

DEVELOPING AN IMPACT EVALUATION FRAMEWORK FOR PRODUCT
DESIGNERS INSPIRED BY THE CAPABILITY APPROACH: A CASE STUDY ON THE
PHILIPS CHULHA

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INSPIRED BY THE CAPABILITY APPROACH:
A CASE STUDY ON THE PHILIPS CHULHA**

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ABSTRACT

DEVELOPING AN IMPACT EVALUATION FRAMEWORK FOR PRODUCT DESIGNERS INSPIRED BY THE CAPABILITY APPROACH: A CASE STUDY ON THE PHILIPS CHULHA

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Within the field of Product Design there is an increasing interest in designing with emerging markets. Considering how long people have already been concerned with increasing global living standards it is surprising how little has been achieved. This suggests our current methods are insufficient. The Capability Approach (CA) by Amartya Sen offers a new way of assessing inequality and poverty, focusing on what people have reason to value to be or do. Products can be means to achieve these beings and doings. An evaluation framework inspired by this philosophy was developed. The framework was tested in a case study. The sociological impact was evaluated of the Philips Chulha, a subsidized cooking stove implemented in tribal India. The impact in terms of the CA was identified and explained using Kleine's Choice Framework and Bourdieu's concept of habitus. The framework was successful in engaging into deep dialogues with the target users. The interpreter appeared to be highly influential on the way the study was executed. Since the research was conducted in one region, no firm statements could be made based on this single case study. The framework needs further testing and developing in order to increase the collaboration between the interviewer and the interviewee. Eventually product designers can use the improved evaluation framework as a prospective framework to uncover design opportunities for developmental purposes.

Keywords: evaluation framework, capability approach, emerging markets, product impact, Philips Chulha

ÖZ

YARARLILIK YAKLAŞIMINDAN ESİNLENİLEREK ÜRÜN ETKİSİ DEĞERLENDİRME ÇERÇEVESİ GELİŞTİRİLMESİ: PHILIPS CHULHA ÜZERİNE BİR VAKA ÇALIŞMASI

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Ürün tasarımı alanında, hızlı büyüme ve yeni gelişen endüstrileşme süreçleri nedeniyle yeni oluşan pazarlar için tasarıma giderek artan bir ilgi oluşmuştur. Giderek gelişen global yaşam hakkındaki kaygıların ne kadar uzun süredir varolduğu düşünülecek olursa bu konuda çok az yol alınmış olması şaşırtıcıdır. Bu da izlenen mevcut yöntemlerin yetersiz olduğunu düşündürmektedir. Amartya Sen'in önerdiği *Yararlılık Yaklaşımı*, insanların hangi nedenlerle neyi değerli bulduklarına veya bulmadıklarına, ne olmak veya ne yapmak istediklerine odaklanarak eşitsizliği ve yoksulluğu değerlendirecek yeni bir yaklaşım sunmaktadır. Ürünler bu konuda önemli bir araçtır. Bu çalışmada, bu yaklaşımdan esinlenilerek bir değerlendirme çerçevesi geliştirilmiştir. Çerçeve, bir alan çalışması ile test edilmiştir. Bu bağlamda, *Philips* tarafından Hindistan'ın kırsal kabile bölgeleri için sübvansiyonla desteklenerek geliştirilmiş, odun ateşi ile kullanılan çömlek fırın *Chulha*'nın sosyolojik bağlamdaki etkinliği alan çalışmasında değerlendirilmiştir. Sosyolojik etkiler, *Yararlılık Yaklaşımı* bağlamında, *Kleine*'nin *Seçim Çerçevesi* ve *Bourdieu*'nün *habitus* kavramı kullanılarak tespit edilmiş ve açıklanmıştır. Değerlendirme çerçevesi, hedef kullanıcıyla ürün hakkında etkin diyaloga girilebilmesi konusunda başarılı olmuştur. Zorunlu olarak devreye sokulan çevirmen çalışmanın yürütülmesinde oldukça etkili olmuştur. Çalışma sadece bir bölgede gerçekleştirilebildiği için tek bir alan çalışması üzerinden kesin yargılara varmak mümkün değildir. Dolayısıyla, görüşme yapılan kişilerle görüşmeyi yapan arasındaki işbirliğini arttırmak için değerlendirme çerçevesinin geliştirilmeye ve ilave testlere ihtiyacı vardır. Sonuç olarak, ürün tasarımcıları geliştirilmiş değerlendirme çerçevesini, gelişim amaçlı tasarım olasılıklarını ve fırsatlarını ortaya çıkarabilmek için muhtemel bir çerçeve olarak kullanabilirler.

