Group Discussion#1
Date and Place: 26.09.2016, Ilakala
Participants: 9 ICS group members including group leaders (chairperson, secretary)

Can you tell us your reasons for participating in this ICS group? How did you get interested?
Woman#1: Very first reason was to save firewood, 2nd reason to save time (ICS with 2 plates where food can be cooked simultaneously)
Man#1: saved time for wife (used to fetch firewood three times a week, now only once per week), 2nd: reduce smoke
Man#2: call of government that they should shift from traditional ways of living to modern ways of cooking (health issues of wife), cook simultaneously, kids safer when they play around (new design hard to mess up)
Man#3: protect environment (less cutting of trees), time saving for whole family (listen to this part again)
Man#4: way of employment (payment for building stoves)

In your opinion, what are the main benefits of the ICS?
Man#2: Save forest
Man#4: Group activity, good communication, social, wife is cleaner now (ash wind)
Man#5: no more worries about smoke-induced diseases, women look more beautiful (ash on faces)
Woman#2: she enjoys them
Woman#3: cooks fast, kids can eat in time and go to school, she has time for additional activities
Woman#4: health issues
Woman#5: cook fast
Woman#6: can cook simultaneously save time

And what do you consider as main flaws of the ICS?
Man#3: ICS not mobile
Man#4: expensive for adopters from other villages (because transportation costs have to be paid for workers additionally to building costs farmers from other villages complain about too high costs less income for builders here)
Woman#2: ICS burns easily of you delay
Woman#3: takes some time for the fire to get up to speed
Woman#5: build by clay, so sometimes in early stages it's not completely dry so it took longer for the fire to catch on, demotivating
Three say no flaw

Do you still use the TSF (or any other older versions) instead of the ICS sometimes? If yes, when (in which occasions) and why?
Woman#7: TSF at feast or gathering at home (with many people big pots needed)
Men: some other types of ICS from World Version: more creative, smaller, 2 cooking places (one for small pot, other one flexible to size), lower/smaller, cooks the same

All use original but modified version of ICS

Which trainings did you receive from Trans-SEC on ICS?
Training on how to build ICS
Training on how to create a group and run it (chose a leader, have a constitution)
Practical training (trainers came, compared 3sf-ICS cooking test; comparison of firewood usage) good, because they understood why cooking on 3sf is delayed (wind)
Training on leadership (qualities of a chairperson, treasurer, secretary)

5. Training on entrepreneurhip
6. Trained on market tracking (for all UPS groups)
7. Training on how to cook foods buy using measurements
8. Training on chicken keeping (as additional plan)
9. Training on firewood management

No feedback sessions?
Irregularly but yes, many times, every time a researcher comes by he wants feedback

Did all of you participate in all trainings?
Yes
All happy with training,

Were you missing some trainings?
Woman#7: more knowledge on stoves and chicken
Man#2: training on environment protection/tree management

Did you have the opportunity to give feedback on ICS, trainings and sessions? How was it perceived?
Irregularly but yes, many times, every time a researcher comes by he wants feedback
Feedback sessions are helpful, because news are being sampled
Example: own idea that they needed chicken and this was taken by TransSEC, trainings happened

In general, if you were in charge of the program, what would you have done differently?
Do you have any recommendations or ideas for improvement for next projects?
Man#2: Trans-SEC CSS from Dodoma came here for training, all met in Changarawe, they came to train them, so Kilosa UPS members should also go to Dodoma to observe and learn
Man#4: in Dodoma poultry project: go there and learn
Man#1: German farmer partnerships

How do you share knowledge on the ICS with other group members?
Meetings every two weeks by 2 sub-groups, monthly joint meeting

Do you share knowledge on ICS with people outside the UPS group?
Yes

If yes: why do you share those information?
To make all have the ICS

If no: why don't you share those information?
Never happened

Do you feel personally responsible for your ICS? Or do you rather feel it is still part of the project?
TransSEC just as helping hand, now feel as it is belongs to them

Which agro-ecological factors are affecting the UPS implementation mostly and how?
Man#2: Climate affects farming (crops) interferes with income interferes with purchasement of required materials hinders successful ICS implementation
Man#4: climate main aspect

Which inputs are needed for the ICS implementation and usage?
(PVC pipes to shape chambers/Banana stems, bricks/mud, insulating material (rice husk), maize dust, dried grass)
Measuring tape

Are they easy to access? Do you see problems in purchasing them after project end?
no brick making if shortage of water
no problems, can get them from shops nearby

In your village are the roads and the transportation infrastructure sufficient for getting the required materials?
During dry season no problem, have bikes, can manage easily, big problem during heavy rains (people have to use boats) even if you have the money you cannot go buy anything

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Focus Group Discussion#2
Date and Place: 27.09.2016, Ilakala
Participants: 7 ICS group members

Did you chose the ICS group or were you selected randomly?
All of them chose ICS group voluntarily

Can you tell us your reasons for participating in this ICS group? How did you get interested?
Woman#1: just found out that CIS uses less firewood, less smoke emission
Man#1: Food preparing faster, health problems eliminated, less firewood
Man#2: Stoves as time saver, he cooks continuously,
Woman#2: firewood only needs to be ignited once and can be used whole day long (sometimes even at night) vs TSF which needs to be ignited every time again, cooks fast

2.1 ICS
Please name the most important benefit of the ICS for yourself

Man#1: cook fast=time safer
Women: firewood safer, Woman#3: ICS not a threat for children, food can be put on there to keep warm/be heated up, safe time from firewood collection, rice cooking now easier
Woman#5: ICS can act as table, too

Please name the most important flaw of the ICS for yourself
3x (male, 2female): food burns if delayed (heat is centralized, no wind too lessen it)
Woman#3: if you use wet firewood, you create strong smoke inside ICS
Woman#1: takes long time to start fire (once it's lightened it keeps on going)
Woman#5: ICS not mobile
Man#2: food burns if delayed (heat is centralized, no wind too lessen it)

Who has a World Vision Stove? What are the benefits?
Woman#4: smaller, different pot sizes fit in design
Man#2i: WorldVision ones start to crack easily

Do you still use the TSF (or any other older versions) instead of the ICS sometimes? If yes, when (in which occasions) and why?
For occasions with many people

Do you have any other ideas for improvement of the ICS?
Man#2: Price of 3.000 TSH too high (2.500 TSH would be better), old people should get it as gift

Which trainings did you receive from Trans-SEC on ICS?
Training on how to build ICS
Training on how to create a group and run it (chose a leader, have a constitution)
Practical training (trainers came, compared 3sf-ICS cooking test; comparison of firewood usage)
Training on leadership (qualities of a chairperson, treasurer, secretary)
Training on entrepreneurship
Trained on market tracking (for all UPS groups)
Training on how to cook foods buy using measurements
Training on firewood management

What were reasons for not attending some of the trainings?
All attended every time

Would you have liked to get additional trainings on some topics that haven't been given?
They would like to get more trainings
Man#2: more training on entrepreneurship and food cooking
Woman#1: entrepreneurship

Do you have any recommendation for improvement of trainings?
all fine, they did understand the trainers just fine, all good, satisfied, no flaw
Trainigns need to be continuous

Were there official feedback sessions?
irregular meetings

How was the extension agent (Samuel) involved in the ICS implementation process? How did he help you?
all love him

Were his predecessors as helpful as him? If not, what is he doing better?
Don't remember names of predecessors

motorbike only difference, takes his job really serious but no significant difference in terms of performance, it is the personality
Woman#1: perfect temperament, not quick to anger

In general, if you were in charge of the program, what would you have done differently? Do you have any recommendations or ideas for improvement for next projects?
Woman#5: If she was Makoko, she would have bought cement to make ICS more solid/durable
ICS as gift for elderly

Would anybody be willing to go build it for free?
Nobody

How do you share knowledge on the ICS with other group members?
Monthly meeting to exchange ideas

If they face problems, to the turn to other group members or researchers?
Some ICS didn't work, so they turned to Obedy and Irene or to Ogossy

How do you share knowledge on ICS with people outside the UPS group?
Yes

Why do you share those information? Are you being approached or do you speak to them actively about ICS?
People already know about ICS group, so they know where to get information, so they usually approach group members

Do you feel personally responsible for your ICS? Or do you rather feel it is still part of the project?
Feel like its their own

Did the ICS cause any problems with your traditions and habits? E.g. change in cooking style, etc
No problems
change pattern on how to use firewood

Why do they think some community members don't want to implement ICS?
Some people need more education on it
still ongoing process, in some years maybe all will use them
Nobody really refuses it
Maybe financial reasons

Which agro-ecological factors are affecting the ICS implementation mostly and how?
No answer

Specifically, what about rainfall?
if heavy rain, water can ruin ICS

Which inputs are needed for the ICS implementation and usage? (besides PVC pipes/Banana stems, bricks/mud, insulating material, measuring tape)
Water, shovel, bucket

Are they easy to access? Do you see problems in purchasing them after project end?
No problems

In your village are the roads and the transportation infrastructure sufficient for getting the required materials?

No problems

Focus Group Discussion#3
Date and Place: 29.09.2016, Ilakala
Participants: 4 ICS Adopters (all female)

Can you tell us how you got interested? What caught your attention on the ICS?
All heard from neighbours who are group members

Each of you, please tell me what you consider as main benefit of the ICS?
Woman#1: cooking simultaneously on two plates
Woman#2: doesn't burn food, workload of collecting firewood is reduced
Woman#3: less expensive than charcoal
Woman#4: better for environment, food condition is better (no taste of smoke)

When did you install ICS?
All around end 2015/early 2016

And what do you consider as its main flaw for yourself/your family?
Woman#1: construction was bad, breaks down (chamber, hole for pots)
Woman#2: no flaw
Woman#3: space for pots not reduceable
Woman#4: availability of clay soil to cover cracks

Do you still use the TSF instead of the ICS sometimes? If yes, when and why?
All say no

What happens in big gatherings?
Never happened, if it happens TSF

Do you use any other stoves instead of the ICS? If so, which ones and why? What are the benefits? (e.g. World Vision Stove)
None of them has World Vision Stove
No other stoves

Would you like/have liked to get any trainings on additional topics?
Very important to get trainings, especially on how construct stoves, technical training (step by step)

Did you have contact with the implementing scientists in any way? If yes, with whom and how did you communicate with them? Did they approach you or did you go to them?
Only with group members and Samuel, would be better to have access to scientists

Was the extension agent involved in the implementation process? If yes, how?
Samuel checks at their houses and checks ICs condition

Do you think the construction cost of 3.000 TSH/ICS are adequate?
Common price, not too expensive

Has any of you constructed an ICS herself?
One woman only at own house, not at other places, plans to build some in her home town Bagamoyo during holidays

The others would like to have the skills, it's a challenge to ask group members because then they would create competition for themselves, affordability of paying group members for training

How is knowledge sharing with group members?
If there are problems with ICS they can go to group members and they will help, but they don't come by themselves and check if ICS are working well etc
One woman did contact a group member because of her broken ICS but no one ever responded back, she didn't tell Samuel (personal reason), normally they could ask him for help

Do you share knowledge on the ICS with members of the community?
One woman told women in Muhenda to ask for an ICS but no group member ever went there for construction (not too far, but transport for materials needed)
Is she would go herself that would start a conflict because she is not a group member

Which agro-ecological factors are affecting the UPS implementation mostly and how?
Availability of claysoil, firewood, dried grass
firewood easier to access than charcoal, Charcoal: illegal, so you get it mostly by smugglers (high penalties if being caught), you can sell it legally if you have a license but it is more expensive
Clay soil: group members provide it
Dried grass: group members provide it
Woman#4: If house is rented it's hard to construct an ICS

How did implementation of ICS change firewood collecting patterns?
It reduced the amount of firewood strongly

Focus Group Discussion#4
Date and Place: 30.09.2016, Ilakala
Participants: 5 ICS Adopters (one male, four female)

When did you install ICS?
All in the first six months of 2016

Can you tell us how you got interested? What caught your attention on the ICS?
Two women were approached by group members, two have group members as neighbours and saw it at their places, the male participant saw witnessed the construction of an ICS at one of the female participant's house and decided to adopt

Why didn't you adopt it earlier?
Woman#1: Busy with other things, no time for people coming over for her place + preparation needed to get house ready for ICS
Woman#2: time, e.g. for preparing bricks
Man: time needed for house preparation
Woman#3: no money last year

Each of you, please tell me what you consider as main benefit of the ICS for yourself/family?
Man: don't need to blow air into many times
Woman#2: less firewood, cook 2 things at once (easier)
Woman#1: few firewood, cooks faster
Woman#4: can't use it yet so she doesn't know, but her motivation was that two things can be cooked at same time

Woman#3: same as others, pans don't get dirty

Any other benefits?
no smoke inside the house

And what do you consider as its main flaw for yourself/your family?
no flaws

Which kind of stove did you use before?
All TSF

Do you still use the TSF instead of ICS sometimes? If yes, when and why?
No, only one woman in big gathering (once)

Doesn't it bother that the ICS is not mobile?
Yes, this is a flaw for all of them

Do you use any other stoves instead of the ICS? If so, which ones and why? What are the benefits? (e.g. World Vision Stove)
They heard and seen about it, no one has one

Did anyone learn how to build an ICS?
No, but they would like to learn it so they would be able to repair it by themselves

Were there any occasions were repairing was necessary?
No but they would call

Do you have to pay for repairing?
Don't know yet

Did all pay the same price and if so, is it adequate?
All paid same, normal price

Did you participate in any of the project trainings or sessions?
Yes

If yes, which ones?
On how to construct ICS
Other topics as well
on cooking
on how to clean

Did you have contact with the implementing scientists in any way?
Only contact with Samuel, he comes to visit their ICS at homes to check (he comes often)
Woman#4: for problems she tells Samuel and he transfers information to group members
Others communicates directly with group members

How is knowledge sharing with group members?
Woman#4 has no group members nearby, communication with Sam good
Others with group members as neighbours: easy communication

Who gets the Tshirts/Caps?
Don't know Tshirts/Caps, but think it is a good idea

Do you share knowledge on the ICS with members of the community?
Yes

Do they know farmers field day?
Yes, participated in it as it was for whole village (presentation of all UPS), interesting because they didn't know about groups before, every group presented themselves
As first decision point for ICS implementation, didn't mention it in the beginning because it wasn't really a big point to them because they weren't thinking about it actively until members approached them

Farmer—farmer visits
heard about it

Which agro-ecological factors are affecting the UPS implementation mostly and how?
Firewood, Claysoil, Maize Husk, Sand, Bricks

Are materials for ICS construction easy to access?
Some inputs were a challenge because of the costs (e.g. water, bricks)
6 buckets/water = 3.000 TSH
30-40 Bricks = 100 TSH /Brick
200 TSH for 2kg maize dust
Another challenge: hard to get the soil to house
Another challenge: bricks

Any general recommendations/ideas for improvement?
no flaws

Focus Group Discussion#5
Date and Place: 01.10.2016, Changarawe
Participants: 7 ICS group members including group leaders (secretary) (three women, four man)

Did you chose the ICS group or were you selected randomly?
all chose group by themselves

Can you tell us your reasons for participating in this ICS group? How did you get interested?
Man#1: though that project (TransSEC) could help them in his and his family life because of trainings and learning new skills
Man#2: a) wanted to know how ICS is built, b) used, c) "importance of ICS"
Man#3: training on how to construct and use ICS
Woman#1: headload of firewood reduced, food gets cooked quicker
Man#4: in the beginning motivated by environmental conservation because deforestation causes CC, second reason to minimize firewood costs (3-4 bundles/week to 1 bundle/week), he was collecting firewood himself, takes 4hours to go and come back
Woman#2: she is representing her dad who is the group member but she is using
Woman#3: get new skills and learn how to construct and build stoves
Man#4: wanted to get to know use of ICS and numbers of woods/how much firewood to use

Which stove did they use before?
TSF

Please name the most important benefit of the ICS for yourself?
Man#1: you can cook without disturbances in the house (no one will notice you are cooking)
Man#2: minimize cooking costs, eat on time

Man#3: reduce health problems by smoke
Woman#1: safer for children to play around, you can cook two things at once
Man#4: minimize cooking time and reduce costs of collecting firewood, safer
Woman#2: more comfortable because of reduced smoke emission
Woman#3: safer for kids, less smoke
Man#4: less firewood, food cooking is not delayed (important for farmers)

Please name the most important flaw of the ICS for yourself?
not mobile
if you are not close/don't pay attention food can get burned more easily
not mobile, hard to cook with ICS if you are a lot of people (can't expand hole)
harder to blow to ignite fire

If you could change anything?
Firewood channel should be made bigger, because wood gets dense, there is not much air left for fire
still has initial stove, wants to reduce height
Some people already applied it, they did it themselves

Do you still use the TSF (or any other older versions) instead of the ICS sometimes? If yes, when (in which occasions) and why?
big gatherings

Other stoves in use?
Some are using charcoal stoves as well
In winter season there is high rainfall, challenge to get dry wood, therefore charcoal stove better
Woman#3: in case no wood present and you are lazy and have time you can use chaircoal
Man#4: There are type of foods you cannot use ICS for e.g. Chapatti because you have to control fire (in ICS you can't control it, it is always strong), second reason: a lot of rainfall that it enters the hut ICS gets wet and can't be used, when farmers work they sometimes need to eat in fields so they need a mobile stove

What do the ones without other stoves in winter season?
start early to collect firewood (in summer) as backup

Which trainings did you receive from Trans-SEC on ICS?
Technical training (how to build ICS)
Group management training (how to create a group and run it: chose a leader, have a constitution, etc.)
Practical training (trainers came, compared 3sf-ICS cooking test; comparison of firewood usage)
Training on entrepreneurship
Training on firewood management
Information session
Training on how to use and maintain ICS
Training on qualities of ICS
Guided training (when constructing ICS)
Feedback sessions

Frequency of trainings sufficient?
They would like to have trainings more often (can't specify)

What were reasons for not attending some of the trainings?
People don't see the benefits of the trainings, present members think it is very important to go because how can you judge the importance without knowing it

Do they you it would help to give more information before the trainings to convince people to come?
Woman#4: information is very important, they said information were sufficient but its personal reasons

Can you think of any motivations for these people to show up?
There was an argument, recommendation: ICS could be built in a very open central space (exhibition)

Are there hindering factors for the participation in session or trainings?
Family activities, distance, time also a challenge because researchers planned trainings in mornings, and mornings are time for field work

Any recommendation for improvement?
to offer transportation to people living far
change timing of trainings

How was the extension agent involved in the ICS implementation process? How did he help you? What is he doing related to the ICS?
Extension officer is very important, comes and checks ICS often, Mr. Geoffrey Muya, involved since beginning

How is the communication with researchers?
Contacts with ARI, MVIWATA, SUA; normally communicate with extension officer who passes information, they are happy with this way, it is comfortable for them

Did you have the opportunity to give feedback on ICS, trainings and sessions? How was is perceived?
After monthly group meeting feedback is given , enough, feel like it's being considered

How do you share knowledge on the ICS with other group members?
If the stove of someone is not working well the others come help

How do you share knowledge on ICS with people outside the UPS group?
Informal conversation (not planned) with people

Who of you has helped build an ICS at another HH?
All of them

Do you know the ICS T-Shirts and Caps?
They know them but haven't gotten any yet

Do you feel personally responsible for your ICS? Or do you rather feel it is still part of the project?
Yes

Did the ICS cause any problems with your traditions and habits? E.g. change in cooking style, etc?
No

Why do you think some community members don't want to implement ICS?
Man#3: economic problems in village, therefore some people might not be able to implement ICS
Men: little information, would be better if TransSEC people would have an ICS field day instead of farmer field day where all groups are presented, ICS should be made more present so it sticks more to people's minds, also Kilosa Council could include them in meetings (have

asked for it, no answer yet), that would enable much more action, advertisement important

Which agro-ecological factors are affecting the ICS implementation mostly and how?
Soil, Bricks, water, husk, firewood

In your village are the roads and the transportation infrastructure sufficient for getting the required materials?
Infrastructure very supportive, you can get soil and water and firewood
Sometimes in rainy season some streets are tricky

Focus Group Discussion#6
Date and Place: 03.10.2016, Changarawe
Participants: 6 ICS group members

Information given before start of the discussion: They replaced the chairperson, because the initial one was "too lazy" and so they made her give up the position and chose a new one) 36 group members (original and new group members), 4 sub-groups

Can you tell us your reasons for participating in this ICS group? How did you get interested?
Woman#1: strengthen knowledge on use of firewood, learn how to build a stove
Woman#2: no smoke, cook two meals at once, less firewood
Woman#3: less firewood (from 3 times/week to)
Woman#4: safer for kids to be around
Man#1: few firewood, food cooks fast, no smoke

Which stove did they use before?
All TSF, all also have charcoal stove but only used rarely

Please name the most important benefit of the ICS for yourself
Woman#1: it cooks fast
Woman#2: Kids are safer (don't get burned)
Woman#3: Protect environment (trees)
Woman#4: Saves time from cooking
Man#1: no smoke, heat can't be felt even if close
Woman#2: less firewood, cooks faster, safer
Men#2: cooks fast, safer to be around

Please name the most important flaw of the ICS for yourself
not mobile (mentioned by four)
cooks fast, you have to pay attention otherwise food burns quickly
can't be used for bonfire (to keep warm)
can get destroyed by water (rain, floods)

If you could change anything? (improvements)
for now it's good to him
Height has been reduced by two participants, the others are planning to do it

Do you still use the TSF (or any other older versions) instead of the ICS sometimes? If yes, when (in which occasions) and why?
Only in big gatherings

Other stoves in use?

Two women use sometimes chaircoal when it rains and there is a lot of wind hard to ignite ICS (ICS is outside)

Are there meals you cannot cook with the ICS?
Cooks everything, even Chapatti

Did the implementation if ICS require any changes in their behaviour/way of living?
No changes of habits

Frequency of trainings sufficient?
trainings ensured good knowledge, for new things trainings can be offered but for now it's good, no trainings on different topics needed

What were reasons for not attending some of the trainings?
Distance
Responsibilities, field activities
Duration: morning until 2/4pm
farming season people have to go to fields
Would prefer to have more but shorter training sessions
Didn't know the importance of ICS (drop outs)

Any recommendation for improvement?
no problems

How was the extension agent involved in the ICS implementation process? How did he help you? What is he doing related to the ICS?
He does a lot of activities, connects them with TransSEC people, also does monitoring (checks if ICS are fine, 1-3 times/months/HH), if it is new he tells HH when it is ready to use, supervisor
Prefer how it is, extension officer as link, because he knows them better, otherwise it will be like randomly communicating

How do you give feedback on ICS, trainings, etc? How is it organized?
Don't give feedback, they meet in big group, they say they never gave feedback

If you think about gender, do you think it affects the implementation of ICS? If yes, how?
First say no difference, then after asking again say women are main adopters, men adopt less often because they are not the cooks (don't see the effort behind cooking)
Twi men say they sometimes cook for family (if wife is tired, travelling, sick…)

If you think about age, do you think it affects the implementation of ICS? If yes, how?
There is no difference

If you think about education, do you think it affects the implementation of ICS? If yes, how?
No, unimportant if you were educated or not, it is so easy to understand

If you think about income, do you think it affects the implementation of ICS? If yes, how?
No

Who of you has helped build an ICS at another HH?
All but one woman (plans to do it soon)
Didn't get T-Shirts and Caps despite having constructed an ICS in another HH
One man says he constructed 46 ICS since February 2015
Sub-groups related to sub-villages for construction

What is happening with the money that goes in the group account?
They are charging 5.000 TSH, 3.000 goes to group account and 2.000 to constructors

Plan to register group as official with government, wrote a constitution but still had many mistakes therefore they have to change it (want to pay registration with this money)

How do you share knowledge on the ICS with other group members?
Sub-groups meet every week, big group monthly (sub-groups can address their challenges in big meeting)

How do you share knowledge on ICS with people outside the UPS group?
Used to mobilize community to convince them of ICS benefits
Also tried to talk with village government so ICS should become obligatory but government is not very convinced

Do you think a farmer field day just for ICS would be a good idea? If yes, would they be able to organize it without the help from TransSEC?
Very good idea, would be very convincing, made people more active
They think it could be organized by them
Man#2:very nice idea, could be very productive, it is too expensive, already thought about it, they target annual meeting of village, but village leaders want them to share costs then

Do you feel personally responsible for your ICS? Or do you rather feel it is still part of the project?
Yes

Focus Group Discussion#7
Date and Place: 05.10.2016, Changarawe
Participants: 2 ICS Adopters (female)

When did you install ICS?
Long time (since beginning of the project)

Can you tell us how you got interested? What did catch your attention?
Woman#1: A lot of researchers went through HH, she saw them go to their neighbours' houses (group members), then neighbours had ICS, told her about it, she liked what they saw there,
Woman#2*:* Her daughter was group member, wanted her ICS to be constructed in her mother's house (therefore she is an adopter, but she has it from the beginning)

Did you go to the farmer field day?
One women

Why did you decide to get ICS later?
The problem was the kitchen, it was being built at that time, so the ICS could only be constructed when the kitchen was finished

What do you think about the farmer field day?
She thought it was very good

Are you member in another groups?
One woman in chicken keeping

Each of you, please tell me what you consider as main benefit of the ICS for yourself/your family?
cooks food fast, no smoke, less firewood

And what do you consider as its main flaw for yourself/your family?
if kitchen is constructed from mud soil, in rainy season ICS is not well protected and can get destroyed as well
not mobile

Which stove did you use before?
TSF
Charcoal stove

Do you sometimes use 3sf instead of the ICS? If yes, in which occasions?
In ceremonies you cannot use the ICS, use TSF instead

Can you cook every meal with the ICS? Or are there any meals you (need to) use other stoves for?
Cooks everything

If you could change anything on the ICS, what?
Woman#1: If she doesn't like anything she can just call the group members and they come and change it, recent problem: chimney is not working well, smoke enters the house

How is the procedure? Do you tell the extension agent about the problem and he contacts the group members or can you approach them directly?
go to the group member directly (to the one who constructed the ICS for her)

Did you already tell the person about your problem?
She told him, he told her he would come but she has to get metal to build the chimney (for a strong chimney)

Is it hard to get metal?
It is not easy to get, she can't find

Does she know where she could find it?
She found nothing

What is the way forward?
She will call the technician

What about the other woman?
She has the same problem, but it was not resolved until now
She also can't find metal

Couldn't Mr Muya be of any help in getting the metal?
She told him, she says he did nothing (he also told her that she has to get the metal)

Do they have to pay for the repairing or is it free?
No

Is it less smoke with the chimney problem or the same as with the TSF?
Less smoke, better situation
When the fire is well ignited there is no more smoke in the house

Did you have the possibility to take part in any TransSEC trainings?
No
Only participated in farmer field day

Would you be interested in forming a group together with other ICS adopters?
would like to join a group

Did you have any contact with the researchers?
Yes, with Mr Muya

Does he come to visit them and check their ICS?
Yes

How often?
Twice a month

If something is not working, what does he do to help them?
They told him about chimney problem but he just advised them to find the metal

If they have any problems with the ICS; who do they turn to?
Group members

How is the communication with group members in general?
Very good
Even the constructor sometimes comes to her house to check the stove

Do you share knowledge about the ICS with people who don't have one? Do you tell people about it? Yes, when their friends come visit them they ask about the stove and then they tell them about it and where to get it

Would you like to know how to build and repair the ICS by yourself?
Yes

Which agroecological factors do you consider important for the ICS?
Bricks, Rice/maize husk, claysoil, sand

Was there any problem in getting the required materials for the ICS construction?
The challenge was to get the bricks, because you have to burn them first so they become strong, the burning process was the challenge, you cannot do it yourself, it takes a long time

Where do you go to burn the bricks?
Brick stations

What was the challenge exactly? Transport, time, …?
You have to buy if you cannot burn yourself

Are they expensive?
A little expensive

Are there any problems in getting firewood?
Yes, because you have to go the bush to collect him, this is exhausting
Also other problems as snakes

Is it a problem to get dry firewood (especially in rainy season)?
Yes it is a problem, firewood gets wet
They have to use it wet, dry in the fire

Are the roads and the transportation system adequate or are there problems?
Woman#1: Big challenge, because the road is very slippy, you can hurt yourself (especially when carrying a big load)

the second woman doesn't collect (her kids go)

Focus Group Discussion#8
Date and Place: 01.11.2016, Changarawe
Participants: 5 ICS Adopters (four female, 1 male)
Observation: farmers are very punctual, active participation, contribute a lot to the discussion, don't have to be asked more times to share their opinion, keep to the topics

When did you install ICS?
Woman#1: August 2015
Woman#2: May 2015
Woman#3: May 2016
Man#1: October 2015
Woman#5: Doesn't remember first one, second one September 2016

How did you hear about ICS first time?
All heard from another project (ICS with only plate): Mkuhumi project in Dodoma Isanga village
When TransSEC ICS were introduced here they heard from all sides directly after introduction

Why did you decide on implementing rather late?
Were assessing other HHs with ICS if they really should implement it

Are you happy with ICS?
Yes

Would you recommend it to other HH?
Yes, they wish all HHs could have it

Can you think of reasons why in Changarawe there are not so many HHs implementing ICS compared to other villages?
Woman#1: poor mobilization as reason, some might not know the real benefits, as less firewood and no smoke and cooking two meals at once, these news should reach all people, she thinks if all people knew that they would decide to implement it; that is why she implemented it rather late because she was not informed earlier
Woman#2: maybe knowledge has spread but some people have not enough income to afford ICS
Man: perhaps it would be better if researchers could improve running of project, there are weaknesses like always calling for the same people and not for whole village, ICS could also get educated in annual meeting as everyone participates
Woman#4: Objecting comment of male participant, she says some group members have already requested village leaders to announce in annual meeting, but it has not been done yet
Woman#3: some people might not implement because they don't have bandas, as herself, had to build it

Do you know the Farmer field day?
Some time this year
They attended
Woman#2: they made a good thing, she liked how it was done, they even brought people from different villages and showed them different UPS around village, they tried their best
Man: maybe this is the weakness of the project, not everyone was reached, he could not attend because he didn't know, in future they should make sure everyone gets the news

How is the information flow about important things like annual meeting in general in Changarawe?
3-4 ways to pass information
1. speakers: like a microphone, someone runs around streets announcing
2. put posters/advertisement throughout village (trees etc)
3. village chair person can use village council to reach entire community, uses phone to call for meeting, council spreads news to the village

There seem to be flaws in the information passing system according to some of you – do the others agree, where lies the problem?
Mr Muya told group members, they were supposed to invite other people
In general they are satisfied with ways of information passing, normally news reach everyone

Who has charcoal stove? How much is charcoal here?
Three women and the man have
At the moment 15.000 TSH/bag, but it depends on season, on dry season there is availability of firewood, therefore cheaper, in rainy season it can go up to 20-25.000 TSH
If you use daily you need 1.5bags/month (or 1 bag/1.5 months? Listen again, min. 40)

When do you use charcoal stove instead of ICS?
Two women: at night times
Man/Woman#2: only in emergencies like when they run out of firewood

What do you do in rainy season?
Collect firewood in dry season, keep them in bandas, only if this gets wet they use charcoal stove

Is your ICS inside or outside your house?
Woman have outside, man inside

Why outside?
no space, tradition
Two women already had banda for cooking that also includes space for firewood

Do they have problems with floods?
Every few years (maybe all 3-5 years)

Are there meals for which you use other stoves than ICS?
It is not about special food, it is about special pans, ICS can cook every food but sometimes you need bigger pans e.g. Makande (plural for Kande), in ceremonies or big gatherings
Ramadan: according to the male participant you only cook for own family so you do not need bigger pan

Does someone come to check their ICS?
Yusufu (Secretary) and Pakomisi use to go around and check ICS

Did you already need to repair/adjust ICS?
Three had improvements/changes called group leader

How much did you pay for ICS construction? Availability of materials?
5.000 TSH
Bricks: very available

Do they think the price is adequate?
They think this is a normal price

Many people can afford, it is a question of education according to the male participant

Would you like to become a part of the ICS group or is it enough to have ICS?
Everyone would like to join because everyone wants to become a trainer for other community members, people in Changarawe are often not born here but moved here so they would like to get training and then go to home villages and train people there

Did you have any contact with TransSEC researchers?
No
Only with Mr Muya and they consider him to be very important because he comes to check their ICS a lot and asks them about problems

How is the communication with group members in general? Enough support for ICS?
Satisfied with communication, they would like to be more in touch with group members or TransSEC researchers

How about access to firewood?
Difficult to get firewood sometimes
Many people here don't collect but buy, price is 2.500 TSH for one lead which lasts for around 1 week
Woman#2: around 90% of Changarawe people buy it
Firewood collector comes to their houses

What about the transportation and streets, are there times when it is a challenge to get firewood?
For people who are collecting: There is not even roads for collecting firewood, only paths, have to make paths by themselves, problems with thorns (can hurt people or cause damage on bikes), insects, tricks to pass with bike and big lead through small ways
For people who buy: sometimes in rainy season they do not come, those one that come sell for higher price, so you can safe but not for whole rainy season, then you have to buy

Are you not coming because streets can't be used or because they do not want to come in the rain?
In rainy season it might also be tricky for them to get firewood, les available, paths can't be used, in rainy season they might be working in other jobs

What about normal streets?
Can happen but not frequently

Do you think the gender of the decision-maker in the household is relevant for the decision to get an ICS?
Women decide if they want to implement as they work in the kitchen, men also see benefits but maybe not as much as men

Did ICS implementation require any changes in daily routines?
No just simplified life, saved money from firewood

Is anyone also member in any UPS groups?
Woman#2: chicken keeping group

Do you own a radio or a TV?
All have radio, two women have also TVs

Do you agree with the following statements on ICS flaws?
Takes time for fire to set up speed: not true, unless firewood is wet
Burns easily if delayed: no
Burns pans fast: no

Focus Group Discussion#9
Date: 08.10.2016, Idifu
Participants: 11 ICS group members including group leaders (chairperson, secretary)

Why did you decide to join ICS group?
reduces firewood
cooks faster, two meals at once
reduces smoke (also in food), safer to cook with

Did all of you chose ICS group, did they want to enter another UPS group?
chose group by themselves
Researchers approached them and told them to choose one out of the eight UPS groups

What do you consider to be the main benefit?
reduce smoke
Save time, less firewood
Cooks two things at once, cook fast
No diseases (smoke)
cooks food fast, can cook two things at once

What do you consider to be the main flaw?
If height is not reduced it takes more time until flame reaches pots, if height is reduced no flaws
If you don't take care ICS gets cracks and get demolished
if you don't use animals will live inside it

If you could change anything about the ICS, what would it be?
Another flaw: when you cook and leave house afterwards, kids could sit on it and get burnt because it keeps warmth for a long time
Changed height of the ICS
Also improved firewood channel, was expanded to allow more air to enter
They don't use pipes anymore to construct ICS, they use small bottles to measure

Do you still use other stoves?
They say no, say TSF is like history

Don't you ever need to use a mobile stove?
Never happens
They have money, they can buy, but if the project can bring them another stove they won't complain

Other farmers said that there are meals that can't be cooked with ICS – do you agree?
Cooks everything, even Chapatti
It depends on the pan size not the meal

What reasons can you think of for not participating in trainings?
Lack of information
Some people have low understanding, they don't like being in groups, different way of thinking

Focus Group Discussion#10
Date and Place: 10.10.2016, Idifu
Participants: 11 ICS group members including group leaders (treasurer)

Why did you choose ICS group/did you chose it?
chose group herself because she wanted to reduce smoke in her house
cooks fast, less firewood, two meals at once
safer (fingers don't get burnt), cooks faster
cooks food fast, less firewood, cooks a lot of things
less firewood

Did researchers approach you or how did you become members?
there was a community meeting where UPS were presented

Which stove did you use before?
TSF, charcoal

Please name the most important flaw of the ICS for yourself
First say no flaws, detailed questions necessary:
Hole size: not a flaw because you can build a big ICS
No mobility is a flaw
Burns food easily if delayed: No
Burns pans fast: No
Special meals: All possible
Takes time for fire to set up speed: only yes if you are not using it daily or if the wood is not dry wet

Do you still use the TSF (or any other older versions) instead of the ICS sometimes? If yes, when (in which occasions) and why?
Big ceremonies (TSF), funeral service
Special big heavy pots can't be used with ICS (for cooking Makande: shelled maize+beans) (TSF)

If you could change anything? (improvements)
Woman#1: she started to repair her ICS yesterday to improve chimney (smoke started to enter the house),
Woman#2 wants to reduce height and to repair cracks build a new one

Did the implementation if ICS require any changes in their everyday habits and routines?
No

Which trainings did you receive from Trans-SEC on ICS?
received all trainings

What were reasons for not attending some of the trainings?
If someone is sick
Information is not given in time or doesn't come through
Special occasions (personal)
Distance could be a problem, was a problem for some of them
Time constraints? No problems because there were conducting sessions during noon hours

Any recommendation for improvement?
No

Would you like to have some of the trainings again?
They need more inputs (pipes), they came up with a new innovation (see last discussion), could

be a good thing to sit together and get kind of training on this

Have you talked to researchers about new innovation?
Zacharia (ARI), Ogossy

How do you get to know about trainings in general?
Group leaders get contacted by researchers and then secretary spreads information to rest of the group members (some have phones, for others he/she has to go to house)

Any group leaders present?
Treasurer (female)

How was the extension agent involved in the ICS implementation process? How did he help you? What is he doing related to the ICS?
Fadhili: more involved in micro-dosing; for ICS he is only for passing information not for checking etc.

Who do you turn to help for when facing problems?
Secretary+chairperson, or old group members

What about researchers?
Don't talk to researchers, cause leaders and researchers talk about anything

Feedback through group leaders working well?
Best way to solve problems

If you think about gender, do you think it affects the implementation of ICS? If yes, how?
Gender matters because women are the ones affected mostly with kitchen issues
Men also see benefits, are not hindering factors for implementation

If you think about age, do you think it affects the implementation of ICS? If yes, how?
For cooking: age doesn't matter
For construction: middle age

If you think about education, do you think it affects the implementation of ICS? If yes, how?
No, practical skills

If you think about income, do you think it affects the implementation of ICS? If yes, how?
Doesn't matter

Have all constructed? Are all of them regularly constructing?
Four have constructed
There is no rotation schedule

Do you build alone or in teams? How is it decided who gets to construct?
Don't go as team, one builds the whole thing
Devided themselves in sub groups according to sub villages

How do you share knowledge on the ICS with other group members?
Subgroups meets once a month, big group meeting as well once per month
All attend every meeting

How do you share knowledge on ICS with people outside the UPS group?
Exchange ideas with neighbours, when they visit them see ICS and benefits, questions
Village Annual Meeting: use as opportunity to convince people about ICS

What do you think about the TShirts/Caps? Are they helpful to spread the ICS?
Woman#1:not really a big help for promotion because information is already spread
Woman#3:helps a lot to get new customers

Do you feel personally responsible for your ICS? Or do you rather feel it is still part of the project?
Yes

What are the benefits for you of being in the ICS group? Why don't you leave now that you have ICS? To keep going with the trainings
Continue to construct ICS

Which agro-ecological factors are affecting the ICS implementation mostly and how?
Claysoil, groundnut peels, grasses, bricks

Are inputs easy to access? Do you see problems in purchasing them after project end?
Claysoil: easy to get
Pipes: last year they were given pipes, they were told they would always get those from project but sometimes they don't, so then they use wood as replacement (access to wood? not that big a problem), wood can be permanent solution to replace pipes
Water: not a challenge

In your village are the roads and the transportation infrastructure sufficient for getting the required materials?
Infrastructure is helping to get materials

Focus Group Discussion#11
Date and Place: 11.10.2016, Idifu
Participants: 6 ICS Adopters

Does each of you have an ICS at home?
All yes

How did you get interested in the ICS?
group members were coming to their houses and were talking about ICS benefits
Some heard when constructors went to neighbours, witnessed there, got interested

Are there any flaws?
All say no

Are there occasions when you need to use other stoves?
Big gatherings (3sf/charcoal), if you don't have firewood (charcoal)

For how long do you have the ICS?
Since end of 2015

How much did you pay for the ICS construction? Which materials did you have to get before?
Had to pay for construction: 2000 TSH
Materials: Claysoil, groundnut husks/peels, Water

Challenges in getting these materials?
Only challenge: bricks here people construct houses without bricks, so hard to get them here,

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you have to find a bricks maker or you have to buy

What about access to Firewood?
Also a big challenge, go to mountain to cut trees, very far away, big reason for implementing ICS

Do you know any other stoves from other projects?
TOAM: also brought improved cooking stoves (not well introduced yet, just took people for training, in plain process at the moment)
Do practical trainings in village, people go to HH and construct One woman participated three times in those trainings
The others just heard

What are the differences between TransSEC and TOAM ICS?
No big difference, same construction, same application, but chimney is different (not build to outside, they just make a hole to the outside)
They say with the chimney (TOAM) when there is strong wind the smoke enters the house, and the walls get dirty

Does the woman who was trained by TOAM nevertheless wants also a TOAM ICS?
She prefers TransSEC one but didn't receive enough training from TranSEC on construction

What kind of trainings would you like to get?
Target: get skills, then construct to other HH, increase income
Others would like it as well

Who constructed your ICS?
Majuto or Emmy constructed ICS for all of them

Were invited twice (seminar, going around through village)
Did all take part in going through village? Only two women
The others didn't participate because they weren't invited

Ask again about reasons for bad information flow: they don't know

Who do they approach if something is broken?
Woman#1:: problems with chimney (opposite direction to wind), she told constructors (Emmy) and they came to fix it

Did you have any contact with Zacharia or Devotah?
With Ogossy (demonstration session), don't know the others

Are you member in any other UPS group?
No

Focus Group Discussion#12
Date and Place: 12.10.2016, Idifu
Participants: 12 ICS Adopters

When did you install ICS?
Almost 1,5 year for all of them (difference only few months)

Can you tell us how you got interested? What caught your attention on the ICS?
Group members went through HH to get ICS

Each of you, please tell me what you consider as main benefit of the ICS for yourself/your family?
all say less firewood and less or no smoke, some mention that it cooks faster and two things at once

And what do you consider as its main flaw for yourself/your family?
All: no flaw

Which stove did you use before?
All TSF, no one charcoal

Do you sometimes use TSF instead of the ICS?
Many cases
size for pot holes can't be changed
Big ceremonies
Cooking Makande
For cooking of alcohol (with big drums)

What about ICS not being mobile?
Yes it is a flaw

Do you consider the following statements on ICS flaws to be true?
Burns easily if delayed: not true
Takes time for fire to set up speed: not true
Burns pans fast: not true

Were there any reparations necessary/changes made to your ICS?
One man changed height of ICS
Others still have higher ones
No other changes, nothing broke yet

Who do you approach when there is something to repair?
Call constructors

If you could change anything on the ICS, what?
No

Is the extension agent Fadhili involved?
Not involved at all

Does someone come to check your ICS?
Group leaders come to HH to check, around once a month

Would you like to become a part of the ICS group or is it enough to have ICS?
They would like to be group members
Woman#1:if her ICS has any problems she can fix it by herself because she would receive trainings
Woman#2: to get skills/trainings to repair and construct ICS
Woman#3: sometimes group members feel privileged, wants to share that feeling
Woman#4: don't like to be isolated (related to Beatrice's statement)
They don't know if group members are doing it on purpose

How is the communication with group members in general?

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Good communication
problem is that group leaders have meetings and trainings

How is communication with other adopters?
Good

Does anyone of you know how to repair cracks in the ICS?
All know, it is easy to do

How much did you pay for the ICS construction? Which materials did you have to provide?
All paid 2.000 TSH for ICS
Materials they needed to provide: claysoil, groundnut husks/peels, water, bricks

Any challenges in getting these materials?
No, bricks were provided by TransSEC

How about access to firewood?
Very big challenge, because you have to go to the mountain

Are you dependent on a good road and transportation system to get firewood?
Roads: Very important

Any problems with roads?
Sometimes challenging because roads have a lot of holes, if you have a troll with a barrel deep holes make rolling harder

Roads in rainy season?
In rainy season no collection of firewood possible

Coping strategy?
Collect now, storage inside of their houses

Access to water a challenge?
Water is no problem

Socioeconomic characteristics
Gender: women more implementers because they work the kitchen, husbands support ICS
Age: age doesn't matter
Education: doesn't matter
Income: doesn't matter

Did ICS implementation require any changes in daily routines?
No changes necessary

Anyone has TOAM ICS?
Don't know

Member of any UPS groups?
Four are members of the Kitchen Garden group, two in tree nursery, one in micro-dosing one in independent soap making group

TransSEC start: how were groups presented/selected?
Village annual meeting: announcement that there would a meeting with researchers, then sub-village leaders went through HH, invited them to participate in meeting, there researchers presented UPS groups

Did all of you go to the meeting?
Some not because they didn't get the information
it can also happen that someone cannot come due to external reasons but not for them

Those who were there: did not chose ICS group or were told you cannot participate?
Groups couldn't take all interested persons, limited number

Did you have contact with the implementing scientists in any way?
No

Focus Group Discussion#13
Date and Place: 14.10.2016, Ilolo
Participants: 10 ICS Group Members including group leaders (chairperson, secretary, treasurer)

How did you hear the first time about the ICS?
people came to village, introduced themselves as TransSEC, needed villagers, invited them for meeting, introduced UPS, no deep description more briefly, afterwards they asked who is interested in which UPS, could select what they liked, so they chose ICS group without really knowing the meaning, researchers came again some weeks later, got people who were interested in respective UPS groups, then trainings started

How many group members were you in the beginning?
25 up to date
Adopters also have same qualification as group members but in different way: have ICS and contributed some money, so they are a bit like group members (35 "new" group members)

Are group meetings for all members or only for original ones?
New ones also come
Normally meetings each week
No meetings in last 3 months because they were busy
seems like they had very tough times to meet, because they are preparing fields, 3 months ago they were harvesting….Nyika pushes them a bit…just admitted that they were not very much committed

Is it that you don't see much sense in meeting at the moment?
there is no really specific reason, there is just no real reason for meeting

What did you do before in weekly meetings?
In the beginning they discussed the group constitution constitution seems to be source of troubles: Peter (group member) brought it to Boniface who should do some authorising or else with it, Boniface didn't react like group members hoped he would, didn't give real feedback, mixed up names of Ilolo and Idifu people, so they got frustrated with the process and also didn't want to contribute money for the constitution if they didn't know what was going on
Trouble started in December 2015, unclear situation since July
Boniface came to one meeting to defend his side: he said he did what he was supposed to do but there were amendments missing, he already returned it to Peter, just integrate recommendations, so group leaders asked Peter for it but he is been missing since then (couldn't find him at his house), he is working as engineer, very busy (can be taken to build stuff at other places for longer time)

Are there no copies? Not possible to write the constitution again?

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Peter got money to make copies, constitution already costed 55.000 TSH (group money)
They said they don't know if Peter didn't do anything and is just hiding or if he has everything in his house but is busy
Persons in charge not really involved, group leaders could call him (he has mobile phone), group members seem also to think that group leaders are part of the problem?

Did you turn to some of the researchers/Abdala for help?
Yes, all researchers now, Abdala doesn't
Boniface/Zacharia/Ogossy told them to get the constitution back and revise it again

Are you constructing at the moment? How is it organized?
Yes, division into sub-groups for sub-villages, 1-3 persons/construction have to give feedback to group leaders about constructing
Adopters have to pay 3.000 TSH for construction, 2.000 TSH to group, 1.000 TSH to constructor

Any plans for using group money?
Accomplish group registration: at the moment they have 49.000 TSH but need constitution to finish process, and they need a lot more money for registration

How many ICS have you constructed until now?
Until now 60 new ICS (+ 25 for members)
35 new members then maximum group size of 60 was reached, new members didn't receive any training but know how to construct ICS

How did the new group members learn to construct?
Observed old members while constructing, new members can build for new people when accompanied by old members
One old group member passed away, so now they are 24

Was there a "pattern" of adoption, e.g. a peak time or else?
In rainy season low number of adopters (busy with field activities), in dry season high number of customers, because people are at homes and have time on their hands to finish kitchen
This year there was a lot of rain, that destroyed often stove places ("bandas") of customers, they have to rebuild them before they can build ICS (again)

Did you have to do a lot of advertisement in the beginning?
In the beginning neighbours came to see how ICS were constructed, so calling neighbours to watch was kind of promoting ICS,
another way for promotion is to invite people to watch them cook at their own places with ICS
also used annual meetings for advertisement
in their group there was a monitoring team (Grace, Stanley, Mjega), they went through HH to check ICS, also used opportunity to mobilize more people

What do you think about TShirts/Caps? Do they help? How many did you get? What is the deal?
One woman and one man have TShirt and Cap, more people have caps
The man has constructed around 40 ICS, the woman 5
They say there are no specific rules for distribution
Ogossy gave group secretary more Caps and TShirts and he is supposed to distribute them
One womena went to Dodoma town to farmer exhibition day (nane nane: 8. August) to promote ICS
Promotes ICS, makes groups alive, people who see you see that something is going on

Has group changed? Drop Outs, new members? If no drop-outs, is there a rule in the constitution to specify when someone becomes a drop out?

One old member passed away
Many drop outs (didn't show up to meetings), some just dropped out during training process

What were reasons for not attending some of the trainings?
During training session: all people were participating

Was the timing of the trainings a problem?
No problem

Any recommendation for improvement?
TransSEC as very good project, because community is not putting much effort into doing better things, TransSEC didn't give up to them

How was the extension agent involved in the ICS implementation process? How did he help you? What is he doing related to the ICS?
He is not involved

Who do you turn to help for when facing problems with ICS?
Group members (trained ones), together they can solve any ICS related problem

So are you still in need of the researchers?
Researchers are very important to them, not for helping but for giving new input as they are much more experienced and also implement ICS in a lot of different places

Do you give feedback? How?
In group meetings they give each other feedback on ICS, no specific day for giving feedback to researchers, just when they meet with researchers, sometimes researchers call them, everyone gives feedback

Did participation in group change anything about social status?
Seems like it contributes to get known in the village

Which agro-ecological factors are affecting the ICS implementation mostly and how?
you must maintain a clean environment (kitchen), ICS –> less firewood less cutting of trees forest is not destroyed more trees necessary to gain more rainfall, the more trees you have the more fertile land (leaves of trees become fertilizer), also reduces diseases (having a lot of trees) like coughing, flew etc

Access to firewood?
Big challenge, no trees

Access to water?
Available

How is the situation with the pipes?
Few left now
when they ran out of pipes, they will use what is available like tree stems or pals (strong sticks), cut according to tape measures
They can also get access to banana stems (no too easy)

In your village are the roads and the transportation infrastructure sufficient for getting the required materials?
Roads are available and helping, challenge because passing through roads can be tricky in some points (big holes), difficult to push wheel barrel through these holes

Focus Group Discussion#14
Date and Place: 15.10.2016, Ilolo
Participants: 7 ICS Group Members (without group leaders)

How is your ICS group functioning/working?
There is no meetings at the moment because the group leaders are careless
Leaders are supposed to plan meetings, are supposed to give people notice, but they are not doing it

How were the leaders selected?
in the very beginning they were told to select own leaders, open vote (closing eyes, showing hands), researchers counted votes, it was only the leaders from now that wanted to do it

Were leaders from beginning careless or did they do a better job in the beginning?
Woman#1:from the beginning careless elements, because things were not so perfect/not so active, in the long run they got really bad, treasurer was changed (former one: Susana, now dropout; new: Stanley)
Woman#2:in the beginning they were ok, but in the middle went bad, didn't appear in meetings, disappointing for members, some people also stopped coming because of this

Why was treasurer changed?
Used group money to make own business, when group needed money there was no money left, so group members forced her to return money, then Susana stopped being a group member (around April this year)

How are drop outs defined?
When you miss 3 meetings
At the moment they are waiting for next meeting to decide what to do about group leaders

Couldn't you organize a meeting by themselves?
They can't call for a meeting themselves because it's the group leaders that are in hold of the group, it would be a brave thing to call for a meeting on your own, there is no secure backhold by the other group members, so at the meeting the person who called might be alone in the meeting threatening the leaders

With this problem, can you turn for help to some of the researchers?
One womansaid something about the problem at one meeting (Boniface), group members all turned on her, supported group leaders, afterwards leaders followed her and accused her of lying

Why did the others not support her?
No answer is given to the question

Would you like to have meetings again? Why? What did you do in meetings?
The want meetings to keep group active, to discuss things as future planning, to discuss new constructions, discuss savings and credit in the group

Are people constructing at the moment?
Yes, people are
Present members mix materials for construction, other members construct, but normally they construct as well, they went to someone called Job to construct ICS, one womanaccuses others not to take her, others respond why didn't you come?, she says she was there, then silence

What about constitution problem? Real problem or are the group leaders just using it?
Big challenge for development of the group, everyone says something different, they don't know if to believe Boniface or the group leaders and who is causing the problem
They trust Boniface normally but in this case they don't understand, because even if it is with Peter he is not helping with the problem (but responsibility still lies with leaders to get constitution back)

What about other researchers?
Contact with Devotah, Ogossy, Zacharia but Grace says no one told them about problem with constitution, they say there are not getting invited to meetings with researchers (just people who live within center, controlled by group leaders; present members are coming from sub-village)

Aren't meetings with researchers trainings/sessions or just informal gatherings?
Kind of training

Did you participate in all trainings?
Yes, in the beginning yes, all meetings within one week
In later meetings group leaders started to select who to call to come
Other reasons: pregnancy and early motherhood

You said all of you live far away (in sub-villages) – was the distance a problem for you?
The leaders are the source of the participation problem according to them, also possible that leaders couldn't reach them/didn't get access because they live so far away

Do you have phones?
Three women have
Leaders have their numbers but don't call

How does it work when you go to construct, you take 3000 TSH (2000 TSH for group, 1000 TSH for themselves) – what do you do with the group money? Do you keep it until the next meeting or do you bring it directly to the treasurer?
They bring it directly to the treasurer

Do you have any ideas for improvements? Did the trainings cover everything you needed to know? Were they often enough?
Trainings they had were very satisfying

Is communication with researchers enough, would you like more contact?
They say they never communicate with researchers, only with group leaders (especially Stanley),

Are the group leaders doing a good job in the communication?
Seems to be working well

Is giving feedback important to them?
Very important

What kind of feedback? How are you doing it at the moment without meetings?
Meeting in April, everyone gave feedback on ICS, some said height was a problem
Now? Go to chairperson
Monitoring team (Grace, Roza, Grace from yesterday, Stanley, Jesica, Henry): also collect feedback, two people in center, two people downside of village, two people Malichela, no fix timetable, at least once a week, check all group members and adopters
Also take orders from interested people
Monitoring team formed with Pramila's help in the end of last year

How was the extension agent involved in the ICS implementation process? How did he help you? What is he doing related to the ICS?
Only know Abdala by his short name Dula, only involved in passing information between group leaders and researchers

Do they think his involvement would be helpful?
It could be helpful

Is any of you another group member?
One in Kitchen Garden Group, two in Micro-Dosing Group

Did the implementation if ICS require any changes in their everyday habits and routines?
Didn't change daily routines, just improved lives because of benefits

Did participation in group change anything about social status within the community?
A bit but no big thing

Do you feel like the ICS are truly theirs or do they still feel they belong partly to the project?
Yes

Does anyone of them got a TShirt/Cap?
No

Do you know what they would have to do to get one?
When you construct many stoves

How many stoves did you construct?
Four women constructed between one and five stoves
Woman#3: she can't construct because she doesn't go to school
Woman#2: she knows how to, but Stanley tells old people just to help and let them do the construction
Two women help with preparation of materials (assist others), they don't get money

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Focus Group Discussion#15
Date and Place: 18.10.2016, Ilolo
Participants: 11 Adopters (New Group Member)

Are all of you new group members?
Yes

When did you install ICS?
July and August 2015

Was there some triggering event for the decision to adopt or why did all adopt at the same time?
Because at that time group members constructed a lot of ICS
Come from different sub-villages

Can you tell us how you got interested? What caught your attention on the ICS?
They heard from group members when they constructed in their own houses, so they went to see and watch, that is what caught their attention

How did you become members? Automatically or did you have to ask for it?

Old group members called for a meeting, all adopters were invited and they were asked if they wanted to become a group member, all confirmed

Why did you want to become a member of the group, which benefits did you see in joining the group?
Because they also wanted to construct ICS, when you are not a member you cannot construct ICS, get additional income from ICS construction

Did all receive training since they joined? Which trainings did you receive? By whom?
Group members: construction of ICS
Ogossy: how to use ICS, how to use firewood, demonstration how to repair ICS problems like chimney, comparison between 3sf and ICS (cooking and firewood load)
Boni always joined, but Ogossy presented
Zacharia helped in comparison session (measured firewood load)

How were you trained on the ICS construction?
Individually, divided according to location, always 1 or 2 old group members and 2 new group members, went together to customer, first times only observed, next times constructed under supervision

The ones who only received two or three trainings: was it enough?
not enough, she needs to participate in more
All think they need more trainings.

Who of you has constructed? How many ICS?
Two women have constructed two stoves, one women constructed one stove

Old and new group members with same right to construct ICS for new customers?
Same rights, old members sometimes even refer to new ones

If a customer wants ICS, how does it work?
Tell randomly any person
This person has to inform Stanley, most received trainings from him, he seems like an active person

What do you think about other group leaders?
Thinks they are good

Can you tell me why there are no meetings or the last 3 months?
They say last meeting was last year
There were meetings only for old group members, last year they were always meeting all together, this year only old group members were called for meetings

What do you know about the constitution problem?
Don't know much

Did you contribute money to the constitution?
Constructors paid 1.000 TSH to group
Later for printing and photocopying, 1.000 TSH each

Did anyone of you approach group leaders?
Some asked group leaders and they answered meetings are only for old members
They don't know if there were any meetings since last year and they didn't ask

Do you know anything about the treasurer issue?
Susana as old treasurer, dropped out of own will after returning money

Stanley was telling Jesika that Susana is no longer group member and he is the new treasurer
Don't know any specifics

Do you still consider yourselves as group members?
Still consider themselves as group members

Why do you want to remain group members?
Because they like constructing and the additional income

What about people who haven't constructed yet?
Want to learn

Do you think you will get more training despite of not being contacted for a year?
Don't know

Have you been taken to construction with old group members this year?
Two women yes, rest no

Is Abdala involved in any way?
Not involved, they know him but for them he is not involved in ICS

Would it help to have Abdala or someone else more involved or are group leaders enough?
Because in KG he went to check the KG
Would help because he stays in same village as them, not like Zacharia who stays on town

Is no one coming to check your ICS?
Zacharia checked a lot in the beginning (January to July: twice a month), since July not anymore they don't know why
Stanley does the monitoring, he came since construction 2-3 times a month to check
Grace and Jesika (monitoring team) also came sometimes to check

If you see Stanley two or three times a month, did anyone ask him about the meetings?
No

Why not?
No answer

Focus Group Discussion#16
Date and Place: 19.10.2016, Ilolo
Participants: 6 ICS Adopters

When did you install ICS?
Woman#1: August.2016 (interested because many community members already had ICS, so she asked Zacharia and he told constructors to come to her)
Man#1: September 2016 (heard from group member, came to convince him to have ICS because of less firewood use, got him interested)
Woman#2: heard about ICS from group members and Zacharia, because they were passing through her house when they went to see ICS at other houses, when she was using 3sf, told her about ICS, then she wanted it, September 2016
Woman#3: heard from Zacharia, also member of Tree Nursery Group, Zacharia convincer her to get an ICS, September 2016
Woman#4: heard from group members, she saw ICS and her place, got interested, March 2016

Woman#5: not convinced by anyone, just interested by hearing from other villagers who had ICS, started to ask people like Zacharia or group members like Jackson, then reported to group members that she would like to get ICS, after collection of materials ICS was constructed, December 2015

Where are the ones living, that implemented just short time ago? Far away? Why didn't you hear about it/decide earlier?
all more or less center
Heard and asked earlier, but group members said they had a waiting list, so first they have to construct for group members, then they will come to construct at their places

Did any of you talk to people who don't have the ICS to convince them?
One woman says she tells people about it
One woman did it once, and this person responded in a difficult way ("are you going to pay for it"?), so afterwards didn't do it anymore

How much did you pay for the ICS construction? Which materials did you have to provide?
All paid 3.000 TSH for ICS construction
Bricks: 1.000 TSH (some had to buy, others had their own)
Man#1: bought metal roof for chimney (around 3.000 TSH)
Claysoil (1.000 TSH) (soma had to buy)
Water: 500 TSH

Do you think the price is ok?
Normal price, because it is also something you use on a daily basis

Challenge to get some materials?
No

Generally, challenge to get water?
No challenge, only need to pay for it

Challenge to get firewood?
Very big challenge,
Alternative is to cut trees they are planting, any trees that is around, because at the moment there are no trees in the mountains

New problem or typical for dry season?
Not a new thing, only time for cutting trees is dry season, because in rainy season fresh trees can't be cut, have to cut now to prepare and dry wood for rainy season

How do you cope with shortage of firewood? Do you see problems in the long run when you are cutting trees around their houses?
that is why they run for ICS, because it uses less firewood
you don't cut all trees, one by one
The man thinks it will become difficult, one woman doesn't agree because Tree Nursery Group is building a lot of trees (also specific ones for firewood) so there will be enough in future

Are you dependent on a good road and transportation system to get firewood?
If you have trolls (only if you have money):
Holes in roads, have to be filled with soil so wheels don't get stuck
Dried water streams often very sandy, hard to pass
All present adopters don't have trolls, but good roads also important to them because harder to walk on sandy soil with big headload

If you face any problems with the ICS – who do they tell?

Woman#3: Inform the constructor, constructor informs Zacharia
Others say you tell constructor, then constructor comes to fix it
Man#1: his ICS has specific problem, didn't work well since beginning due to location of stove in kitchen (smoke comes in because of wind), chimney constructed in wrong direction, Abigail Mdewa, he told her, she came and admitted to have done it wrong, she wanted him to show her another place to reconstruct it, but he says there is no other place possible (so he is not using it at the moment), says he has not enough yard to relocate, someone advised him on a possible solution,

Were there any repairings necessary in past?
No

How is the communication to group members in general?
Very good, very close

Do you know difference between old and new group members?
No

Would you like to be member of the ICS group?
Yes

Why?
Because you can also become a constructor, get the skills

Zacharia seems to be very involved?
Used to go check ICS in every HH to measure use if firewood, saw him often
Around twice a month before, at the moment he is not coming

Would you like to have him more involved again or is the communication with group members sufficient?
Group members better people because they know them and are easily to reach

How involved is Boniface?
Accompanied Zacharia, but was not much involved, they know him not because of ICS but of other groups (sheller machine, sunflower processing), see him when there a general meetings

How involved is Abdala?
Never saw him in ICS, not as part of the promoters
For communication with researchers (told them when there is a meeting with researchers)

Would you like him to be more involved or group members sufficient?
Beatrice: Would be helpful if he would be more involved because he is also helping other groups, if there are problems with ICS he could also help

How involved is Ogossy?
They know him by name, because the group members talk about him a lot

Are you members in any other UPS groups?
Three women in Tree Nursery group, two women in kitchen garden group

Did ICS implementation require any changes in daily routines?
No negative changes, positive changes (saving cooking time, no more smoke, less firewood, food gets cooked fast, saves a lot of time)

And what do you consider as its main flaw for yourself/your family?
There is no flaw of ICS; only flaw can be you, she didn't take care so food got burnt in the

beginning

Do you sometimes use TSF instead of the ICS?
Say they are not using TSF anymore
Woman#5: have to prepare food for drought season, have to peel a lot of pea leaves, cook in a very big pan (TSF necessary) and let them dry in sun afterwards
Have some discussion, then agree that it is a flaw of ICS that big pans can't get used (big ceremonies, etc)

What about ICS not being mobile?
They say they don't want mobile stoves, no need of moving food

Do you think the following statements on ICS flaws are important?
Burns easily if delayed: not true
Takes time for fire to set up speed: say it is even faster
Burns pans fast: not true
Special meal: cooks everything

Do some of you use chaircoal stove in some occasions?
Two women have
Use it for a change of perspective in between, to see the world while cooking (mobility)

If you could change anything on the ICS, what?
Don't see any problems

Focus Group Discussion#17
Date and Place: 28.10.2016, Mzula
Participants: 10 Potential Adopters#1 (all female group)

Which stove do you use at the moment?
All are using TSF, no other stoves in use
There was a project introducing ICS, they don't know anyone who has the ICS

Would you wish for improvements of the stove you are using? What is bothering you about it?
Woman#2: TSF has a lot of problem: a lot of firewood, smoke, not safe (burns kids)
Woman#2: takes a lot of cooking time
They wish that they could change to a better alternative

What is important to you while cooking (location, height, number of meals that should be simultaneously cooked)?
Firewood, water

Do you often need a mobile stove?
No

How often do you need to prepare meals for bigger or smaller groups than usually?
Often cook twice a day, in the afternoon with big pan (a lot of participants) in the evening smaller pan because less people/people eat less than in the afternoon

Do agree agree that for meals like Chapatti or Kande bigger pans are needed and do they cook it often?
For Makande they need a bigger pan, they cook Makande once a month, don't cook Chapatti

Are there any other meals for which they need special equipment?
Sometimes they use big pans for ceremonies, funerals

How is the firewood situation?
Very hard to get firewood

How often do you have to collect per week, how long does it take, which family member is going?
Go themselves, some collect daily (if you have enough energy), others go less often, takes about 4-5h
If you go daily you can collect for saving firewood for rainy season, if you go 3-4 times a week it is for cooking
On Sundays no one is going, day of rest
One to two bundles is enough for one week

Are all carrying by headload?
Yes

How is the situation for roads and transportation?
Not good situation, very challenging: A lot of crosses, a lot of corners, very hilly, wood drops often

How is the access to water?
Enough water in the village

Presentation ICS

Would you like to try this ICS out? Which of its benefits are most appealing to you?
Yes they like, less firewood, that it cooks two things at once, safer for kids, no smoke

Is it a problem that you need big pans every afternoon?
They think it is possible to cook for ten people with ICS

Do you have the possibility to build an ICS inside your house or outside (place for Banda)? Preferably inside or outside?
It would be no problem, they would prefer to build inside, safer during rainy season

How much would you be willing to pay for an ICS?
Answers differ from nothing to 20.000 TSH, in average around 6.000 TSH

Are you very busy throughout the year or are there times when they have free time on their hand?
In dry season they have a lot of free time on their hands,
They have a lot of things they can do, some go to church, some people to mosques, some spend time with families, high percentage goes to clubs

Would you like to get trained on how to construct an ICS? Why?
Yes they would like to get trainings on how to construct, so they can train and construct for others

What about other trainings?
Would also like to get group training, economic training

Why?
To become a role model within the community, to make many people interested in ICS

What about the community in general?
They think many people would like to have an ICS at their homes

Do you think many people would like to participate in trainings for different topics?
Yes, some would be interested, others wouldn't be so excited
All would come to meetings, but some men might not be very committed in the implementation

How long do you have to walk to get here (school)? Distance a problem?
10-20 min for all of them
Karanzala the only sub-village that is far away: 1-1.30 hour

At which times trainings would fit well in your schedule? (Day time, season)
2pm is a good time
Rainy season: could not participate

Would you be interested in joining a group with other community members? Why? What would you expect from such a group? On ICS?
Yes they would like, if they have a group they can learn together,
Woman#4: help each other
Woman#5: mobilize community

Would you prefer a women group or mixed group?
Two would prefer a women group, the rest thinks mixed group is better

Why?
Woman#2: Women are easy to understand, trust, work with each other/together, with man sometimes you plan or agree on something and then they go to club in the next day, also men might think ICS are women stuff as kitchen is women topic
Woman#1: tasks that they cannot do as women as carrying soil
It is good to have a man in the operation of constructing ICS as technical issues are involved and men are good in technical stuff, having a man there is a good mix

How is communication with other community members?
There is a custom of sharing and exchanging ideas and good things

How if flow of information within the community? Do information always reach you or do you miss out on things sometimes?
Baragumu (drums): goes everywhere in village to announce, helps a lot, everyone participates in gatherings

How important is the village executive officer for you? How important is village chairperson?
Both are important
VEO: invites people by letter
Chairperson: prepares meetings, calls for meetings

How important is the gender of the decision-maker? Are husbands hindering factors for participation/getting new stove?
Men can also be interested in ICS when they get to know that there won't be smoke with this stove, they like to have conversations in the kitchen

Who do you turn for when facing problems?
For any problem they turn to chairperson

Are you/have you been part of any other projects?
TASAF project, still ongoing

Focus Group Discussion #18
Date and Place: 28.10.2016, Mzula
Participants: 11 Potential Adopters#2 (mixed female and male group)

Which stove do you use at the moment?
All use TSF, no other stoves in use,
Produce charcoal here, sell at UDOM, don't use charcoal stove here (except one man who uses charcoal stove and TSF) because they are just used to use the TSF (custom)

Do you know anything about the former ICS project in this village? Do you know the stoves?
New ICS brought by other project (around 3 years ago): saw the stoves but never knew how to use them, just saw it at neighbours
Attached to wall, two holes for pans, chimney (also built by claysoil)

Were you interested in having an ICS as well back then?
Yes

Couldn't you just ask someone of the project if you could get one?
Not possible, project only trained 25 people

Did those 25 people also build to other HH or only to their own houses?
Only at own houses

Presentation ICS: show them pictures, they say it is very similar to the one from the old project

Would you like to try this ICS out? Which of its benefits are most appealing to you?
Yes they like, cooks food fast (saves time, you can do more activities), less firewood, no smoke, safer for kids (prevents burning), protect environment (cut less trees)

Do you often need a mobile stove?
They want a permanent stove and not a mobile one, more comfortable for cooking, just build a banda in which it is protected from rain

Would you prefer to build it inside or outside the house?
Women like stoves inside the house, men want it outside
Nowadays there is a change, before Gogo people had everything inside the house (cattle, livestock, kitchen, …) but now people have modern life with houses in which they are living and kitchen outside to cook

Why do the women then still prefer the stoves to be inside the house?
They want the firewood to be inside cause if it rains it will get wet otherwise, women would prefer everything to be inside, more comfortable for cooking

You say you do not need a mobile stove – what about farming season? Do you not eat in the fields or how do you organize it?
They cook in the morning or at night, take food to fields

How much would you be willing to pay for an ICS?
Answers differ from pay nothing to 30.000TSH for an ICS, average for all Mzula around 6.000 TSH

Are you very busy throughout the year or are there times when you have free time on their hand?
Woman#1: in rainy season they are very busy due to farming activities
In dry season (after July until November) they have a lot of free time on their hands,
They have a lot of things they can do in idle time during dry season, some go to church, some people to mosques, some spend time with families, high percentage goes to clubs

Would you like to get trained on how to construct an ICS? Why?
Man#2: if people are really educated, the information flow reaches everyone, people will come to trainings, if communication flow is bad less people will come
Yes they would like to get trainings on how to construct, so they can train and construct for others
But people also have to be motivated to show up

How would it be possible to motivate the people?
Man#2: He meant people will have to be motivated to get ICS constructed, e.g. by public demonstration on ICS construction and showing its benefits

It is possible to get the ICS without participating in trainings. So would they also be interested in additionally participating in trainings?
Yes, they would like to participate in any trainings or meetings (regardless of the topic)

Why?
They think many people would like to have an ICS at their homes and also get trained on how to build it
They say their village catch up quickly when having new projects, are eager to learn, see e.g. change from mud to brick houses etc.
They say they would like to learn how to construct, also to construct at other HH and form a group as well
Would be nice to form a group because money from ICS construction could be used as group funds, ideas can get exchanged within a group, solve community problems through cooperation

How is the communication within the community in general? Do people share knowledge openly or are they more involved in smaller groups?
People communicate well, a lot of knowledge-sharing and helping each other

How is the communication from top to bottom? Do information always reach everyone in time or do people sometimes miss information? How do information reach you?
3 ways of communication: individual (face to face), mobile phones (some people have), for e.g. annual meeting they go around with drums

Who do you turn for when facing problems?
Problems have 3 levels: for problems with the family they go to the clan leader, for more serious problems they go to sub-village leader, afterwards to village chairperson, afterward to ward council (depending on level of severity of the problem)

What is the function to the VEO for you?
Like a secretary to the chairperson

Focus Group Discussion#19
Date and Place: 29.10.2016, Chinoje
Participants: 11 Potential Adopters#1 (all female group)

Which stove do you use at the moment?
All TSF, no other stoves in use

Would you wish for improvements of the stove you are using? What is bothering you about it?
A lot of problems, a lot of smoke and a lot of firewood
Not stable stoves, stones break or get cracks are not using stones but kind of bricks
Stones break claypots they are using
Modern pans don't stand still on fire, claypots don't move, fit better (have pans but prefer claypots)
Different sizes (big ones for Kande) all made of clay

How often do you cook Kande?
Once a month

Are you mostly cooking inside or outside the house?
Bricks installed the house, are not moved

How often do you need to prepare meals for bigger or smaller groups than usually?
Use big pans for ceremonies, don't use TSF (3 brick stove) in these occasions but then they dig a hole in the ground, put fire in hole and cook on that
Only 1-2 times a year (June/July) for circumcision ceremony, repairing graves, harvest ceremonies

Firewood situation? How often do they have to collect per week, how long does it take, which family member is going?
Firewood is not a problem, availability is good, go to mountains, around five hours to go and come back,
they go daily to save for rainy season

Are all carrying by headload? How much? How much fire do they need in a week?
All headload, they carry one bundle, enough for one week

Spatial problem for saving firewood in dry conditions?
Some put directly in houses, some store outside because they cannot take everything inside (problem during rainy season)

How is the situation for roads and transportation?
Roads are big challenge, streets are hilly, very steep (problem while carrying headload when coming from mountains), have to climb mountains to get firewood

How is the access to water?
Water is a problem, only have one well which is damaged, not working efficiently, go to Gahelesi village to fetch water (get it for free), if they wait for someone to bring they have to pay for it (500 TSH/1 bucket)

Would you like to try this ICS out? Which of its benefits are most appealing to you?
Yes they would like to try
Most important: no smoke, less firewood
Cooking two meals at one
Also safer for children
Easy to use

Preferably inside or outside?
Would prefer inside the houses, protected from rain
Not a problem, enough space

How much would you be willing to pay for an ICS?
Answers vary from 500 TSH to 30.000 TSH, all Chinoje average around 10.000 TSH

Construction materials
Six women have brick maker

Are you very busy throughout the year or are there times when you have free time on your hand?
Only 2 months of resting time (august to October, in October field preparation starts)
Some do domestic activities (collect firewood, fetch water, spend time with family), some can get in small activities (cooking for selling etc), some just relax and drink from morning to evening, some go to church

Would you like to get trained on how to construct an ICS? Why?
They would liked to get trained and to have ICS at their houses
To understand how to construct
To become an expert
Also would like to get knowledge to spread news and to construct to other people

Would all of you like to construct ICS and gain additional income?
Yes

Would you like to form a group with other constructors? Why?
Yes, to be united
To compare, help each other
To keep learning together

Very quiet, long time of silence

Do you think it would change anything about your social status within the community?
They think their status would change, improve

How long do you have to walk to get here (school)? Distance a problem?
10-25 minutes
Ndachi is the one most far away

At which times trainings would fit well in your schedule? (Day time, season)
Rating: most say afternoon, four women prefer morning

What about rainy season?
Dry season: time not such a problem
Rainy season: even afternoon a problem
Sunday is resting day, trainings would be possible after 2 pm

Prefer women group or mixed group? Why?
Very mixed, equal share for both options
Mixed: so men can also be more educated, bricks as muscles job so it fits men better
Female: more kitchen activities so women role, even bricks can be made by them

How is communication with other community members?
Open communication, like to share ideas and help each other

How is flow of information within the community? Does information always reach you or do you miss out on things sometimes? Who is responsible to inform you about news?
Two ways: a) using drum for general meetings through whole village (different persons, get

appointed), b) village chairperson uses sub-village leaders, they use embassadors (10 house leaders/sub-viallge)
Each sub-village consists of around 100 houses

How important is the gender of the decision-maker? Are husbands hindering factors for participation/getting new stove?
Husband and wife should discuss together, husbands won't refuse but wife has to inform him

Do you think women are more likely to decide for ICS implementation?
They don't think there is a big difference

Who do they turn for when facing problems?
Protocol with different levels
First they bring it to sub-village leader, he informs VEO, VEO informs chairperson, if chairperson cannot solve he will take it to ward executive officer
Sub-village leaders: in Chinoje all are man, coincidence, could also be women (get elected)

How is the availability of media?
some have radios, no television in village

Focus Group Discussion#20
Date and Place: 31.10.2016, Chinoje
Participants: 12 Potential Adopters#2 (mixed male and female group)

Which stove do you use at the moment?
3 brick stove, all inside the house
For ceremonies: sand holes with firewood or big stones
Use clay pots for cooking

Rating: TSF when it is hot (October, November) (to them there is no difference between 3 bricks stove and TSF, that's why they said they do not use other stoves), so then they need a mobile stove

Would you wish for improvements of the stove you are using? What is bothering you about it?
Are not very fond of 3 brick stove, needs a lot of firewood, lot of smoke, needs you to be around when you cook because the fire goes quick and you have to keep putting firewood, keep fire "active"

How often do they cook Kande?
for big gatherings twice a year, for family 2-3t imes a month

How often do you need to prepare meals for bigger or smaller groups than usually?
Twice a year

Firewood situation? How often do you have to collect per week, how long does it take, which family member is going?
Go for firewood around 2-3 times a week, 1 bundle they use for 2-3 days
Availability of firewood it is good for them, but far (walk around 5 hours)
Normally women are firewood collectors, just in emergencies man go to collect (can go and bring big stems which are cut at home)

What do you do for saving for rainy season?

It is true that people in dry season go to collect firewood daily

Are all carrying by headload? How much? How much fire do you need in a week?
Spatial problem for saving firewood in dry conditions?
Women carry on heads, men on shoulders, no one has a troll

How is the situation for roads and transportation?
Roads are very bad, they say there is not even roads per se, you have to find some way to pass to collect firewood, on hills/mountains you cannot collect them in one bundle, you have to take them one by one downhill, tie them down there together because you cannot go down the hill with the whole bundle

How is the access to water?
Availability not a problem but it is costly

Presentation ICS

Do you have any questions on the ICS?
Only how to get them

Would you like to try this ICS out? Which of its benefits are most appealing to you?
Yes
Woman: Less firewood,
Man: two meals at once, cooks fast
Bahati: no smoke, saves eyes
Woman: just beautiful
Woman: apparently it will be a relieve for her because she can let her child cook

Do you have the possibility to build an ICS inside your house or outside (place for Banda)?
Preferably inside or outside?
All inside the house, space no problem
Woman: escape costs (not to build Banda)
Man: escape destruction from kids
Woman: protect food from sand and dust

Construction materials
Most can make bricks, if not you have to buy

Would you like to get trained on how to construct an ICS? Why?
They would also like to get the trainings
Women:
- so she can repair/reconstruct if it breaks
- they want to learn to become the technicians
- become a role model within the community, become trainers for other community members

Men don't answer even when asked

Would all of you like to construct ICS and gain additional income?
Yes

Would you like to form a group with other constructors? Why?
Woman#1: wants to form a group because you can collect money together, group fund, group can help in emergencies
Man#1: better to form a group to benefit in different ways, receive trainings together, use group money to form something new like a small project within the project like selling vegetables or build group building to make it selling center
Man#2: he would like to have a group because it is a powerful thing, as individual it is harder to

benefit/have power, group as string device

What about the community in general?
Yes

Why?
Woman: because groups create more projects

Are there any groups in Chinoje at the moment?
Yes there are some groups, especially credit saving groups and keeping livestock groups (chicken, pigs)

Do you think it would change anything about you social status within the community?
Yes it would improve reputation

At which times trainings would fit well in your schedule? (Day time, season)
Prefer dry season, in the morning (around 10am), all agree
Morning is good because some people live far, have to walk fair distance, if you tell people to show up at 10 they will arrive until 12, then yu can start and release them early (if you tell them to come in the afternoon some will show up very late)

How is communication with other community members?
Very open community, share ideas and knowledge, help each other

Is there anything compared to the "man game-meeetings" for women for exchanging of ideas?
Woman: women also have two ways to meet, a)collect firewood as group, b)fetch water as group; a lot of communication at these activities

How is flow of information within the community? Does information always reach you or do you miss out on things sometimes? Who is responsible to inform you about news?
If it is on short notice some people might not get the information in time but on long notice they will also be informed

How important is the gender of the decision-maker? Are husbands hindering factors for participation/getting new stove? Do you think women are more likely to decide for ICS implementation?
Man: Women more involved in decision-making cause ICS is kitchen issue, so he says wife decides everything in kitchen area
Woman: women can decide to construct without husbands
Husbands don't neglect, but couples may discuss it

Who do you turn for when facing problems?
First sub-village leader, if it is more serious to chair person or VEO

Media: Who has radio?
No one

Focus Group Discussion#21
Date and Place: 02.11.2016, Tindiga
Participants: 8 Potential Adopters (all female group)

Which stove do you use at the moment?

TSF, charcoal stove (2 women)

Would you wish for improvements of the stove you are using? What is bothering you about it?
Those who only have TSF want charcoal, those who have both want gas stove
Taking firewood daily as big challenge
Woman#1: a lot of smoke, hurts her chest

What about safety for children?
Not comfortable, kids get eye problems, don't sleep at night, cough a lot

Do you cook most time inside or outside?
In rainy season you have to cook inside, in dry season you can cook outside

Why don't you get a charcoal stove? How much is the price for charcoal?
Expensive, stove itself 7000 TSH
1 bag: 22.000 TSH, you can use it for one month approximately
Woman#2: also depends on using style, what you cook
Gas stove: don't know,
Woman#3: 65.000 TSH for one plate stove

How often do you have to cook for bigger groups?
Only for special occasions like ceremonies or for family clan meetings (2-3 times a year)
If you are sick for a long time people can come to visit you and then you have to cook for big group

How often do you cook Chapatti?
For Chapatti you don't need a big pan, you do it in a normal pan

Do you often need a mobile stove?
Woman#1: they need mobile stoves because in rainy season, water may flow in kitchen, you need to be able to remove stove
Woman#2: When you are cooking inside you should put metal underneath 3sf, if you don't you have to remove it regularly
Woman#3: when it is very hot, you have to be able to move from inside to outside
Woman#4: when you are using fresh wood there is a lot of more smoke, so you go outside when you are using fresh wood

What about farming peak times? Do you take stove to fields?
They don't cook in the fields, eat enough in the morning, enough power for the rest of the day according to them, only need water
In harvest season they move to fields and stay there for 2-4 weeks, then they need to take stove

Does it happen every rainy season that there are floods (even kitchen are flooded)?
Every year floods, water always enters houses

Are there any other meals for which you need special equipment?
You need small pan for vegetables
They cook Kande (variety of foods being mixed: beans, groundnuts, Bambara nuts, green leafes, ….) as well, need big pands
In Ramadam: special meals at night, very liquid, also need big pans

Firewood situation? How often do you have to collect per week, how long does it take, which family member is going?
Woman#5: she is firewood collector, approximately three hours, hard to find firewood, one load lasts for up to one week, carrying by headload
All agree

How often do you go per week? What about saving firewood for rainy season?
One bundle is six firewoods, but one load is a component of ten bundles
They go once a week, no saving for rainy season, go collect in rainy season as well and use wet wood

Are you carrying by headload?
All by headload

How is the situation for roads and transportation?
Roads are challenging, because there are no roads in the bush, there are only paths, a lot of thorns, a lot of insects and animals like snakes, also danger of being raped by men

How is the access to water?
Water is there but not as much tap water, you have to queue for tap water, it can take up to 4 hours waiting, sometimes this brings conflicts in families (e.g. husbands don't believe you that you really spent that much time in waiting line, caused divorces; or you can't cook for children who come back from school because you were in line, husbands comes back from field and doesn't find food he can accuse her of not doing a well job at home but only occasionally, not regular problem)
If you don't want to queue you can let someone bring: Three buckets for 1000 TSH

Presentation ICS

Would you like to try this ICS out?
In each rainy season the floods fill the houses up to the roots, so they move for one-two months to the hills until the water is gone again
Therefore implementing the ICS doesn't seem like a very good idea
But when being asked if they would be willing to build it every time again after the floods destroy it they said yes, if they get training on it

Due to long discussions during previous questions the two hour limit has already passed, when being asked if they want to continue the discussion and stay longer all say they wan to

Which of its benefits are most appealing to you?
Less firewood
No smoke
Cook two meals at once
Food keeps warm

Do you have the possibility to build an ICS inside your house or outside (place for Banda)?
Preferably inside or outside?
Inside, outside kids (might destroy ICS)

Would you prefer to build it on your own or to pay someone to do it?
They want to learn how to build it themselves because if someone comes and builds it and then leaves, then the flood comes and destroys it, what are they going to do

How much would you be willing to pay for an ICS?
Big discussion, how should they know how much to pay without knowing anything on the materials costs, how it is constructed etc --> clarification of construction costs
Start mentioning many prices, long exhausting discussion, agree on 5.000 TSH in harvesting season as constructing fee (additional to activities)

How is the access to bricks?
50 TSH/brick, some of their husbands make them (male task), others can buy discussion on

who has to buy and whose husband can make them, but say they can't answer for their husbands so they do not know
Claysoil: high availability
Rice husk: no problem

30-40 bricks: around 1700 TSH
6 buckets water: 2000 TSH
Ca 4000 TSH for materials + construction fee □

Do you want to change the price you would be willing to pay now?
They say at the moment it is a difficult situation, even 2000 TSH would ba a lot now because there is not much income at the moment, in harvest season they could pay a reasonable rice

If you could choose the time of implementation, when would you like to get it and how much would you then pay for it?
5000 TSH for construction + materials = total 9000 TSH

When would be a good time for trainings?
Dry season

Are you very busy throughout the year or are there times when they have free time on their hand?
They are always busy, many people also go to fields in dry season to cultivate vegetables with irrigation, some also do business
So trainings have to be announced much time in advance
Cannot decide on which time of the day would be best, keep discussing whether morning or afternoon is better
Can agree on Saturday morning (9 am)

Focus Group Discussion#22
Date and Place: 03.11.2016, Tindiga
Participants: 9 Potential Adopters (mixed male and female group)

Which stove do you use at the moment?
All TSF
Charcoal (all but three women)

Would you wish for improvements of the stove you are using? What is bothering you about it?
Female#1: Charcoal is very expensive. Firewood hard to find at the moment, face a lot of problems when going to bushes like snakes, insects
Smoke is also bothering them, makes whole house dirty and dark
Igniting fire every time again is stressful, gives you a headache

Do you cook most time inside or outside?
Almost all inside
Men#1: just built Banda and has ICS outside now
Most of them have it inside because of rain and sun

How often are you affected by floods at your house?
All were affected by flood last year
Lost their houses, are living in kind of bandas at the moment
Plan is to stay here because the old place is destroyed, bad infrastructure

Want to build new houses where they are staying at the moment
They think at new places there might not be floods
In these sub-villgages there have never been problems caused by floods (?)
No one has started yet to construct house

How long do you have to walk here (school) from their houses?
Farest one: 15-30 min (Mbwane Kiegea)

Why don't all get charcoal stove? How much is the price for charcoal?
25.000 TSH for one bag, if you only cook at home one month
Very expensive

How often do you use TSF or charcoal stove, for which meals or occasions …?
Rainy season: charcoal stove because you cannot get firewood
When the firewood is used up
Normally they use 3sf, only use in charcoal stove in emergencies

How often do you have to cook for bigger groups?
3 times a year
In Ramadan (muslims are majority, can't say how much more than Christians and Paganis=non-believers) they use to invite friends to cook together

Do you often need a mobile stove?
They don't like mobile stoves because it disturbs the cook to move it
They prefer fix stoves, when planning their houses there is only one location for kitchen

What about farming peak times? Do you also go to fields and stay there for a couple of weeks?
Depends on how far away the fields are, some stay, some go each day

What about majority in village?
In harvest time most move to fields
They don't take stove, make a new brick stove in the field, all say they cook there in fields

Are there any other meals for which you need special equipment?
Kande: depends, not a timetable, maybe like 3times a month

You said you would like to have new stove, which attributes would you been looking for in such a new stove?
Female#2: reduce smoke, reduce heat while cooking, reduce firewood consumption
Others agree

Firewood situation? How often do you have to collect per week, how long does it take, which family member is going?
Some go once, some twice, some three times a week, depends on how many times you cook
Collection takes three to four hours
If you cooking normal food, you go once and collect enough for one week
In all HHs wives are collecting, one man is helping his wife at the moment because she is pregnant

How often do you go per week? What about saving firewood for rainy season?
Two save for rainy season
The others use fresh firewood (wet) or charcoal stove

Why don't you save for rainy season?
No time

Are all carrying by headload? How much? How much fire do you need in a week?
Spatial problem for saving firewood in dry conditions?
Two (one male, one female) use bycicles the others carry by headload

How is the situation for roads and transportation?
The infrastructure is not very helpful, there are not even real roads, you have to find your own way, challenges like snakes or insects or pieces/roots of woods, you can have accidents by stepping on those

Presentation ICS

What do you think about this ICS? Would you like to try this ICS out? Do you have doubts?
All like it

Which of its benefits are most appealing to you?
Remain quite silent when being asked
Less firewood mentioned six times
reduce smoke mentioned five times
safer than TSF mentioned twice
quality of stove
nice whole design in itself

Do you have the possibility to build an ICS inside your house or outside (place for Banda)?
Preferably inside or outside?
Inside, at night it is too dark to cook outside
Men#1: he would like to have it outside

Construction materials
Bricks: all of them would have to buy, all can afford
They say they do not have claysoil here, the soil here is a mix of sand and?
Claysoil: they can get but it is around 3 hours away
Contribution for water is 500 TSH per month

How much would you be willing to pay for an ICS?
Answers vary from 6.000 to 30.000 TSH, all Tindiga average is 9.000 TSH

Would you like to get trained on how to construct an ICS? Why?
Yes

Would all of you like to construct ICS to other HHs?
Yes

Why?
They want all people to benefit and also to gain additional income

Would you like to form a group with other constructors? Why?
They would like to form a group and construct together, divide income
Woman#3: in training some people may not catch on everything, but during construction together you can keep learning and improving together
Woman#2: more income as group
Man#1: cooperate together, higher work speed than individually, if someone is not clear to you you can ask other group members

Do you think many people would like to get an ICS in Tindiga?
When they see the ICS at other houses many people will want it too

What about floods?
The flood is never all over the village, e.g. Kibwana never had flood until last year (and he is born here), some parts might be more affected

Are you very busy throughout the year or are there times when you have free time on their hand?
Busy people throughout the year, business-minded people, also in dry season they are cultivating vegetables and other small crops along the river, also additional small businesses like selling food etc

At which times trainings would fit well in your schedule? (Day time, season)
Saturday in the morning, only in dry season

Do you think it would change anything about your social status within the community?
Yes, social status would get higher, they could even go outside of village

Are there any other groups in Tindiga? Are you part of any?
Only saving and credit groups: no one is member

How is flow of information within the community? Does information always reach you or do you miss out on things sometimes? Who is responsible to inform you about news?
Woman#4: 2 ways: sub-village leaders to inform people (by phone, sub-village leaders then go to houses) or drum
Short notice is ok, but they don't like it

Have many people cellphones in Tindiga?
Around half of the people

Who do you turn for when facing problems?
First sub-village leader, next level would be village government

How is the access to media**?**
no tvs, all have radio

Focus Group Discussion#23
Date and Place: 07.11.2016, Muhenda
Participants: 11 Potential Adopters (all female group)

Observation: 8 FHHs out of 9 participants - According to them this is a coincidence, there are much more married women than FHHs
Participants are very well dressed, clothes and shoes are well maintained, well-groomed, good physical conditions (no signs of health problems), many with jewelry
Some are very active, others don't speak that much, but participation can be considered as good

Which stove do you use at the moment?
All TSF, two women are also using charcoal stove

Would you wish for improvements of the stove you are using? What is bothering you about it?
Want different stoves because they have to collect firewood a lot, smoke emission, stones sometimes not strong enough to carry pans, also can slide and food is being wasted, not safe

Do you cook most time inside or outside?

Half of the inside, half of them outside (in bandas)

Why don't all of you get a charcoal stove? How much is the price for charcoal?
Too expensive, one charcoal stove is 5.000 TSH
One bag is 15.000-25.000 TSH, it lasts around one month if you are using it together with 3sf, if not less time

How often do you have to cook for bigger groups?
Around three times a year

How often do you cook Makande?
Once or twice a month

Do you often need a mobile stove?
They don't move their stoves

Does it happen every rainy season that there are floods (even kitchen are flooded)?
This year there was a flood, therefore no harvest this year, no food, but not regularly

Are there any other meals for which you need special equipment?
No

Firewood situation? How often do you have to collect per week, how long does it take, which family member is going?
It's them who collect, they all go once a week, it takes them around two hours to collect, the collected amount of firewood lasts around one week

What do you do in rainy season? Use wet wood or different coping strategy?
Collect in rainy season, bring them to houses and put them at wall, when there is sun they put it to dry, they often have to use wet wood in rainy season

Are you carrying by headload?
All by headload

How is the situation for roads and transportation?
Roads in the center are very fine, but the roads they are using for collection of firewood, there are no roads, they have to make own paths, in rainy season very dangerous because it is very wet (grasses are wet and they get wet) and snakes/insects and ways are slippery (can fall)

Presentation ICS: When being shown the pictures of ICS they discuss it with interest, not as interested as Dodoma farmers but half of them is discussing it actively, other half not as excited about looking at pictures

Would you like to try this ICS out?
No strong reaction visible, say they want and admire them but just from looking at them they don't seem very excited, most of them need to be asked to name benefits

Which of its benefits are most appealing to you?
Less firewood, cooks two meals at once, no smoke, cooks fast, safer

Preferably inside or outside?
All of them want it outside, because the space inside the houses is limited

How much would you be willing to pay for an ICS?
When being asked about their willingness to pay they keep discussing, takes some time until they give their answers

Answers vary from 500 TSH to 20.000 TSH, all Muhenda average is around 7.500 TSH

Construction materials
Access to water: a bit tricky because they only have 2 tap water stations, they say they have to queue for very long time, around 6 hours, opens at 6am, Fridays and Sundays are better for access because of less people (Friday: mosques, Sundays: churches), one tap is in center, other one is Madibira
Don't have to pay for water, but when station is broken they have to contribute 1.000 TSH

Would you like to get trained on how to construct an ICS? Why?
Yes they are interested

Why?
Woman#1: if you are trained and become an expert you can also construct to other HH and get money from it
Woman#2: if she is trained she can construct ICS for herself so she doesn't have to pay for it, if they are getting trained it can become a project, might also get known in other villages and go there to construct
Woman#3: to get knowledge and learn
Others remain very silent

Would others prefer to have it built by someone else to them?
All want trainings

Why again?
Silence, no answer

Are you very busy throughout the year or are there times when you have free time on your hand?
Seem to be busy throughout the year, In dry season they cultivate vegetable gardens, there is no long dry season, finish harvest in September, prepare fields in October/November, therefore no long resting time

Are there any groups in this village? Is anyone member?
Saving and credit groups (four women)
Sustainable charcoal group

Would you like to form a group with other constructors? Why?
Yes, they would like
No answer when asking why

What is more appealing/interesting to you? Be a member of a group, any group, or to learn how to construct an ICS?
One big reason: if you have a very big problem you know where to run to for getting help

How are news being spread in the village? If there is an important information that needs to be brought to everybody, how is it being done?
Two ways: to appoint and hire people to beat the drum, very effective, OR chairperson uses sub-village leaders (informs via mobile phone) to inform people

Who do you turn for when facing problems?
Bring problems to sub-village leaders as first level, second level is VEO, third level is Ward Council

How is the access to media?
Three women have mobile phones, three have radios

Focus Group Disucssion#24
Date and Place: 08.11.2016, Kitunduweta
Participants: 9 Potential Adopters (mixed male and female group)
Observations:
Participants appear similar to participants in Muhenda, very tidy clothes and well-groomed
Participants are not very attentive in the beginning, mobiles are ringing a lot and they accept calls and go outside, situation improves during the course of the discussion, participation in general is good

Which stove do you use at the moment?
All TSF; one women only uses charcoal stove
Woman#1: Another stove made out of three bricks, two next to each other with space in between, one at the back of those so they touch no air can enter when you put pan on top --> the others don't know how to construct it, her own idea, so she just constructed for herself

Would the others like to get a charcoal stove?
Too expensive to buy charcoal
18.000-20.000 TSH/bag, 1.5 month if you are only using on normal cook, but if you have a lot of things to cook about one month

Would you wish for improvements of the stove you are using? What is bothering you about it?
Very active participation
They would like to use less firewood, prevent smoke; food taste is disturbed by smoke as well, if it is windy the fire goes everywhere, so this delays cooking a lot, pans get so dirty

Do you cook most time inside or outside?
All of them outside because of smoke

How often do you go to collect firewood? Who is going?
The women in all HHs are collecting, it takes one to two hours to collect, one load lasts for around one week

How is the road and transportation situation for firewood collection?
No good roads, valleys and hills, a lot of struggles to look for firewood, dangerous animals like elephants, when there are a lot of grasses in the bush they also come close to settlements, snakes etc., have to make your own paths

Does it happen every rainy season that there are floods (even kitchen are flooded)?
Normally there are no floods

What do you do in rainy season? Use wet wood or different coping strategy?
They also go to collect wood in rainy season
Use wet firewood, there is no other way for them

Is it not possible to collect more firewood in dry season?
They try to collect more but still all is used up until rainy season

Are all carrying by headload? Does someone own a troll?
All by headload

Are your stoves in a fix place outside or do you move them?

Not mobile, prefer fix stove, one women prefers mobile stoves *(the one with the charcoal stove)*

How often do you have to use very big or very small pans/pots?
Big pans for ceremonies (2-3 times a year)

Are there any meals for which you need special equipment?
Man#1: If you cook cassava and banana you need to use a big pan (maybe not very big but bigger than normally) others disagree, they you only need bigger pans if you have big family, not for special meals
When being asked about Makande they agree you need big pan because

ICS Presentation: Showing of pictures: *don't look too excited but look at them interested*

One male participant arrives late, turns out to be the ICS technician

Who of you has an ICS?
Two women have an ICS
When being asked why they didn't say so before, they answer this might have closed some opportunities

Would you like to try this ICS out?
Yes

Which of its benefits are most appealing to you?
Firewood, smoke, cook food quickly

How much would you be willing to pay for an ICS?
Bricks, cement, stones, sand (3.000 TSH for bricks, doesn't know the cement price)
Answers very from 500 TSH to 15.000 TSH, all Kitunduweta average is around 4.500 TSH

Are there any groups in this village? Is anyone member?
VEKOBA (saving and credit) group: 6 female participants and the wive of one male participant, whole group has 30 members

How do you solve conflicts in the community? Who do they turn for when facing problems?
Subvillage leader, to VEO, then council
For group conflicts they have to consider the leaders

How is the access to media?
Two man and five woman have mobile phones
Two man and five woman have radios
No one has TV

Questions for the ICS constructor after FGD has ended
How were you trained and by whom? Can you briefly explain the process?
He was selected by village government to go to Europe and be trained, does not remember the name of the organization (turns out to be World Vision, same prject as in Ilakala),
Two people of each village selected to get training, he was the only one who attended training, then he came with one trainer and another student from Europe to construct 11 stoves in Kitunduweta, in 2nd round they constructed 7 stoves, were constructed for free,
selection by chairperson and VEO according to different subvillages and streets,
there won't be a 3rd round, so if anyone wants they can call him and he constructs for payment, no one asked yet, in September 2nd round finished, negotiation about price

Differences: cement, 25 bricks (but burned ones, not fresh ones)

Is World Vision planning any more ICS related activities here or are they done?
Done, all up to him now

Do you feel well equipped or would you need more training?
For World Vision stoves yes

Would you like to have more people trained on ICS construction?
He thinks it would be good if there were many because this could spread innovation easier

Appendix 12 Transcipts Interviews

Interview#1
Date and Place: 16.09.2016, Morogoro town
Participant: SUA Student, Key Informant Implementation ICS: OS (male)

How do you report work in the project?#
Submitting report after fieldwork to SUA, this is afterwards distributed to all involved parties- also german parties, in case of ICS its Goetz

Who has access to the reports on UPS implementation?
People who the report is send to have access

Is there any kind of platform for collecting and sharing all reports on UPS implementation
No platform just a common template that is shared w

How do you evaluate the UPS implementation at HH level?
Some HH are just using stoves, when they hear that researchers are coming. BUT: Field assistants are monitoring the HH weekly through special forms with predefined monitoring indicators, that way it is possible to check how long they need to use up the wood
Problem with using the stoves, farmers still think its just there for learning and don't understand that there is a real benefit to it.

How do evaluations influence future work planning?
Immediate adjustments after evaluations brick problem example
During implementation go to CSS once per month but now at later stage only when it s necessary, more ARI involvement
Monitoring responsibility is now shifted to group level under supervision of ARI-> self monitoring part of Exit strategy, make use of flip chart per household to fill in wood use indicators , so and end of week aris can collect monitoring data-> send to Goetz for analysis

How often do you meet with other implementing staff?
Mostly emails kimaro for basic stuff , important larger issues like budget Goetz /frieder

What kind of communication channels do you use to communicate with other scientific staff
Currently emails is fine, but if trans sec grows and all zalf people are not around is a problem, interviewee suggest to have a zalf person located at here, or responsible have to be shifted.
Cumbersome decisison making process

Is there a sharing of experiences and lessons learning?
Hesitantly: during internal thematic trans sec workshops, eg evaluation workshops invite all stakeholders,like oficials, to share information to the people of interest. Currently enough but he suggests improvements:
there is no proper update and clear collecting of information. Need to improve the website, firstly for better internal communication but secondly also for the stakeholders, who need to use it as they are the ones to use the actual technology, so they need better access to information and education material on the ICS, suggests mobile application, so during dry seasons, without farming activitites they could use that time to engage with that material, thinks this is very important. Trans sec uses much money, but he thinks the community are not enjoying the technology because of lack of access,

Are there trainings for the scientific staff? If so, how often and what kind of trainings?
No training, just through experience
Extension agents: yes they participate in training like all members, they know about all UPS

Were the offered trainings for farmers sufficient?
yes the methods are sufficient, but only if the participants concentrate, but problem men come a lot due to money incentive , maybe they don't listen well, around 70% absorb the knowldege

Which factors hinder access to these activities?
Almost 60% participate, mostly family matters: social obligation, training activities are aligned to their work schedules, mostly conducted during evening

How could the access to training be improved?
Exchange program between the districts to motivate farmers for better performance

Was it necessary to adapt the methods?
yes, farmers asked to not have trainings on weekends, so now they are only being conducted on weekdays

Which communication channels to farmers would you improve? And How?
Perfect, mobile communication, no option to include any other , technological barriers, face to face is only in case of severer problems then personal meetings are arranged

What kind of feedback did you get on the implementation methods mentioned above? Was this feedback used to adapt the implementation methods?
He normally asks for feedback after training : usually positive, because they learn about it, free to ask questions-> which implies content for feedback. Example for feedback, they prefer trainings during eekedays to save weekends for church or leisure activities, this has been implemented

Apart from money, material inputs and knowledge, are there other incentives you used to get farmers to participate?
Money1: recommendation premium: half of the amount flows into group treasure half for individual 5000-2000 depending on which village
Money2: trans sec project, 200 TZS for built stove given annually -> meant to be little additional fund for group actitivy that's why it is a small amount.

Was the UPS technology adapted during the implementation process? If yes, why and how?

During implementation, after 6 months farmers proposed design changes:
1. lower height stoves , initial stoves to high only cooking while standing, also takes fire capacity away
2. Penetration chamber change from horizontal to diagonal.

Apart from Farmer field days, farmer-to-farmer visits, media coverage, requests from outside do you use other methods for outscaling the UPS?
Proposed one not in use so far. Only farmer field days are in use but he thinks media is a good idea, media happened they invited television team during evaluation session, thorugh that aired program they got requests from far away, contacted SUA consulting work resulted. Carera region, norther tanzan. Consulting through phone, instead of travelling there personally, costly would have to train 40 people at least to pay out refugees, are located in protected areas and thus impacting strongly the protected areas -> deforestation
Preparing group constitution, just waiting for sua to give them training so the can autonomously form groups. They just need money from zalf to do these outscaling activities.

Do you have ideas for other methods?
Start own education program, aired thorugh TV (local "theatres"/radio (twice weekly)

Why people stop using stoves?:
1problem is lack of intrinsic motivation, initially joined just for financial rewards
2 lack of awareness of benefits of stoves. But there are not many of those "takes too long, hungry" "inconvenient" takes time for farmers to understand the benefits. Short sighted

What do you think motivates new adopters?
Because of outscaling activities -> they are informed , more intrinsic motivation prevailing, no money incentive, just provision of inputs (20 feet pipe = 3 sets) -> good functioning and low cost dissemination strategy

For which implementation steps do you think more time is needed?
Maybe add practical aspect should be increased to 2-4 days , different implementation design between two districts: Dodoma trainers very experienced. In kilosa they imported Dodoma trainers
Knowledge captured in Dodoma is different

For outscaling approaching villages that already show interests, unlike changarawe that weren't even aware of anything ulaya, they have been asking continuously to be part of the project, but no one has acted upon this

What are farmers motivations to participate?
learn new skills knowledge, reputation,
low cost implementation, material used is fully provided . for adopters after realizing outcome of stove fuel consumption, faster cooking, after

What mechanisms of knowledge sharing are dominant in the CSS? Do they exchange helpful information with other farmers?
Most farmer do share, even between UPS eg, KG , sunflower, no holding back of info for most, suggests: visual trigger to create active interest from new adopters curiosity (tshirt , cappi)

How are group dynamics (just general, most important issues, differences)?
Answer: Construction: goes with dissimation of knowledge nothing besides that. And even this is done by very few members

Do you think farmers have a sense of ownership for their UPS ?
YES, prepare own consitutions and guidelines for group membership, to ensure uniform awareness among all members, who doesn't adhere is excluded from group

What do you think is needed to create a sense of ownership for the UPS:
further training is needed to make sure farmers understand that UPS is not for scientists but for themselves. -> he suggests training: more training on stove itself, more effort on economic training for group activities

Do you have strategic partnerships to public institutions that are helpful for the work?, if yes, which ones?
Yes! Because many important leaders are alumni , eg. Chief of forestry + beekeeiping department is teaching at SUA , minister of natural resources and tourism are also from , director of wildlife divison also lecturer a SU

Which agro-ecological factors are important for the UPS?
Firewood, deforestation
Access to firewood: kilosa: almost 1 h walking
In Dodoma : 3-4 h
Safe time: with ICS only once per week

Do you think the villages have adequate infrastructure?
not that good, but there, usually provide transport, not important for the training

Which inputs are most important and do farmers have access to them?
PVC Pipes to shape chambers, bricks/muds, insulating material rice husk, dried grass (hollow grasses)
Pipes get from material shops, have to safari far for that. But no problem, maybe use banana stem instead of pipe.

Interview#2
Date and Place: 28.09.2016, Ilakala
Participants:
MVIWATA Kilosa district, Key Informant Group Management: IK (female)
ARI Ilonga, Key Informant Technical Implementation ICS: MO (male)
ARI Ilonga, Key Informant Technical Implementation KG: RA (male)

Since how long are you involved with Trans-SEC?
IK: joined in September 2015
MO: joined in January 2015
RA: joined in July 2015

Could you illustrate the organizational structure of MVIWATA and what is your role in it?
IK: MVIWATA: national network of farmer associations, usually link farmers with other stakeholders, in Trans-SEC involved in group formation/setting/dynamics
Her role: field officer, backstopping farmer groups/members, checking progress of groups, a little bit involved in implementation (technical aspects)
MO: ARIs involved in technical part, ICS responsible, make sure that ICS group members have ICS, every member should have ICS, monitoring data collection, comparison of TSF vs. ICS, check if ICS are active (reporting to Ogossy Sererya (SUA) or Götz Uckert(ZALF), sheets for data: firewood consumption (how many/per week, headload who does the work of collectioning? Agewise, division of labour etc)
RA: KG & storage expertise, responsibility to make sure that implementation is provided to group members and number insure number of members, MVIWATA especially for group members, monitoring (weekly)

Do you have strategic partnerships to public institutions that are helpful for the work?, if yes, which ones? How did they help you?
IK: yes sort of, different projects with different partners (can't say who exactly), but partners and individuals (a bit about government, but she doesn't know exactly, knows that there are a lot of partners but she can't say which ones especially), eg. ESAFF
MO: of course, so many projects, ARI is governmental, MVIWATA is non-governmental, ARI work with different partners&projects, in villages cooperation with extension officers (=government), individual partners e.g. Victoria from Kilimanjaro region facilitates trainings on KG (how to construct bags) trainings in Kilosa&Dodoma

What previous experience with the farmers do you have?
All no experience

How do you report work in the project?
RA: certain protocol, here to collect data, send to main office to Bashir Makoko (supervisor), who analyses data, RA enters also sometimes data and sens it to Hadija so reports are written
Set of moniroting indicators (monthly on the timetable), weekly not on the timetable but to make sure UPS is going well
MO: Bashir Makoko, Ogossy Sereya Götz Uckert

Is there any kind of platform for collecting and sharing all reports on UPS implementation?
Always emails

Who is evaluating?
Hadija sometimes in communication with Bashir, sometimes with RA
IK: report to supervisor, then he shares to consortium (sometimes IK directly to consortium), depends on information

Which methods/means /tools do you use to evaluate the Ups groups activity? Monitoing indicators as main tool?
IK: activities: monitoring, evaluation, capacity building on leadership and group management, financial management, entrepreneurship, assessment on drop outs

How do these evaluations influence future work planning?
IK: depends, reports being shared to Nickson Mahanga (supervisor) , sometimes Nikson does evaluation, if he found something needs to be changed he communicates it to IK
MO: sheet for data correction: data are sent to Ogossy /Götz (copy Bashir) Ogossy/Johannes analyse data Götz receives analysed data if he wants changes he tells OS
ARI & MVIWATA do monitoring together, share data

How often do you meet with other implementing staff?
ARI & MVIWATA contact each day, communication works well, important that they share information and exchange ideas

On which levels and in which links could decision-making and information flows on adaptations between you and coordination be improved? ZALF-SUA-MVIWATA/ARI-ExtAgents-Farmers
IK: Advantage that it is in stages, direct link sometimes causes confusion, thinks it is a good mechanism, sometimes there can be challegnes, to some extent is working good, sometimes some people do not share information, system is good but people might be the challenge in some cases (if they forget to share information, if you ask you get them)
RA: mechanism works well, hierarchy works quite fine (e.g. extension agent-RA-Bashir works well)
Centralization wouldn't be a good idea for this project, each organization for itself is centralized, but information should get decetntralized to SUA, then to Germany

IK: chain of information is better, if it reaches final destination the information should be shares to all, that is the only thing to be improved,

Are there trainings for the scientific staff? If so, how often and what kind of trainings?
RA: [KG]
MO: trained by Götz himself, then they trained farmers together, first training at Changarawe, invited 3 Ilakala farmers and trained them as well, and those farmers were the ones to construct ICS in Ilakala (together with some farmers from Changarawe), farmers being trained by farmers under MO's supervision, 3 or 4 trained farmers from Dodoma also present in Changarawe
IK: before joining TransSEC field practicals in MVIWATA, there different activities where she was trained on group management..

Which of the methods were not sufficient?
MO: trainings on sanitation/hygiene would be needed, for ICS: mentorship (spending time with farmer elaborating more about ICS and their importance, long-term effects e.g. smoke effects on health), he would recommend himself to do it
RA: agrees with MO, farmers want to know the outputs, more mentorship needed, he could do it (sometimes busy but sometimes free)
Samuel as option?
MO: He could do under supervision of ARI

Which factors hinder access to these activities + How could the access to training be improved?
IK: Happens, different people (not always the same)
Reasons: distance, farm activities, personal reasons… (ICS: members very active, KG also not that often)

Was it necessary to adapt the methods? And should there be additional trainings on other topics or more training on specific topics.
IK: Trainings always part of meetings, not regularly but more or less once per month with all groups
RA: Demonstration for ICS and KG, first show them and then practice themselves, weekly meetings, when a farmers wants to implement KG they go there
MO: same

RA: farmers well equipped with knowledge, nutrition education has shown its effects
MO: same, ICS construction by themselves, a lot of new adopters (ICS contructed by members without MO being present)

Feedback session?
During monitorings normally (monthly)

Which communication channels to farmers would you improve? And how?
IK: Sometimes members call (very active members as channel to get information to rest), normally she contacts Samuel (extension officer Ilakala) and he gets information to farmers , problem that most farmers don't have phones (sometimes hard to reach, in both villages same problem)

What kind of feedback did you get on the implementation methods mentioned above? Was this feedback used to adapt the implementation methods?
RA: [KG]
MO: firewood consumption is reduced (reduced labour), afraid of smoke now, save time, start construction new stoves

What in your opinion is a good incentive to get farmers to participate and how can you ensure a long term commitment ?
RA: [KG]

MO: financial incentive, T-Shirts and Caps (everyone who constructs an ICS gets one)
IK: when they see project it is all about taking, give more and more training to change mind (!), in Kilosa there are too many projects (less patient, quick to change to other projects, farmers sometimes participating in several projects)

Adaptation mechanism
Was the UPS technology adapted during the implementation process? If yes, why and how?
ICS: are there different adaptations in different CSS? Was the design shift implemented in all old ICS
KG general

Apart from Farmer field days, farmer-to-farmer visits, media coverage, Requests from outside do you use other methods for outscaling the UPS?
IK: Farmer field days in Ilakala and Changarawe (once): get farmers in one place, explain about UPS
RA: demonstrate technologies in field days, comprising members of all UPS and different HH to come to same place , technology is explained as well as advantages, then all farmers visiting each UPS to see what is going on
IK: not ALL UPS, but several

Do you have ideas for other methods?
IK: Farmer-to-farmer visits: involved other stakeholders (ext. officers,) in forst one, second one only involved farmers

Recommendations for outscaling to Scale-N?
RA: [KG]
MO: selection of village according to closeness of village, if village is very close adoption is slow
IK: approach: in the beginning they were not consistent in the approach, there should be a uniform approach and all impleemntaors should be treated the same (e.g. not get different amounts of money paid for implementation as happened in Trans-SEC), ideas for improvement from farmers should be considered for new project villages
MO: In Changarawe it happens that TransSEC didn't manage to be any help to farmers there, activities should be implemented well, floods (ICS being washed away) no help provided, that might also have caused the low adoption rate in Changarawe

Previous knowledge of farmers regarding important topics connected to UPS
MO: for ICS they didn't know anything
RA: nothing

Gender
RA: KG most members are women, farmers should have children, kitchen activities mostly for women,
MO: same for ICS

Age
KG: most people younger, as old people sometimes too weak
ICS: mostly older people, Irene: HHH as members (younger ones often not in possession of decision-making power to get an ICS)

Income
NO
ICS and KG affordable to everyone who is interested (3000 TSH ICS, 9000 TSH KG), Running cost very low

Knowledge sharing related to women?

CXC

RA: Tanzanian farmers interactive, if a farmers harvests he/she normally gves some harvested fruits etc to neighbor so they can try it out, shows mentality, so if someone likes KG they will promote it to other community members, KG also very visible,
IK: RA or Hadija as big motivators

Better working for adopters than for initial members?
RA: yes, adopters mostly doing well, members more inconsistent
MO: very difficult to say that for ICS, adopters caught attention by seeing that members did will

Drop Outs?
RA: Personal reasons

Time span between group formation and implementation
KG: Group Formation in 2014, July 2015 Implementation, August Construction (get exact data from Bashir), for ICS less time in between

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Interview#3
Date and Place: 30.09.2016, Ilakala
Participant: TransSEC Extension Officer Ilakala

Could you briefly introduce yourself and describe the tasks you are doing for TransSEC in Ilakala?
Works in Ilakala since January 2016
Supervisor of all UPS in Ilakala: KG, maize sheller, pyrolyzer, tied ridge + mother plots, storage, ICS
Not in charge of technical issues, if problems occur he reports to ARI Ilonga or assistant researchers
Before he came, Kassim was supporting the project, he is still involved sometimes when there are emergencies for instance, or when Sam is absent.

Please describe your daily work for Kitchen Garden and ICS
Routine: visits everyone, adopters + members
ICS: goes to each member + ask around -> for feedback, if there are any problems, always talking to experts first

Do you think there is a good dynamic between the group members and the adopters or do you have any concerns?
ICS he thinks there are no communication or relational problems, positive outlook

Did you receive any trainings from TransSEC before you started working?
He received a general training on his duties and tasks.
Training on: how to live and interact with village people, orientation, objective, tasks, how to organize the groups, by bashir
Introduced to group leaders, they gave him another training/introduction to the members
Rashidi gave technical training
ICS he doesn't know how to build it
Some technical knowledge he learns from farmers , other stuff from the field assistants
farmer training, he is ususally not present

How is the knowledge-sharing between the group members? How is the group attitude in general?
he says there is good communication

ICS : group is very well organized, always attend the meetings
Drop outs:
ICS they are just using it.

Do you have any recommendations for the implementation process?
He recommends to give more trainings,
Leadership training, for leaders and every group members, on roles and tasks, so they take them serious.

Interview#4
Date and Place: 06.10.2016, Changarawe
Participant: TransSEC Extension Agent Changarawe

Could you briefly tell us about your role, what you are doing, how you are involved in the project?
He is here to supervise and ensure well working of KG and ICS, acts as linkage between SUA, ARI Ilonga, MVIWATA and farmers

What are your insights in the groups, what is going well/not so well?
ICS: individual responsibility, monthly meetings

How do you consider the group dynamics? Do you think they are working well together or are there challenges? Do you think the groups will keep going after project end?
Challenge: availability of firewood careless because they have a lot of resources (ICS)
In Ilakala people care much more because they have limited resources

How intense is your contact with the farmers? How often do you see them?
No specific schedule, he comes when a problem arises, more demand driven

How do you get to know about problems?
Everyone has his mobile number, not all farmers have but can use the ones of neighbours

Have you been employed with TransSEC since project start?
in the beginning they were using extension officer from government, he started last year (after all trainings had been conducted)

Are your responsibilities for the adopters the same as for the group members?
Same as for group members, they can call him for problems, almost all have his phone number, and everyone knows him as he has worked as extension agent for government for 10 years before he resigned and started working with TransSEC

Do you know how to help with problems for KG/ICS, how to repair them?
He also got technical trainings, he knows how to build ICS, but he can't handle every problem due to time constraints, so he connects people that need help with people who have the skills

The ICS adopters told us they had problems with getting metal to repair the chimneys of their stoves. What can you tell us about this problem?
The objective of ICS is not to make people get expensive things which are beyond their capability/possibility to reach, initial purpose was to construct ICS with claysoil, also chimney, when it is dry you don't need to use metal, you can (if you want) but there is no need for its functioning or to prevent smoke
It is an option, not a necessity but people want the metal because it is more perfect

Do you think offering trainings for adopters would be a good think or is there no demand for it?
It's very important that they also get trainings, because aim of the project is to spread innovations, group members are only serving as examples, they tried to do it at annual village meeting (of village council), farmer field day for more villages combined, extension officers selected representatives of neighbor villages to come to Changarawe (transport wasn't offered but money returned)

Do you think people would come to trainings without monetary incentives?
Some would come, but attendance would be very low

Interview#5
Date and Place: 11.10.2016, Idifu
Participant: ICS Group Secretary (male)

Can you explain us briefly how the group system is working? Initial group members, what happens with adopters, do they become group members automatically or how do they apply, who decides who becomes a new member?
Initially they were told that they could add more members, but 30 would be the max. (in the beginning they were 25), in the process of constructing they grew to 30, then they just constructed to adopters, no new members, but then some members didn't show up anymore (kind of dropped out), so at the moment they are only 24 members

How does someone become a drop out?
If a member doesn't show up for 4 consecutive meetings

Did all participate in the trainings?
Yes, in all

What about the new members? Did they participate in some of the trainings?
No training from researchers but only from members themselves
After some confusion M clarifies that the 5 added members were kicked out of the group again because Ogossy told them that according to their constitution they couldn't be more than 25 members, and then 2 persons dropped out and were replaced by 2 new members
The women from the FGD before (adopters) who thought they were group members are mistaken

How often do you have group meetings?
Normally once a month, but lately every Saturday because they were trying to get their constitution registered (to be officially recognized by government, makes the group legal,

Did you get help from the researchers how to register?
Götz helped and gave them 15.000 TSH for the registration

How is attendance at regular meetings?
High

When the project ends, will the group stay together and keep working?
They are a sustainable group, they have enough skills and experience, also installed in other villages (Mvumi-Iringa etc) and went to Ilolo to train members there, it is also kind of employment because they gain money from constructing

Should the group size remain like this or is the demand high enough to add more members or make it even necessary?
competition would be very high

Can you tell us something about the TOAM project?
He says he doesn't know, therefore it is explained briefly by Nyika
Yes, he heard. It is from Miganga village, people from there came to Idifu to train people here, but Idifu people don't like them because the chimneys are not well built and the smoke comes back inside the house, no one is using them

In the rating most participants said one motivation for participating in the ICS group was to increase the social status or reputation – can you explain why this is? Is it only for getting known or really enhancing the social status?
Not really a big reason, for him the main reasons for the people are to get knowledge, to reduce firewood and to cut less trees

If you think about the whole process of training and implementation, do you have some recommendations on how to improve it? If we would implement this project in another village, should it be done the same or could some things be made better?
The only thing he would change is the quantity of trainings, not different ones, but more repetitions of the existing ones, so people can take in all the details quickly and profoundly and work more efficiently

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Interview#6
Date: 13.10.2016, Idifu
Participant: ICS Adopter (male)

When did you install ICS?
August 2016
He had heard about it before but didn't implement it earlier because he was not around (he was in Tanga region for 3 months), his mum couldn't afford it by herself.

Who constructed it:
Rosemary Manghawira adopter

How did the process of implementation take place/whom did you approach first?
Rosemary was in 2nd intake of trainings (adopters received some trainings) so in their sub-village she is the only one to know how t build ICS he approached her (subvillage: Nyerere)

How much did you pay for the ICS construction?
Price: free for him (as incentive/advertisement) , materials: claysoil, groundnut peels, water no challenge, by then everything was very available, he made bricks himself

Did you participate in meeting were all UPS group were presented?
He doesn't know the meaning of Trans-SEC

How did you hear the first time about the ICS?
A lot of neighbours told him about it

Main motivation?
Less firewood, no smoke

Benefits:
less trips for firewood collection

Flaws:
no flaws

Stove in use before?
TSF, still use sometimes when kids are cooking (don't know how ICS works yet)

Mobility?
Flaw

Would you like to know how to construct? Trainings?
Yes

Are you member in any groups? Are you interested?
Tree Nursery
Bee Group

Would you be interested in forming kind of an ICS Adopter Group?
Very interesting

Why?
Because there are only few people who know how to construct so it would be better if more people were trained

Would you like to make changes/improve ICS?
No, he already has short one

Do you consider the following flaws of the ICS to be important?
Hole size for pots can't be reduced/enlarged (not flexible for more or less persons): not a flaw for him
Can't be used as bonfire: Can be used for bonfire (cause it saves heat)
Special meals (e.g. Nande): you can use ICS (depends on pan)

Did ICS cause changes in daily routines?
No

How do you consider knowledge-sharing with other ICS group members?
Communication only with Rosemary

Interview#7
Date and Place: 13.10.2016, Idifu
Participant: ICS Group Member (female)

How did you hear about the project?
Heard about Trans-SEC groups through sub-village leader (went around HH to tell about meeting), went to meeting where UPS were presented, liked ICS and KG

Motivation:
was curious about ICS (construction + use)
Wanted to join both groups but weren't chosen for KG; jut for ICS

TransSEC researchers came back every week so she told them (Swai, Devotah)

Mum or sister any UPS group member?
No

Which trainings did you receive?
She received all trainings and became a trainer herself for Changarawe people
Seminar of 2 villages: Ilolo (2 chosen)+Idifu (all) group members were trained by trainers from Chololo from another project: Tanzania-Sanseed-Technology on how to construct ICS (technical training)
 2 Idifu members were chosen (Majuto, Emanuel Chamhene) and send to Ilolo to join 2 Ilolo representatives (Donald, Grace) and together train the rest of the Ilolo group members
 Margret and Emi Kamando were chosen + 1 Ilolo guy (Peter) were send to Changarawe to train all group members there

Trainings for adopters? Can you help clarify?
Don't receive any trainings from TransSEC but if someone is interested they sit down with people and give them information/share knowledge on ICS before constructing it, no real trainings given to adopters, random process, if there are many interests they can sit together as group, if not individual meeting

How many ICS have you constructed?
At least 15

Are there any adopters who learnt how to construct ICS?
Rosemary knows, she learned it by commitment and talent, when they constructed ICS at her place she afterwards went with them to watch them construct at other places, they told her it was fine and that she could construct them as well

If adopters also found a group to construct ICS, is the demand high enough or would it create too much competition?
They don't only construct for community here but also to other villages, so enough demand

Same price for people in other villages?
Last year it was 2.000 TSH for everyone (time for advertisement)
This year business perspective: 5.000 TSH for everyone (+ materials)

What about transport costs?
The customer has to pay for transport or come to get them

What about pipes?
Group members get them
2 people for construction of 1 ICS
Pipes: can also use banana stems instead of pipes, but it is hard to find banana stems

What happens when project ends?
They will never stop as group, they have to find some way to go to shop and buy pipes (don't know yet where to get but they will find)

Transport means/roads as challenge when they go for construction?
In rainy season big challenge, they don't go when it is raining, but when rain stops for few days they can go

Do they still have to advertise or are people approaching them by themselves?
Last year house to house promotion, this year information is widespread so annual meeting for promotion, they get a lot of customers through annual meeting because villagers can see group

members, also prepare posters and put in centers with phone number of group leaders

Tshirts/Caps?
Also helps a lot

Would you like to go to more villages as trainer for other farmers?
Yes

Why/what did you like?
She likes environment, going somewhere new
Also likes to mobilize and train people

Same group leaders as in beginning? Group dynamics?
Jospeh Malima was chairperson before, now it is Emanuel
Reason: Jospeh is stubborn, fighting with people, alcohol problem
Wanted someone they can rely on/always approach him
Researchers not involved, acted as group
Group dynamics: in trainings they were 33, 3 people could not attend all sessions due to distance, now they are 30, doesn't really respond to group dynamics question, says she likes her group

Did replacement of group leaders lead to troubles within group?
No problems at all, Joseph took it very wisely, he understood the reason

Do you think all trainings were important?
Yes, very important

Do you have general recommendations/ideas for improvement?
Everything very well, she really appreciates it
Would only be nice if project could continue.

Why?
New things to be implemented

Interview#8
Date and Place: 16.10.2016, Idifu
Participant: Extension Officer Idifu

Could you briefly introduce yourself and the tasks you are doing?
in charge of KG; ICS; milling machine, sunflower
3 years, since the beginning of Trans-SEC project
Prior to Trans-SEC he worked in Morogoro on another project, similar work on rice production

What kind of trainings have you conducted?
ICS trainings on the benefits for the environment
There were only trainings in the beginning, afterwards only on demand.

How would you describe your daily work?
Checking the group members, once a week, raising problems or seeing if everything is fine,
Checkings only for KG, but not for ICS

Which problems do you see in the groups?

ICS attendance with trainings, especially husbands not allowing their wives (3 cases)
People are living far away ca 30 mins (Nganga subvillage)
Doesn't believe that husbands don't want the new stoves

Trainings without monetary incentive?
Ogossy tried trainings without giving money
He thinks they would not come without money. Or at least very few would come, and especially men would not attend, for both groups
Adopters would come with training he thinks they care much more compared to the groups.

Outscaling acitivites
Farmer field days each group members is allowed to invite 2 people, plus people from surrounding village, going to village leaders, find me 15 people who need/want trainings.
He thinks that size was not enough.
Media: maybe radio could be effective to reach many people but certainly not enough to mobilize farmers

Emi kamando: toam miganga village, he also notices competition. He thinks Trans-SEC ICS is better, the construction is different as well.

In his opinion trainings for ICS are enough, he worked with them 4 weeks in total. He would not recommend more.

How often do the groups meet?
Each month on the 15th

Outlook for time after project end
After project ending, both groups will continue because members usually train new adopters
If new adopters want training, than the group members form a training team and teach them.
"Training" = show how ICS is being constructed when construction is happening
Majuto is constructing in other sub-villages, contradicts statement that construction is divided according to sub-villages

"time for free is over" you need to give it to adopters for free, because group members also got everything for free

bricks for adoptes, should not be a problem, everyone can make the bricks themselves.

Recommendations
ICS – Members appreciate the project
He suggests ICS as a policy to protect environment
Members were very active, promoting and educating interested people.

Interview#9
Date and Place: 17.10.2016, Ilolo
Participant: ICS Group Member (male)

Data: 45 years old, MHH, Farmer + Mason, 7 HH members, all cook sometimes

Are you a group member since beginning?
New group member, joined April 2015

Did you receive some training?
Because of his expertise in mobilizing within community he could join in one-week workshop with consecutive trainings provided by Götz
Group training, leadership training, technical training by MVIWATA
Trainings were provided for old group members (only he was allowed to participate as new group member)

How many stoves did you construct?
He never constructed himself, only accompanied members

Why did you decide to join the group?
He likes the way the ICS works, was very interested to see how it works, wants to be part of it
There are a lot of benefits from being in a group: you can get a loan, easier to be recognized by other organisations/institutions

What do you think about the group dynamics being a member since around 1.5 years?
Group very good in the beginning
Grew from 24 to 58 members in July 2015, good until then, afterwards communication between group members became a challenge
Initially Swai was communicating with him when researchers were coming or when group members were supposed to meet because he is good at mobilizing and he has a motorbike and is therefore mobile
Later TransSEC changed the process of contacting members, only contacted leaders, who maybe couldn't contact all members (out of their capability) or were too lazy for it
Group became undivided
Lack of information on meetings (not everyone was getting them)

How did it work before you joined group?
For baseline survey Peter already helped, was mobilized by Swai
Helped like an assistant researcher for all UPS groups
He was actually doing the job of extension officer until TransSEC got extension officers, so communication got weaker between Peter and Swai

When did TransSEC get the first extension officer?
Got first extension officer Francis in 2014
2nd extension officer in 2015: Kichebwa
3rd extension officer: Abdallah

Member in any other UPS groups?
Drop Out Tree Nursery

Can you describe to me your view on the constitution problematic?
Prepared a rough draft of the constitution, as the group trusted him he was given the task to submit the constitution to responsible people, he went to one of these people (ward development officer) who is responsible to register groups in ward villages, can also give feedback on the constitution, he told Peter to make some amendments, then Peter returned constitution to group to change it accordingly, later he handed it to Boniface who recommended some more changes, during TransSEC field day Peter was one of the Ilolo group representatives, there he saw the district development officer, told him about the constitution and asked for feedback or if it was fine like this to get registered as group, he told Peter the constitution was ok and the group should be registered, he informed the secretary afterwards (beginning of August 2016) that everything was fine with the constitution but now they need money to register group in Chamwino district, people has to be sent there, the money he had been given (40.000 TSH) was partially used to correct the software and the printing after integrating the amendments, 12.000 TSH left, not enough to go to Chamwino district
After him telling the secretary that people had to go to Chamwino district the communication

became problematic, group leaders don't contact him anymore, he told secretary constitution was ready but they don't react

Did you try to contact them?
No, he was waiting for them to respond
He says he has done his part, now it is up to the group leaders
Secretary should call for a meeting as she knows that the constitution is ready

Do you think it is possible that the secretary hasn't told the other group leaders about the constitution?
He doesn't know, but he doesn't think so

Don't the group members see each other randomly living in the same village? Haven't you seen anybody from the group in the past months?
For him yes, because he is very busy at his work and sometimes he leaves the village for long time because he gets job at other locations

Do you know anything about the confusion regarding the replacement of the treasurer?
In his perception Susana is a good person, but some people thought she couldn't take care of the group money, he says she gave the group all the money back when being told so
According to him there were just bad rumours about her misusing the money

Do you think at some point the communication within the group will improve again or has he already given up hope ?
Things will improve if leadership changes, especially the chairperson because he is a drunk and will forget everything you tell him and won't pass information

What do you think about the new treasurer Stanley?
Very good person, would be best person for chairperson because he is honest and good/hard worker

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Interview#10
Date and Place: 17.10.2016, Ilolo
Participant:
MVIWATA Key Informant Chamwino District, responsible for group management: BL (male)

Could you briefly present yourself, your work, how it is related to Trans-SEC?
BL: started to work for Trans-SEC officially in April 2015

Were any trainings given before they started working for Trans-SEC?
BL: Internship at MVIWATA before
July 2014-August 2014 Field Practical, afterwards applied for internship
August 2014-April 2015 Internship

Specific trainings on Trans-SEC UPS?
BL: Yes, by team leader Nickson (supervisor), on all UPS, all WP, role of MVIWATA, what they were supposed to do

Were there trainings for KG and ICS group in 2016?
BL: he sent plan to Nickson, he said other activities are to be implemented
Busy with other groups (sheller machine, sunflower processing)

Who did you want to invite for official trainings?
BL: He would like to have external professionals to come more often to help with trainings, but it is not happening

Is this a weakness to him/bothering him?
BL: Would be better for farmers, he thinks it is more effective if people come from outside
Tried different things (bring a pastor) but farmers are reluctant to really learn/pay attention, just want the money they get for attendance

Is there any cooperation between ARI Makutupora and MVIWATA for project activities?
BL: They cooperate because when they come to field they want farmers and need organization, if BL is not around Abdala (extension officer Ilolo) does it, mostly they cooperate, sometimes they just inform him they are going to do somethings (ARI are very technical)

Are there any improvement for the implementation process you would like to suggest?
BL: He likes as it is done in Kilosa, close cooperation between MVIWATA and ARI staff
Ilonga close to Kilosa, therefore Kilosa guys can plan and conduct field work together wihout problems
Here: Fadihili (extension officer Idifu), Abdala
Zacharia Maseta (ARI Makutupora) came a lot in the beginning, then stopped, because he was doing monitoring
ARI technical issues, MVIWATA group management

BL would like to enable more training for group members on group management to change mindset, more trainings would make sense, involve political leaders, they could tell them to change their mind
Follwo up on group activities
Problem: every member with own ICS, no collective activities that would enforce regular meetings
So BL is responsible that all partners can establish activities to groups,
Hard to manage ICS group, only come together for trainings, meeting schedule, they don't come because no money is provided , low attendance due to no allowances
They only come for official meetings

Why do you think they are still group members?
BL: Not so important because they already have ICS
Constructors do it for money
Others groups are benefitting from group activities, ICS group members don't
Another strong reason to stay in the group is the allowances they get for attendance of official meetings

Same for Idifu and Ilolo?
BL: Idifu: very active, have a look at ICS construction numbers , much more in Idifu than in Ilolo, also transfer to new villages like Miganga and Ikombolinga and Iringa-Mvumi
Idifu: very innovative, Majuto is very innovative, he goes to new villages and looks for customers
Ilolo: don't spread to other villages
In Ilolo they have Stanley who is very active but others are holding him back
In Ilolo they call BL or Stanley to repair ICS, they do not understand meaning of group

New group members in Ilolo
BL: Took a long time in the beginning to get adopters, now it is fine
In the beginning, didn't use it (maybe because they were not aware on how to use it)
In the beginning in Idifu it was also an idea, so first they wanted to get new group members, then decided not do keep this rule because group would become much larger

Group dynamics – group leaders
BL gave training on group management, also on constitution writing, they wrote it then brought it to him so he corrected it and gave it back, they have to bring it to Ward Development Officer, Ward Executive Officer, Village Chair Person, they should show them how to continue
Responsible person: Ward Development Officer, located in Mongano Village but living in Dodoma town, according to BL the responsible person for problems in process at the moment
Already told members that they should process to Village Chair Person
In Tanzania: groups have to register as groups if you want to get any kind of loans, not possible to get loans as individual when you don't have capital

Where do you see the reason that the members don't push the process?
Maybe ward development officer?
BL and Peter met, he gave constitution to Peter
BL says group leaders know that constitution is ready
Issue is to continue registration process
BL told them every member should have a copy
Problem for all groups: whenever you tell them to do something they say they don't have money, want to get money from others for everything
As they don't have collective activities process is kind of stuck at the moment
They have to be pushed a bit, BL thinks he has to do it

Involvement of extension officers
Abdala is involved in technical issues with ICS, BL doesn't know much about it

What do you know about the problem with the former treasurer of the ICS group, Susana?
BL: Problem of leaders that don't know their roles, chairperson collected money instead of treasurer, after training had been conducted problem solved, group monitoring:
Problem: all group leaders collected money, treasurer didn't get all of it,
Rumors? Member might not know where money went
Susana gave money to Peter for printing, constitution issues etc.
One page costs 1.000 TSH, constitution has 8 pages
Susana says she is still a member, BL confirms that she is still coming to trainings
If you want to drop out you have to write a letter to chairperson and secretary
She destroyed her ICS, wants to build another yet
BL doesn't know that Stanley is supposed to be new treasurer

Interview#11
Date and Place: 18.10.2016, Ilolo
Participant: Extension Officer Ilolo

Could you briefly introduce yourself and describe your tasks?
in Ilolo since 2012 , government extension officer, now he works for both, because former Trans-SEC extensionists left after getting employment from government (there were 2 before him)
government employment is permanent -> trans sec is just project based/temporary
employed by Trans-SEC for 1 year,
no training beforehand
focus on KG , ICS, production
For ICS don't check as regularly, on demand, challenges like construction of smoking funnel -> wind direction

ccii

How is the cooperation with other trans sec staff?
MVIWATA: they mostly ask for his help in arragements, then he organizes, mviwata have there own time table, whenever they want to come the have to inform ari and abdallah
ARI: all activities under supervision of ari,
ZALF people visits are organized by ARI

How do you perceive the group dynamics?
ICS group are doing fine
Constitution, is not in his responsibility,
Whenever they complain to him, he forwards to the responsible people, like constitution -> Boni ICS suzanna is treasurer, members do not complain, group members are not responsible it is MVIWATA who should take care of the constitution

Do you have any recommendations or ideas for improvement?
Trans sec is not his first project, he thinks it is good,
Every month people from ARI and MVIWATA come to train people, monitoring and evaluation, give farmers all inputs
Other projects only give trainings only, so participants are willing,
He thinks Trans-SEC is better, because they force people to come and listen.
Without money it would not work,

He recommends to give more trainings,
Leadership training, for leaders and every group members, on roles and tasks, so they takes them serious.

Interview#12
Date and Place: 24.10.2016, Dodoma town
Participant: ARI Makutupora/Hombolo, Key Informant Technical Coordination: ES (male)

Could you illustrate the organizational structure of ARI and what is your role in it?
around 50% of his time for TransSEC activities
ES: ARI Makatupora/Hombolo involved since beginning, participated during inception meeting and in proposal, responsibilities/key roles: WP2 related to research, workshops etc and at later stage embarked on more activities, but in general involved in organizing implementation of Trans-SEC activities on CSS sites Idifu and Ilolo
Organisation of stakeholders from ZALF, SUA when they want to visit CSS, coordination task, work on the ground
Regular communication necessary to be able to take corrective measures in case something is not going well on the ground

How often do you update each other?
ES: ZALF Coordinator (Frieder Graef) skypes with them to get update on status, ARI should always know what is happening on the ground, Fadhili also updates them on current status of the UPS, Fadhili is full-time employed, Abdala is almost full-time employed, very important people for them, facilitating smooth implementation of UPS at grassroot and village level
In case something comes up directly communication with FK

Exchange of experiences with ARI Ilonga?
ES: Yes, sometimes, but more on demand, not regularly, during annual meeting they sit together, cooperate for organization for e.g. transport etc.

Do you have strategic partnerships to public institutions that are helpful for the work?, if yes, which ones? How did they help you? (min 22)
ES: Under minister of agriculture,
Reports to ministry also on TransSEC, keep them updated
National stakeholder meeting on upscaling: brought together different actors from government and private sector, research institutions etc, discussing policies and technical level, government as key actor because it is formulating policies
 final meeting because some of the UPS have been proven to be worth for upscaling, best practices

Who is employed for ARI within Trans-SEC and what are his/her responsibilities?
Key researchers who are involved directly
ES: responsible for overall coordination of Trans-SEC activities in Dodoma region
Next to him: LM (assisting him, director, administrator, finances, lead person with ministry)
Also next to him: Devotha Mchau, directly involved in assisting ES for coordination on ground level

Other scientists involved in different UPS
Natural Resource Management/Crop Production/Gardening/KG/: Nuru Mgale responsible for monitoring, lay out, provide technical expertise to farmers, two roles: has to know day to day activities in villages, directly involved Wood/ICS/Forest: Zacharia, responsible for every issue at grassroot level
ICS: Gätz Uckert (ZALF) communicates with Zacharia, Dr Kimaro, ICRAF also involved for tree issues
Business related issues (thresser, sunflower processer): Devotha

ES: Monthly workshop: all groups participate
MVIWATA also has to coordinate with ARI for planning of activities, group formation, workshops, monitoring

ARI also responsible for PhD students, horizontal and vertical communication with Frederick Kahimba (SUA), etc.

Preparation of annual meeting: nice image of kitchen, listen to part again; each scientist has his/her place there, knows what to do etc.

ES: For each UPS the farmers chose voluntarily in which group they wanted to participate, so the farmers are very motivated/enthusiastic, linkage between nutrition and KG

Does he see challenges for himself at work?
ES: A lot of partners, institutions, expertise is a very nice thing, holistic approach of the project to address several problems as beauty of this project, bottom-up approach

How was ARI involved in selection of farmers? Which criteria were applied, how was decided which farmers to contact?
ES: Baseline survey, list of HH was collected, random selection from survey HH for interviews, then farmers got information on UPS, meeting were groups were grouped together, all groups were presented, so farmers could chose UPS groups by themselves
UPS were decided after collecting information from CSS, scoping activities

May farmers wanted to join project in the beginning, groups had to be restricted to certain size to keep them functional,
Success has shown, farmers have improved ICS by themselves

List was prepared and handed to Anja Fasse (Uni Hannover), exception for business group (sunflower), participants with economic stability needed

How were CSS selected?
ES: Set of criteria were derived and given to districts, ask Khamaldin Mutabazi (SUA coordinator) about it,
e.g. village with minimum amount of other interventions ("to enable measurement of success"),

How is the flow of information and decision-making? Show on flow chart. On which levels and in which links could decision-making and information flows on adaptations between you and coordination be improved? ZALF-SUA-MVIWATA/ARI-ExtAgents-Farmers
ES: Personally, he is happy with the structure, very comfortable, means of communication has improved a lot through emails and mobile phones, ZALF-SUA-ARI goes very smooth, since inception of Trans-SEC happy with ways of communication, two way traffic of information flow, he does not think that something he reported remained unheard/did not get attention

Are there trainings for the ARI staff? If so, how often and what kind of trainings?
ES: Especially to PhD student on natural resource management
Not for researchers
Training on CPM

Is there anything like a training schedule for the project implementation? Who could provide it to us? Could you provide us with a short overview about the implementation activities, what happened when?
ES: Each activity started differently and at different times, send him an email on specific UPS implementation schedule, should be able to provide them

Recommendations for outscaling to Scale-N?
ES: Different strategies for different UPS
e.g. ICS: policy level important, ward executive officer, leadership, council, mobilize communities, very important issue due to low availability of firewood, government/policy maker has to get involved,
[KG]

How was the whole process planned?
ES: Annual meeting! Important, before implementation a lot of information sharing necessary, communication about all the UPS needed, a lot of emails were shared, annual meeting as reference to planning,

What do you consider as main constraints for a successful implementation?
ES: Scientific coordinator in communication with Khamaldin comes to visit to make sure things are on right track before annual meeting, most activities are during annual meeting

What does he think about not having annual meeting next year?
ES: He thinks it is due to budget, he would like to have another one, considers it very important

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Interview#13
Date and Place: 24.10.2016, Dodoma town
Participant: ARI Makutupura/Hombolo, Key Informant Technical Implementation ICS: ZM (male)

Could you briefly present yourself, your work, how it is related to TransSEC?
ZM: works for ARI Makatupora, also works for Trans-SEC with Götz, has responsibilities for two things: ICS + Tree Nursey, collects data, checks up, sends data to GU

Could you explain a bit about your daily work, details on how you monitor?
ZM: 2 ways of collecting data: individual data collection, group data collection
1) Go to HHs individually to collect data: frequent time of visiting/checking ICS is every week he has to go twice (once to each CSS), 7 days per month intensive monitoring
2) Monitoring & Evaluation, all three months, updating, mobilizing: he is the only one responsible for sheets

ZM: Last month there was Trans-SEC meeting, therefore no time to do monitoring visits
This months a lot of other people are in the field so they were given priority, so next week

How is cooperation with MVIWATA researchers and extensiona agents?
ZM: Yes cooperation, with Boniface (MVIWATA), he is involved in M&E (7 days every three months) but Boniface is more involved in group dynamics
Extension officer: Abdala and Fadhili, they are the ones on the inside, can collect data easily,
Also cooperating with Ogossy, Götz, Johannes: e.g. cooking tests (demonstration) with Götz (2x), Ogossy comes for master thesis (1x)
ZM is involved in organizing, flow of information, he represents linkage between researchers from outside and farmers

Have you been employed for Trans-SEC since beginning? How long have you been working for ARI?
ZM: Only partly employed for Trans-SEC, he is assistant researcher, employed for that position by government, he is working with agronomy department, no time separation, institutes support these of projects, Trans-SEC pays field days, government pays office days, 15 days per month for Trans-SEC activities
Employed since November last year, before him Kabaka Majige, he was not lucky to keep position because he was not collecting data accurately, data was missing, so employed a new one.

Was it difficult to understand Trans-SEC, understand who is doing what, what are responsibilities etc?
ZM: He found everything ok because before he started he got a workshop of 4 days from OS on everything, how to fill out sheets, introducing him to farmers, explaining about project

At ARI institute, who are you reporting for TransSEC related issues?
ZM: He sends to project leaders (Elirehema Swai), nothing is done without informing Swai, not a challenge because Swai is also head of agronomy department

Who has access to the reports on UPS implementation?
ZM: Documents are always shared with Swai, Gört, Frieder, Devotha, Ogossy
Report to LM immediately: obligatory
Others ask for it

Is there any kind of platform for collecting and sharing all reports on UPS implementation?
ZM: Only via emails on demand

Does he think a platform for data would be helpful or is it not necessary?
ZM: It is necessary, they have something like a platform to put publications, articles, documents etc at ARI but not for Trans-SEC related issues, he thinks it could be very helpful to have for Trans-SEC as well
SUA has something like that, but not everyone has access

Is there a sharing of experiences with colleagues from ARI Ilonga?
ZM: Yes he sometimes talks to MO, maybe about once or twice a month
They use to exchange ideas, like talking about challenges or improvements of ICS, changes that

have been made, are they working well

Did you give any trainings? Who gave trainings in CSS besides BL?
ZM: Yes, he gives trainings all the time, every week, practical training/demonstration
Training on cooking behavior, how to prepare food,
Once a month there is a FGD with the ICS group (only original group members), different topics can be discussed, also depends on season

How is attendance in these meetings?
ZM: Most times around 15-20, composition of group keeps changing, not always the same ones missing

What does he think are the reasons for not attending?
ZM: Many reasons, but according to this area/Gogo people, if they have everything they want at their homes they won't come to meetings anymore , in rainy season it is very hard to get them

Idifu: complaints about lack of information about meetings – excuse or true?
ZM: They have no right to say that, he has more than 10 phones numbers of group members, when he comes for meeting he informs them and tells them to inform neighbours/other group members
Can be a challenge, that group leaders don't pass information, in the beginning Majuto was working really hard but nowadays he is busy and not so involved as before
He thinks group leaders should be changed

Ilolo: no meetings since at least July or even longer?
ZM: Last time he met in August with them for FGD

What do you know about this constitution issue?
ZM: Problem of group leaders to monitor/follow-up with constitution, he is not involved in group management (Boniface's responsibility, Frieder delegated this to MVIWATA initially) but he knows there has been a lot of misunderstandings, names of Idifu people appeared on there, group is not really serious and careless
He hopes he can help to resolve the issue when he gets there, because this is also messing with his activities

Do you know who is treasurer?
ZM: Susana is actually drop-out according to ZM, since he is working there is knows Stanley as treasurer

Are farmers being paid for participation in his FGD?
ZM: No, but they come
But there is payment for M&E (3000), field farmer day (twice a year in every village) (3000),

Do you think farmers would come if they were not paid for participation?
ZM: They would still come, but motivation would be necessary like e.g. cultural dance, announce it more repeatedly, ICS is a very complex thing that involves a lot of things related to livelihood like health and environmental issues, family organization, they come when you put that it concerns aspects of their lives

Why do you think ICS are spreading so much better in Idifu than in Ilolo?
ZM: Idifu people has more business minds, sense for competition, therefore ICS education reached well their minds, in Ilolo it is different, their minds are less desiring

Is there a phasing out strategy? What is your outlook on the group? Do you think they will keep existing after project end?
ZM: He thinks about making the group sustainable, he wants to advise the group more on

entrepreneurship, so they keep working together, he is very concerned of the constitution issue, he thinks BL has been very careless and lazy, so he thinks when he now goes to groups the future will be brighter
Even if project is over, ICS will stick in their mind

ZM: Adopters: can check them every week but not all in one week
There is no real arranged training for adopters, he can explain when he comes to check their ICS,

Recommendations for outscaling to Scale-N?
ZM: He recommends for new project, that first they should improve ICS, height should be reduced, chamber for fire should be reduced, make it attractive AND effective, recommends people like Stanley in Ilolo and Emi Kamando in Idifu, use them as farmer trainers for Chinoje and Mzula, so train farmers there on construction as well

What about trainings?
ZM: Farmers prefer more trainings, same trainings but more consecutively, also ask for livestock trainings (especially chicken), mixing things changes the taste**,** so why not try to mix up UPS

Interview#14
Date and Place: 24.10.2016, ARI Ilonga
Participant: ARI Ilonga, Key Informant Technical Coordination: BM (male)

Could you illustrate the organizational structure of ARI and what is your role in it?
Oversees Trans-SEC activities, About 60% of his work time for TransSEC
Make sure that all UPS are being implemented as planned
Receive all guests and provide transport, accommodation and all assistance needed, arrange for meetings with farmers
BM as part of process since the beginning

How is the communication with other TransSEC institutions?
Weekely, per email and phone
BM visits the CSS each week to monitor UPS implementation

Exchange of experiences with ARI Makatupora?
Yes they communicate, regular communication, common problems
Also regarding financial issues, organization….
Administrative and technical issues

Who is employed for ARI within TransSEC and what are his/her responsibilities?
BM: head of all TransSEC activities at ARI Ilonga
Phlorentin Lagwen: poultry, IMMS,
Methusela Obedy: ICS,
Rashidi Ally: KG, storage
Aswile: pyrolizer, maize sheller (phd student)
Supervise day to day activities, monitoring

Monitoring outcomes to BM, he compiles them and sends it to SUA and Germany but also checks for challenges and what can be done about them some adjustments can be decided on by themselves, others have to be agreed on with other coordinators

Examples for such challenges? (ICS/KG)
[KG]
ICS: last year in February there was a problem in the firewood chamber, was too small, height too high, so after consulting Götz ICS were adjusted accordingly

Cooperation with MVIWATA?
Strong, monitoring, group management and technical issues are all being done together

Does he see challenges for himself at work?
BM: Adoption rate
[KG]
ICS: people say 3000 TSH is too much to pay, farmers expect to get a lot of stuff for free, in Ilakala additional WorldVision stoves

How was ARI involved in selection of farmers? Which criteria were applied, how was decided which farmers to contact?
BM: After selection of CSS, 150 farmers were randomly selected (farmers then could chose UPS group)
Advantages and disadvantages of random selection: some just want to be involved in any activity, be interviewed, few didn't want that at all

How were CSS selected?
SUA selected, Khamaldin Mituabazi (SUA) and Prof. Tumbo (SUA)

How is the flow of information and decision-making? Show on flow chart. On which levels and in which links could decision-making and information flows on adaptations between you and coordination be improved? ZALF-SUA-MVIWATA/ARI-ExtAgents-Farmers
With emails communication is very quick and very easy, he is satisfied with the status quo

Is there anything like a training schedule for the project implementation? Who could provide it to us? Could you provide us with a short overview about the implementation activities, what happened when?
No, most trainings were done in the first year before implementation
If there is need for more trainings they are being offered (when they detect in monitoring that it is necessary, then they decide to do it)

Recommendations for outscaling to Scale-N?
BM: They are trying to use the field days, so far scaling out approach has not been very much developed
Farmer field days only on invitation for outsiders, from CSS all people can participate

CSS specific challenges?
BM: Ilakala is doing better than Changarawe for both UPS, in Ilakala they have more firewood but still they are doing better with ICS, maybe because Changarawe is closer to town, they can use charcoal

If you would chose a CSS which criteria would you use?
BM: Village nearby Ilakala, find out reason for high rate of adoption in Ilakala compared to Changarawe

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Interview#15
Date and Place: 27.10.2016, Mzula

Participant: VEO Mzula

1. Can you briefly introduce yourself? What are you doing as VEO in Mzula?
Village Executive Officer since 8 years, his responsibilities is to supervise all projects in Mzula
Position of VEO is given by local government (district director)
He is also village secretary and village security agent: people can take complaints etc

2. Which projects are there in Mzula?
Currently there are no projects, previously (several years ago) school project in teacher houses
TASAF project (presidential fund for poor families)
He knows SUA people, doesn't know about Scale-N project

3. Is there an extension agent (from government) in Mzula?
There was one 3 years ago, he left and there was no replacement
Very important to have an extension agent, beyond their ability to bring one to village, they do not even know how to get one

4. What kinds of conflicts are there in the community?
3 types of conflict
- Random conflict (alcoholic people arguing, fighting arrests them and takes them to police/ward council=like a court)
- Field conflicts e.g. boundaries of farmland/plots also directed to ward council
- Conflicts between husbands and wives, relatives, etc beyond his ability, sometimes solved by sub-village leader, little and minor conflicts (roles within family, assets)

5. How is the community attitude in general, regarding knowledge-sharing etc.?
Mzula is among of 3 villages which make Mungano Ward (with Ilolo and Mungano)
His village has a lot of challenges: bad road for access to town, no nice infrastructure, many people like to drink in local bars therefore no nice sharing of ideas when people are drink, but there are elders (Gogo tradition: elder people with annual meeting for discussing social issues, community life)
Village government annual meeting (includes all village people)
Village council (few people selected to be in council)
There is knowledge-sharing within the community

6. What are big challenges for his village?
There is no health center in Mzula, people have to go to Mungano (walking 2 hours) or even Mvumi
Infrastructure as second big challenge, e.g. transportation after harvest
Some people walk even until UDOM (?), have small local businesses and sell their goods there e.g.

7. How many sub-villages are there?
13 sub-villages
Most sub-villages are in center, only one is far (Kalanzala)

7. Are people very busy or do they have free time on their hands? (for trainings, new activities)
In rainy season very busy (cultivating, agriculture9
People have a lot of time in dry season, he thinks they would be very happy to being offered trainings etc because they feel very neglected by government

8. How would you describe personality of Mzula people?
Mzula people are very good people, very direct

9. Do people have mobile phones? Is it hard to reach them to pass information?
Only way to get people is to beat the drum to announce something or you go to sub-village

ccx

leaders

10. How is cooperation with sub-village leaders?
Good

11. How is water availability in the village?
Tap water is available for 90%

12. How is availability of firewood?
Yes, about 40%: there are no more trees left, so big challenge
There was a project some years ago, implementing form of ICS, didn't work well because NGO just came for a short time and left quickly, constructed ICS in some HH, trained some people and wanted them to become trainers for other community members, there might be some people still using it

13. Do you think a long-term project on ICS would be more successful?
He thinks yes, people would use because of less firewood

14. How are people coping with the low availability of firewood?
They go to mountains to find wood, walk around 4-6 hours to collect firewood (carrying by headload)

15. [KG]

16. What kind of activities do people during dry season to generate income?
Many people are based on small activities, selling livestock (pigs, donkeys) or local beer
Not many people own livestock, but trade/buy and sell

17. What does the chairperson, are they cooperating/sharing responsibilities?
Difference: VEO appointed by district director, chairperson elected by community (so different interests that lead actions)

Interview#16
Date and Place: 29.10.2016, Chinoje
Participants: Chinoje Village Leaders: Chairperson (male), VEO (male), Teacher of Primary School (male)

1. Can you briefly introduce yourself?
Chairperson: chairperson, ensure security, supervise all developing activities, supervise mobilization, update community about different development activities (school management, construction of teacher houses) and other projects
VEO: coordinate all village activities, monitors development activities; also secretary of village government meetings so secretary of chairperson, in village there are 25 members of village council (he is secretary and takes minutes), he is heading security station, responsible for all government staff in the village (hospital, teachers)
Teacher: teacher in primary, supervise all academic issues including teacher responsibilities and students academic live

2. Which projects are there in Chinoje?
Not at the moment but they had WFP programme 2004-2014 (school foods)

3. Is there an extension agent (from government) in Chinoje?

No, never had but they would like to have one, complained a lot about it at ward council meetings but were told to wait

4. How would you describe the community of Chinoje? How is the community attitude in general, what can you tell us about the people living here?
VEO: village has some challenges: poor roads, poor infrastructure, not enough water, poor nutrition intake of people, no nutrition education, no electricity; people and community have no negative attitude towards new people, they are good people, help each other, good cooperation
Use generator to get water, sometimes machine gets broken, have to take it to Dodoma or even Dar to get it fixed so it takes long time, in this time they need to to Ghalesi village or local wells to fetch water, if water is being brought one bucket costs 500 TSH and not everyone can pay for it
Can't say how often is happens approximately, hard to predict, can happen up to 15times a year
Activities and development of the village: lacking someone like an extension officer, people are missing someone they can bring their problems to, therefore it takes more time sometimes to solve problems

5. What kinds of conflicts are there in the community of Chinoje?
Like 3 types of conflicts, not serious ones
- field boundaries
- family conflicts
- drunk people fighting (with words or with sticks)

6. Who do people turn to when facing those conflicts?
Normally conflicts get first reported to sub-village leader, if he can't solve he presents it to VEO; he discusses with chairperson, if they can't solve issue they turn to higher authorities

7. How is information sharing within Chinoje community?
VEO: 2 types of information flow a) secretary writes letter to 25 village council members, they come to meeting and spread information, b) drum (someone gets employed)
Also use sub-village leaders and ambassadors
Chairperson: people exchange ideas and share knowledge according to meetings, there are 3 types of meetings, a) meeting of old people: meet and play local game with stones, use this time to exchange ideas and talk, b)boys/young people meet for draft game, also talk meanwhile, c) women: no special occasion, but have place to meet and chat, exchange ideas, for boys also football games

8. Are people very busy in Chinoje or do they have free time on their hands? (for trainings, new activities)
Chairperson: people have time to do everything that comes up in their lives, august-november: people have time to participate in trainings etc.

9. Do you think people would have to be motivated or would come out of own interest?
Chairperson is very sure that people would come if being called for meetings/trainings, sometimes it is even hard to handle them if more people come than have been called for

Could you explain why you think so?
Teacher: curiosity as main motivation
Chairperson: taking into account village's project history: people are kind of fed up with projects because project people were not showing up a lot, were not serious (because they didn't not come often and/or didn't fulfil promises)

10. Do they think people need leading hand or can learn to keep groups running on their own in the long run?
VEO: People can be independent and supervise themselves, if they receive good training on these issues, if groups have constitutions they will keep being active,

Others agree

11. Have there been projects with group approach in the past?
Chairperson: fragile situation, his perception of these projects was … when he was young (student) people came to make them form groups, they put down their names and then people never came back, formed groups in other villages
In last 10 years only WFP

Interview#17
Date and Place: 31.10.2016, Mzula
Participant: member of ICS project 3 years ago (female)

Could you tell me a bit about the project in which you participated? When did it take place? How?
She doesn't know who brought it or the name of the organization
Just 2 people went to Mungano village to get the training and when they got back they started to construct in Mzula

How was the project involved?
project people had seminars and workshops in the other village

Were the project people Tanzanians or foreigners?
Tanzanians

Local people?
Dodoma
She also went to Mungano and was trained

How were you trained?
people told them about ICS benefits, about measurements, how to construct
She was in the 2nd intake, in the 1st intake there were two other Mzula
In the 2nd intake 25 people went together to Mungano
They were doing demonstrations (on construction)

How many times did you see the people from the project?
2 times

Any other workshops besides the ones on construction?
No other trainings

How many ICS did you construct for other HH?
8 (together with other people)

Are you still constructing?
No, because people didn't want to pay, the price was 1000/2000 TSH

The price seems to be very low, do you think it is (too) high?
The people think it is a lot of money, she also thinks so

You also think it is too expensive?
They don't have much money

So do you think people would only want an ICS if they would get it for free?
For free it will be fine, pying no

Do you think more people in Mzula would be interested in learning how to construct ICS? Would it make sense to come here and teach people?
Yes

You said your ICS was destroyed by rain, how long ago did this take place?
Like one year ago (in last rain season), when she has constructed her roof (she is building a house at the moment), she will construct a new ICS, maybe next month

Did all people who went to Mzula constructed ICS at their houses?
some still have, some were destroyed or had other problems

how did you come together with the other people to construct? Was there like an official group?
official group with chairperson and secretary

What happened to the group?
The group is dead

How long did it consist?
No meetings since August last year

How many members were in the group?
10

Can you tell me the name of the group leaders?
Mentions the names of the former secretary and chairperson
The secretary was present in the first focus group discussion, didn't mention that she knew ICS

Would you be interested in teaching other people how to construct? Or are you too busy with other activities?
Very interested, other people also are interested

Do you think the benefits of ICS are not clear to people? Don't is the smoke bothering them for instance? Because they are not willing to pay for it.
The problem is the money, not the benefits

How much do you think people would be willing to pay?
They would not pay anything

How much is it going to cost you to build the ICS? How much do you pay for the materials?
They have been told to use Mlenda, it is very soft and gets very sticky, mix it with soil and makes soil very soft, so they don't use bricks or groundnut shells or dry gras, 500 TSH for 1kg Mlenda for one ICS, 100-150 TSH/3 buckets of water

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Interview#18
Date and Place: 02.11.2016, Chinoje
Participants: Village Leaders (Chairperson, VEO, member of village council:AM)

Could you briefly introduce yourself and describe your tasks and responsibilities?
Chairperson: make sure that everything goes right

VEO: supervising all projects from governments or village council, taking care of financial acitivities, report writing, ensuring smooth daily activities of villagers. Eg: school activity
AM: Member of village council, involved in acitivities like: if something comes from district they as a panel discuss this , afterwards responsible for spreading the information to the villagers in the respective subvillage/streets

How are you involved in ScaleN project?
Chairperson: Involved since the beginning
Initially he was the person in charge, later he appointed AM to take over responsibility to help him after seeing that she is very engaged
Chair person is like president, not much involved with little things , his position is higher, they only report to him.

Where do you see challenges for you village?
1. floods , really affecting lives of this community, destroys houses + fields. Last year they had a very nice settlements downside but the flood came and destroyed everything
2. pastoralist conflicts, lots of fights and troubles
3. low price of their agricultural products

How do you assess the potential of ICS in Tindiga?
AM: it is a very good innovation for the village, because it seems like a nice thing, can help people in terms of smoke. To her, floods are not a big challange, because they not happening every year, more in intervals of one or two years
VEO: specifically good because there is not enough firewood. He thinks it would work well, as it would help to cope with the environment. floods are not big challenges, as they have moved from the more risky valleys to more hilly areas.
Chairperson: he is also positive about it. floods are not the big issue as the have moved, additionally when people are trained, knowledge is something they can keep, will help them even if they lose their houses and have to move again.

According to them floods happened last year and 2006, but they have a river that has continuously rising levels, > not really a flood but some settlements are close to the water , for them it is an issue.

How is the access to and from sub-villages?
Scattered sub-villages, some are together some are spread the far ones are: Mateteni, Buyuni, Legesamwendo: there is not even wells, in those water is very hard to get.

Do people engage in off-farm season activities and would there be time constraints for trainings?
Most villagers are busy throughout the year, eg, cultivating small fields or gardens additionally to have more money, irrigation through well, some do business.
They will come if: it is sufficiently relevant, see quick results, if it pays out economically

Do you have an extension officer?
There was one but he currently went to studies, he was ward extension officer, just came to help them
Vet is located in the village
Challenge: yes, but it is something beyond their ability , it is in the hands of the local government

How would you describe the community
Love each other, hard working, hospitality, they know what there responsibilities, love outsiders

How is the flow of communication working within the community?
Not a challenge, seems to work well

1. normal way of beating the drum
2. subvillage leaders: informed via phone then he takes charge
3. posters , leaflets.

Have there been projects related to KG or ICS before?
No projects like this.

Recommendations for us:
Actions teach more than words, even though ICS group was horrendous, this should not be taken as a generalization for the entire village

ICS willingness to pay: 5000 tzs could be ok for some but for some not
mobile stove, there are some renters, eg the ones from the downside settlement.
50% of the villagers are renting their houses

Interview#19
Date and Place: 05.11.2016, Changarawe
Participant: New Group Member (male)

When did you implement ICS? Did you directly join the ICS group informally?
August 2015
He requested membership even before ICS implementation, so they told him he had to join them when constructing ICS to other HH (3-4)

Why did he request?
He liked ICS after seeing it at other HHs
Being a group member would bring more skills

Did you receive any further trainings?
Just technical training from group members

Did you participate in meetings?
Twice, because the group is not meeting regularly, last meeting was with a SUA researcher
He doesn't know if there was a meeting last month to make new members official members, he was not informed; he was already accepted and he started to contribute so he thinks he was alredy an official group member

Who informs him when there is a group meeting?
Yusuf

Is he member of any sub-group?
Estate sub-group

Did you construct ICS to other HH?
Not himself, but he went with two other people to construct together
Though he is busy with his activities he wants to do more constructions, it doesn't take much time and is done in afternoon when he is free

What happened to the chimney of your ICS?
He was just lazy, they told him after construction that he had to cut a banana stem and together with mud has to construct chimney on his own but he didn't

Is your wife not bothered by the smoke?
Yes it is disturbing her but it is not too bad according to him (he says he is in the process of fixing)

Do you think the ICS is to be recommended to other HH?
He recommends a lot but after flood people face economic challenges, therefore less adopters
When the economy in the village is stabilized again he will invite more people to construct

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Interview#20
Date and Place: 05.11.2016, Changarawe
Participant: ICS Group Secretary (male)

Can you tell us more details about the group dynamics? How often do you meet? How is knowledge-sharing, cooperation between members?
His group is divided in 4 sub-groups, every sub-group is component of 2 sub-villages, initially sub-groups met every Sunday, whole group met once a month (28th) but recently change of schedule, big group meets 20th but still monthly,
Last year many stoves were destroyed because of floods, so they had to come up with a plan, when they met recently they agreed on rebuilding stoves and focus on construction activities before

 what was focus before?
Focus has remained the same as in the beginning, it is just that there were many group members in the beginning, but since implementation many didn't show up to meetings or to construction of ICS (busy, family reasons or that they only wanted to participate for allowances, afterwards didn't want to participate anymore as meetings were not paid), if you don't show up 3 times without notifying group leaders you become a drop-out, so your spot is given to interested adopters, as many members were not active many new ones were included, so there is new activism now

How many group members are you? Is every free spot filled directly or is the number changing?
In the beginning 35 original members, they reduced to 14 original members in the long-run, last month meeting: approved 16 adopters as new group members (but acceptance during long time, last meeting as official confirmation), e.g. Asha as new group member
Until now 47 stoves have been constructed (5 outside village: Dodoma Isanga:2, Kivungu Kesa Ulole:3)

Why did you let 16 new members join? Did you want the group to become bigger or did the adopters ask for it?
Some qualifications needed to become a new group members: if the person can mobilize people to get ICS, knows how to build ICS

So there is no training for new group members? They have to know already?
They are not doing things informally, the do it in a very formal way, first they convince someone to get an ICS, explain benefits of ICS to them, then take customer to demonstration point and explain how they are doing things, for those who understand quickly they can become members

Do new members from now on will construct ICS together with old members for other HH?
Yes

Do you think the group will last after the project end? Is he interested in keep it going?

The old chairperson (Fatuma Hosseini, had her at drop out meeting) did not participate in meetings, long process to decide on getting a new chairperson, there was an initiative by him when he wrote her a polite letter, she didn't respond, researchers and him invited her for meetings, she never showed up, he also went to see her face to face and it didn't help, so they decided to replace her

How were group leaders selected in the beginning?
Group members suggested people and then all members voted by raising hands for one out of two people, more people than positions

Adoption rate in Changarawe is relatively low compared to other CSS – do you think this is going to change?
He thinks changing of group leader and members will help

What dissemination channels do you think would work well?
Farmer field day as best thing, it is good to show all of the UPS in one day BUT also a challenge because it is a lot of groups, maybe too much information for people
Last field day: mother plots/new innovations for farming was the slogan, so farming stuck to people's mind, ICS did not that much, micro-dosing UPS as first one to be visited, one big objective and a lot of small objectives
Therefore he is suggesting to do an ICS day, or a farmer field day with ICS as slogan, to get it in people's minds
Another problem: first field day was not announced welluch, micro-dosing UPS as first one to be visited, one big objective and a lot of small objectives
Therefore he is suggesting to do an ICS day, or a farmer field day with ICS as slogan, to get it in people's minds
Another problem: first field day was not announced well

Could they organize something like an ICS day by themselves, as ICS group? With group money?
Announcing to whole village is costly, you need to hire a music system and speakers and get a place where people can sit

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Interview#21
Date and Place: 07.11.2016, Muhenda
Participants: Village Leaders (Chairperson (male), VEO(male))

1. Are you only responsible for Muhenda or also for Kitunduweta?
It is divided into two villages again since 2014
Extension officer is serving for both villages, VEO and chairperson only for Muhenda

2. Since when are you holding these positions?
Chairperson: December 2014
VEO: 2004

3. Are you originally from Muhenda?
VEO: Kisanga, 40km
Chairperson: from Muhenda

4. Can you quickly describe your positions and what you are doing in your job?
VEO: his responsibilities is the security station of the village (supervision of all security issues), treasurer of the village, in charge of village archive, coordinator of all meetings (official ones by

(local) government), supervisor of all projects in the village, it is his responsibility to convince people of new projects
Chairperson: he holds the village council meeting, he holds the village annual meeting, he holds the security chair (VEO as his secretary), chair of all projects/activities within village, member of ward council (represents Muhenda)

If VEO is supervisor and chairperson is chair of all projects – what is the difference?
Chairperson as supervisor, and VEO as implementer (reconfirmed after asking again)

5. Are there other projects in the village at the moment? Have there been any in the past?
Chairperson: TFCG at the moment, organization from Switzerland, project on sustainable charcoal, since November 2015, for period of 4 years: Are constructing a building at the moment, get assets as well, which will be given to village afterwards, teaching them on land-use, plan on use land for firewood only (plantation), another land for charcoal only, also teaching them on how to more sustainably cut trees (not take all of them but so they can regrow), etc (map with land-use divisions for the village)
Anglican Diocese Morogoro at the moment: how to manage groups, keep chicken, supposed to end this year but seems to have been prolonged, since 2009
World Vision started 2015, still ongoing, might take 4-5 years (but he doesn't know for sure), training on ICS and entrepreneurship, group trainings, and provide sponsorships for children after taking their pictures and looking for sponsors online, they are starting right now with ICS: plan to take some people of Muhenda to Europe for workshop, 2 people from each sub-village (5 sub-villages), doesn't recognize names from list of today,

6. As Scale-N is meant to be implemented in Muhenda and Kitunduweta as one CSS - Do you cooperate with village leaders in Kitunduweta?
Kitunduweta is an independent village, therefore he is not involved, no cooperation
When ScaleN was being introduced he was questioning them why did you go to Kitunduweta, if you want to establish a project in this village it can be tricky, because he has his boundaries in reaching people, can only get Muhenda people; they answered Kitunduweta was added because there is no health center

7. Does anyone in the village have an ICS already?
Some people already have, but one plate, from another project (installing modern toilets and ICS), can't remember the name

8. [KG]

9. [KG]

10. How is water availability?
There are only 2 tap water stations (name: Ndundiku), one is in Majibira and other one is in the center, they had 10 but 8 of them are broken or stolen; not enough for people

Why is no one repairing broken ones?
Very expensive, costs around 2.000.000 TSH, hard to convince community to contribute, were initially provided for free by government

What did you do before you got the stations?
Using river water or digging traditional wells

How far are stations from different sub-villages? How long do people have to stand in line?
Sub-villages very scattered, Majibira is last sub-village (at the border), 1 hour is the maximum to walk to a station
People have to stand in line 15-30 minutes, says farmers in discussion lied

11. [KG]

12. How is availability of firewood?
Very available

13. What kinds of conflicts are there in the community?
3 kinds of conflicts: farmers vs pastoralists, personal conflicts (field boundaries), conflict between village government and one investor from Dar (he took 500ha land and is renting the land to other people (for farming) and they do not know how he got it, wrote to district council to question this)
Farmers vs pastoralists: big issue, new village laws do not allow keeping of livestock (also training by TFGC on law formation),

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Interview#22
Date and Place: 07.11.2016, Muhenda
Participant: Extension Officer Muhenda

Could you briefly introduce yourself and describe your tasks and responsibilities?
Advising and helping farmers,
Give recommendations on seeds and train farmers
Acts as a middleman between researchers and villagers

How are you involved in ScaleN project?
Organizes participants for group discussions, project participants.
He is a leading person for administrative stuff. Bc SUA deals with agriculture that's why they approached him. For him it is fine to do so. Sees it as a part of his job.
He is fine with it.

Kitundueta has its own leadership but he is responsible for both villages

Challenges/ room for improvement
1. Agro inputs are expensive (generally in all villages): agro vet shops very expensive, leads to low production, may use the wrong seeds and manure
Seeds. 6000 tzs/kg, when they sell their maize 1 kg for 500 tzs, so it is better to use their own maize.
2. pastoralist conflicts: according to him, it is a huge problem, farmers had to move their fields, until now not as severe as in Tindiga, bc there is plenty of land to cultivate so moving is possible. If this reaches its limits they might have to stop.
3. impatience, of farmers in cultivation practices. Rather taking short cuts on the expense of qualitiy and long term results.
4. low production bc weather change, rain is starting very late.

Potential of ICS
There are already a lot of ICS in the area, but they don't have a chimney to direct smoke out of house
No problem of firewood availability
People are aware of smoke problem, world vision had their program here, trained 2 people to train others, unfortunately both did not attend the trainings in kilosa. These are technical builders, they selected themselves as builders, they volunteered. Did not attend, bc they mistook the dates.

Water availability

There were 12 wells , now only 2 left. The third does not work well.
Some pumping machines were destroyed, additionaly there are lot of rocks so they have to drill deep, hard to get it. So dry season the wells dry.
People are not charged for water, only when the drills fail, for
Paying for water only if you ask someone to fetch water for you.
1 bucket 250 tzs, not all of them are doing that, because due to few wells, they are hiring others to fetch water for them.
Not enough water.
For some it is 2 km to reach them.

Lots of forest burning new challenge
Exisitance of rivers during rainy season, they are close to . from February til October is dry

Income levels:
Varying

Distance
Majority is close to the roads, some are behind the mountain, but they are only because of fields vicinity there.
Roughly 30% of Muhenda people live behind the hills.

Off-farm season activities – time constraints for training
Burning charcoal, locals brews, food vendors, making mats.

Good time for trainings?
During rainy season afternoon and during dry season anytime

How would you describe the community
Negative attitude is a problem of the past
According to him people are helping each other and doing things together, what things? > financial contributions for village projects eg. School, offices, repair work. Everyone contributes
Vicoba: group management was a problem. people even went to court. Court noter was main source of problem, misuse of borrowing cycles.

Flow of Communication/cooperation between village leaders
working well to 70% concerning village leaders cooperation, this is because of poltical situation. Before there was only ccm now there is also , so party affiliation between leaders are different, plus cabinet of village council 25.
Information hardly reaches people who live in the more remote parts of the village. Network problem.

Have there been projects related to KG or ICS before?
ICS: world vision stoves
TFCG (Tanzanian forest conservation g)

Long run potential
need for sense of ownership, if they get trainings, it will work. They can be independent
Example of openness to innovations: intercropping, at first they introduced to only few people, but now everyone is practicing it.

Interview#23

Date and Place: 08.11.2016, Kitunduweta
Participants: Village Leaders VEO (female), Deputy of the Chairperson (male)

Could you briefly introduce yourself and describe your tasks and responsibilities?
VEO: in charge of all government activities in the village, supervision of all projects, treasurer of the village, in charge of security, on behalf of the district director in the village (representing him), 24 years old
Deputy: He is deputy of the chairman since 2014, also sub-village leader): holding all project activities in village, organize and plan village meetings, taking minutes in village meetings, also in charge of village security (he oversees, VEO implements), solving small conflicts within village (like fights about field boundaries), also represents village in ward council
Chairperson is boss of VEO

2. Are you originally from Kitunduweta and since when are you holding these positions?
Chairperson: from Dodoma region, living here since 1997
VEO: from Dodoma region, position since January 2016 (moved here for the job)

3. Are there other projects in the village at the moment? Have there been any in the past?
Sustainable charcoal project (TFCG)
World Vision: they just started, they want to go on for 4-5 years, different activities, also farming activities, sponsor children from very poor families, dig wells/construct water pumps,
ICS: seems that there are no more activities planned after already received training
Anglican Diocese Morogoro

4. Do you think more ICS related training would be needed or is the one provided by WorldVision sufficient?
People would be very interested because WorldVision didn't because community but only one person, WorldVision stove also uses cement which is hard to get, he thinks many people would participate in trainings and construct to other HH

5. What do people during dry season? Very busy or a lot of free time on their hands?
After harvest there is not much to do in this village, people go to burn trees (new activity within TFCG project), 4 people try to cultivate vegetable gardens but there is a problem in getting enough water (e.g. for irrigation)

6. Water situation?
3 pumps are working well, the others are broken, not enough for the village
Normally when pumps are broken they can fix themselves, another problem now beyond their ability (in dry season the pumps cannot reach water because they are too short, even in rain season not all get water)

7. [KG]

8. [KG]

9. [KG]

10. How is the flow of information and communication within the village? How is knowledge-sharing in the community?
Exchange ideas in different ways and groups, local games (Bao): 3-4 people sit and play and communicate meanwhile, draft game (young people): , women (saving and credit groups)
45% active, need motivation and external push lack of education and initiative

11. Why did Muhenda and Kituduweta separate in 2014?
Two big reasons: a) many people (laws foresee separation from certain number on), b) wanted to become an independent ward

Differences between village communities?
Just get along well, high cooperation (for social gatherings), help each other in farming peak times, as community work well together

12. What kinds of conflicts are there in the community?
2 types of conflicts: village borders, and Tanzanian national park authorities and Kitunduweta,

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Interview#24
Date: 10.11.2016, Ilakala
Participant: ICS Group Chairperson (male)

Since when are you the chairperson and how were you selected for that position?
He has been chairperson since the beginning, voting system (writing of names on papers)

Who are the other group leaders and do they hold the positions since the beginning?
Secretary: Stela Mazola
Treasurer: Angelina Fungomali

How many group members were you in the beginning? How many are you right now?
18 in the beginning, 2 dropped out, they accepted 2 new members
Drop outs: Maneno Yakobo, of the second one he doesn't know the name
New members: Ambonisi Wililo, forgot the name of the second one

Is Viktoria a new group member?
She is an adopter, wanted to become a group members, so they gave her some criteria to fulfil (if you want to join group you have to go see the secretary, he doesn't know if she has fulfilled the criteria yet)

What are the criteria?
Entrance fee: 1.000 TSH, monthly member contribution 500 TSH, read constitution

What is done with the monthly contribution to group money?
Group money is being used to pay for emergencies (snacks when they go to construct) and for starting their own project of keeping chicken
Up to now they have 30.000 TSH + 5.000 TSH (gift from Götz for construction of 10 ICS = 500 TSH/ICS) in the beginning of this year
30 ICS (including group members ones) constructed until now
Initially agreement with Götz was that they should construct 100 ICS, then they would get more money from him

When did you install last ICS?
Next Saturday 2 more ICS will be constructed in Ilakala

Are you already registered as group?
Yes

How do you define drop outs? When did they drop out?
Not attending meetings for 3 times (but this rule is not strictly followed because people often don't attend and there would be no group members left), using bad language in the meetings, not doing activities, if someone is quarreling
Both drop outs moved outside village

Can you tell us more details about the group dynamics? How often do you meet? How is knowledge-sharing, cooperation between members?
No conflicts between group members, communication and coordination well, but problem at the moment is the economic situation in this season, everyone is struggling and therefore they are not meeting very much at the moment
There are many people in the village who want ICS, but 3.000 TSH is considered to be too high from them, they are lacking construction equipment (tape measures, pipes), says they need more so more people could construct

What is wrong with the tape measures?
Hard to pull them, they are stuck

How often do you see Irene/have meetings with Irene?
In the beginning twice a month, now once a month, a lot of communication

What do you do at monthly meetings?
Comes to check the progress, ask about if everything is going well, feedback, what are they up to besides ICS

How do you think to solve the problem with the price being too high for many potential adopters?
He thought maybe construct for free, but other group member didn't like that, even wanted to raise price up to 5.000 TSH, but other members said no, no one will pay, then WorldVision came and interfered (they were supposed to constrict for 2 people, then WorldVIsion constructed to them for free), but as WorldVision stoves are not working very well customers came asking for their stoves later, but they were very afraid for some time that this would mean the end of their group

How were you approached by WorldVision? Which training did you get from them? Who else was trained? Which are the benefits towards TransSEC ICS? What are the disadvantages?
He got training, Silvester and Temia Alfons also received training, appointed by VEO (chose people with ICS experience)
Training only for one day, they trained them on how to construct stove, WorldVision stove is shorter and the firewood chamber is smaller (says this is an advantage), the pan holes are not fitting the pans/pots, very expensive (25.000 TSH), 8 have been constructed for free

Can I come to you house to see both ICS?
He doesn't have
Rajabu and Victoria have

Coming back to the problem of 3.000 TSH being considered as too much to pay by potential adopters – what do you expect in the long run?
There is no way out, they have to stick at 3.000 TSH, when economy stabilizes again people might be willing to pay, maybe TransSEC is going to contribute money

Who did construct most of the ICS in the group?
Himself, Fatuma/Stela, Silvester, Amonesi Wilela, Alexia Hamsini

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Interview#25
Date and Place: 10.11.2016, Ilakala
Participant: ICS group member (female)

How did you decide to become ICS group member in the beginning?
In the HH survey they took her husband's name (Mohamed Nnedendo)
There was one day for dividing people in groups, her husband decided to join ICS and maize sheller group (afterwards he asked her to join ICS group)

How often do you meet in the group?
Normally they meet once a month (10th), but there have not been meetings for the last 3 months
It was only few people meeting (5-6), even chairperson is not attending, hard to conduct meetings like this because they need to be at least half of the group (9+) according to group rules to have an official meeting
In the beginning everything was going well, started in August this year, after meeting with Irene in August there were no official meetings
Also due to economic reasons, people are busy
No more meetings with Irene either, she came for one of their meetings but as they were not meeting she decided to see another group (there was also a funeral at this day)
This Saturday they are meeting after ICS construction (all of them are going for construction)

Why do you think the adoption rate in Ilakala is so low?
You cannot force people if they are not ready
Perhaps they think 3.000 TSH is a lot of money or bricks as challenge

Did you install any ICS?
She constructed 3 ICS herself

Do you have any plans in the ICS group to increase the adoption rate/to convince more people?
Yes they have plans, they want to tell people they can construct for loans, so they can pay later, only have to prepare materials

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Interview#26
Date and Place: 13.11.2016, Morogoro town
Participant: ARI Ilonga, Key Informant Technical Implementation: PL (male)

Could you illustrate the organizational structure of ARI and what is your role in it?
PL: assisting Bashir
1. management role, interacts with all focal person of all UPS, representing Bashir, e.g. financial proceedings for Trans-SEC, planning of activities, time line of activities, laying out baby plots (natural resources UPS) generally all implementation related tasks
2. Mainly responsible for poultry group + SMS (market tracking app)
dedicating roughly 70% of work time to Trans-SEC, this project is first priority

When did you join the project?
2014 when implementation of the first UPS took place

Monitoring and Evaluation
PL: Most of the time only the focal people conduct it, unless you see irregularities, then he and Bashir go by themselves to check for the next monitoring, examples:
[KG]
ICS: floods at changarawe, ICS mostly got destroyed, challenge : many people were not willing to reconstruct new ICSs, MO and OS discussed to implement a reward system for ICS construction
Changarawe was not as successful as Ilakala

Worldvision stoves, in the beginning everyone wanted one, because it was free and new, but not sustainable in the long run, farmers are turning back to Trans-SEC stoves
[KG]

How well does this process work?
PL: For minor adaptation changes, ARI acts autonomously
For larger issues, everyone has to be involved, this works fast, even within 3 hours when writing to Frieder Graef (ZALF)
For Tanzanian side, both phone and mail channel are used, mails for references!
In other projects conflicts are much more present. CPM helps a lot!
Example: arrangement for activites, if someone is too late for acititives, you have to talk about it. Eg. Planning travel to Ilalaka which is very far from Ilakala,
Time delays mostly during planning season for natural resoucer groups, for other groups there were not many quarrels.
First days are ciritical, afterwards everything stabilizes.,

Exchange of experiences with ARI Makatupora?
Lately there were no meetings, if then mostly for stakeholder meetings
For many things just through phones.
Most conversations are on payment and financial issues, eg. Translator fees, they first have to agree , otherwise

Mostly only administrative issues.
On Publications they cooperate
Don't have large insights into their activities and progress
Few exchange visits, planned to meet but then failed to go.

PL: But it would be very beneficial if you could do it, because even for minor things it is very helpful to exchange , eg ICS works very well for Dodoma, while in Kilosa there are challenges -> could exchange each other, budget constraints are interfering often times. In that case these exchanges are often cut firsts because it is costly.

Cooperation with MVIWATA?
PL: Strong cooperation with MVIWATA, every 3 monthly monitrong is conducted jointly
It is important as dealing with large farmer groups is huge challenge, eg. Farmers don't show up, complaining on lacking payments etc.
Very good relationship, age mate, hierarchy within the organization age e.g. BM.

Funds are an issue , for frequent field actitivies., if you go to the field a lot you get more budget and vice versa, Bashir decides on theses issue and he is very strict with it.
Budget / allowances according to involvement of field activities, varies between months
Government schedule starts 7 am, ends at 3.30 pm
Project actitives require to be done between 7.30- 12 because villagers' schedule

Challenges ICS: changarawe people are not responding strongly because of availability of firewood, but governemtns starts to take up initiatives to protect the forest, this is very crucial and he sees potenetial
Ilakala: materials, availability of water, large issue, for making bricks, but only for dry season

PL: Ilakala: mostly water, during dry season, person has to fetch 2-3 buckets of water per day, then take HH size 7-8 people, use this for entire household.
Also MHH, men will use a bucket of water, without considering the need of other HH members, man is absolutlely first priority.
In the villages sometimes there is no food in the house, men would go take the only tin of maize to sell that for pombe
Dealing with this issue for a long time already, progress is happening but very very slowly

Villages close to towns, men and women are more equal, for Ilakala they are very strong, e.g. in the evening, that is the time when he comes back to search for money for pombe

PL: Decision making for ICS: men don't care because it is not in his sphere, also it is very little money, just sells a chicken to take money for stove. Men wont notice even.
Goats and cows, chicken is interest , hen no problem, roosters are expensive
[KG]

Outscaling recommendations for Scale-N
PL: Group format has the problem of lack of sense of ownership for UPS that don't have their individual object, example of ICS and KG is working better
Other project: communal farm , does not work, free rider issue

PL: Suggests: everyone has its own KG or ICS and they can be trained as a group
ICS: obtaining bricks is a problem, many complaints, suggesting to provide them with bricks as they are very low costs. ARI s can purchase them cheaper because of bulk purchases, then is is 60 TSH, good entry point, doesn't think you will abandon an ICS as soon as you have it

Involvement of ARI necessary
PL: Might be difficult if follow ups are rare, possibly close cooperation with district officers, need close cooperation , they need some sort of recognition of contribution, eg allowances.
Performance based allowance payment
Having Trans-SEC extension officers is crucial, can act as a buffer in times of budget constraints.

Interview#27
Date and Place: 17.11.2016, Morogoro town (SUA campus)
Participant: SUA, Trans-SEC and Scale-N project coordinator: KM (male)

Trans-SEC
Trans Sec: overseeing the coordination, involved in WP 7 markets, income commercialization of food value chains
Scale-N: WP markets and value chains.

Implementation in Scale-N
3 components: nutrition + health, biophysics (soil + water), markets and FVCs
started with baseline in component 1 + 2, baseline for economics is starting soon.
Not combine everything, because it is too large
Better to do market survey when they just harvest., to et the entire agri cycle.
After baseline, 3 components are linked! How does soil influence nutrition, how are market decisions contributing to nutrition, etc..
Now they are thinking upgrading strategies, based on the constraints, then interventions going to be implemented.

Difference in approach between both projects?
Selling point of Trans-SEC: very well-designed projects, emphasized the factor participatory action research, farmer started from the evolution of all activities from the start. Local stakeholders had a bigger stake.

Scale-N: there is a need for more involvement of local stakeholders, and it is not coming out very clearly. Process is much shorter, but already they are tending already through KG despite lacking basis., they should have screened all UPS, first of all do the consultations with farmers

Is this not being done?
They had work packages: activities across them where well-streamlined, ARI and MVIWATA did the stakeholder mapping, they were good on the ground. Stakeholder mapping was done by Claude, he is in economics and markets.
Improvement for coordination is needed in Scale-N
Then combine inventory of all potential solutions in the Scale-N villages, and see if those make sense for them
Issue of not having staff on the ground is a problem.
Leaders could bring leaders also

Potential of involvement of ARI and MVIWATA?
Trans-SEC involved them from the beginning
Scale-N not, so it might be difficult to bring them in large scale, so maybe third party contracting
Why: taking for granted that later on they can be on board.

Communication in Trans-SEC
Challenges, but they tried to improve.
Decentralized WP tasks, the leaders did follow-ups
Skype with Frieder, very close follow-ups

This needs to be ensured in Scale-N , already you can see some strong compartmentation, in Scale-N , nutrition people see it only as nutrition project.
Diversified agriculture is important too
Example: biophysics were supposed to check the local conditions for agriculture production
Funds for implementation of findings got decided by themselves (by nutrition people)
Lack of coordination of the different components is tricky in Scale-N
Water harvesting was decided at school already.
Even before feasibility study. Without inventorying constraints of water supply

Asked Hamisi, to explore a study if it is feasible, SUA has strong engineering background
But Germany delegated implementation activities before consulting SUA who actually conducted the ground work, German side of course had to come back to them in need of supervision. Tricky to achieve.
Eg.: above or below ground: below is worse option, but engineers without borders decided on below ground

In Trans-SEC: before Germans implement activities in the field: they present their suggestions and after completion they have to present.
In Trans-SEC they had a lot of time to do research on the ground

Economics people did not have money in the beginning: but then people thought economics guys don't do anything. Communication needs to be improved.

3-4 people in biophysics
3 in markets
nutrition is larger 15-20 people

lessons learnt:
regular skype meetings at least monthly calls, updates.
Lack of feeling of unity, if nutrition people are presenting, please call the other 2 teams
He plans to move all meetings to soil and water.
The strength is the cross cutting of all three components.

Affirmation

I hereby declare that the present thesis has not been submitted as a part of any other examination procedure and has been independently written. All passages, including those from the internet, which were used directly or in modified form, especially those sources using text, graphs, charts or pictures, are indicated as such. I realize that an infringement of these principles, which would amount to either an attempt of deception or deceit, will lead to the institution of proceedings against myself.

Berlin, 15.11.2017