Anahtar Kelimeler: değerlendirme çerçevesi, yararlılık yaklaşımı, yeni gelişen pazarlar, ürün etkisi, Philips Chulha

dedicated to my grandmother, Dolly Alberda-Quist, for her inspiration

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CHAPTER 1

INTRODUCTION

1.1 Project in Brief

1.1.1 Context of the Project

This research was conducted in partial fulfilment of the requirements for the Joint Master of Science programme in the faculty of Industrial Design Engineering of Delft University of Technology and the department of Industrial Design of Middle East Technical University. Both Master programmes are concerned with creating or improving innovative consumer goods for human needs to make people's lives easier and enrich people's experiences. This double degree programme focuses on research in the field of human centred product development giving the opportunity to become aware of cultural differences since part of the programme took place in the Netherlands and part in Turkey. The research is also part of Annemarie Mink's PhD project 'Technology and Human Development - A Capability Approach'. This project is conducted within the faculty of Industrial Design Engineering, Delft University of Technology, which carries the research mission statement 'Sustainable well-being'.

Philips and all other organizations and institutions that helped during the case study are no official stakeholders of this graduation project. They had no influence on the research content, the way the interviews were conducted, the outcomes or the content of this thesis. For a full overview of all people and organisations that were involved in this research project, see Appendix A: Contacts.

Naturally not everything in this research went according to the original plans. For legibility of the thesis most setbacks and dead ends have been removed from the content of the thesis. For an overview of all struggles, including a list of advices, see Appendix B: Advice.

1.1.2 Topic and Objective of the Project

The project consists of a research design for evaluating sociological impact. It aimed to use the Capability Approach to determine improved living conditions as a result of product design for emerging markets. The main objective was to develop an evaluative framework for designers to evaluate the impact of products designed with emerging markets on users' and community's capabilities and test this framework through a case study.

1.1.3 Motive behind the Project

Question marks can be put by whether the expansion of the consumption society actually improves living conditions or only leads to the loss of identity through conformity (Wilk, 1994). The current ways of living in the Base of the economic Pyramid are much more personal, while Western consumerism creates alien ways of production and consumption. The consumption society promises satisfaction, since it is there to fulfil desires, and it may do so, but it also delivers the side-effects boredom and estrangement (Slater, 1997). In addition to this, economic growth can not automatically be equated with improved living conditions (Wimberley and Bello, 1992). Economic growth sometimes leads to more inequality or just the acquisition of more conspicuous objects and thus resulting in more poverty. Therefore, this research aims to evaluate and understand the impact of product innovation in order to help product designers to be able to better design products with emerging markets.

1.1.4 Project and Involved Organisations

A framework was developed to compare the situation of before and after acquisition of a product. The framework used Amartya Sen's Capability Approach (CA) as an inspiration. Sen (1999) criticized the focus on income or commodities when assessing poverty and global justice. He believes it is not the income or commodities "that are ultimately important, but what they allow us to do and to be, the kind of lives they enable us to live" (Hoven et al., 2009, p. 2). Sen (1999) focuses on 'capabilities': the freedom of action and decision and the actual opportunities that people have. As the CA is highly philosophical whereas product designers are more practice-oriented, a translation was necessary to make the CA usable for product designers. Capabilities relevant from a designer's perspective were defined and integrated into a framework to extract these from the users in order to see how they actually worked in reality. Furthermore the role of undeniable sociological aspects that should be taken into account and should be turned into working criteria for design approaches were uncovered.

The developed framework was tested in a case study on a stove introduced in India, the Philips Chulha (Figure 1.1). The Philips Chulha is a simple wood stove made of clay which has been developed in India in close collaboration with the envisioned users supported by the NGO ARTI. From the results of the case study new recommendations were formulated in order to improve the evaluative framework. The framework also allowed for usage before the introduction of a product innovation to better be able to predict the impact from a capability perspective, turning it into a prospective framework for product designers.

1.1.5 Relevance to Design Research for Interaction

Design research for interaction is a specialisation Master provided by a joint effort of DUT and METU. It focuses on research in the field of human centred product development. Its international character allows students to experience cultural differences in interaction research.

The framework which has been developed during this graduation project is intended to be transformed into a prospective framework for product designers who plan to participate in projects focusing on emerging markets. The aim is to make designers more aware of the cultural differences between designer and user and the effects they can have upon communities.



Figure 1.1: Philips Chulha, 2010, *obtained from <http://www.lowsmokechulha.com>, 2 July, 2012*

It encourages designers to think beyond their own beliefs and styles. It facilitates creating context mappings of what the envisioned users find truly important and where product design can be beneficial.

The tool is meant to ease the interaction between the envisioned user and the designer in order to overcome cultural differences and uncover the users' true needs in a pleasant, comfortable way.

The tool focuses on the interaction between the product and the user and the capabilities generated by this, but it also goes one step further, incorporating the socio-cultural influences on the community-user interaction of the product.

This tool was tested by conducting a case study on the impact of the Philips Chulha concerning the users' habits, reasonings and freedoms. It aimed to provide rich insights in the true experiences people have as a result of the acquisition of the stove. The impact on other villagers, builders and distributors was also incorporated.

1.2 Thesis Structure

This thesis work contains a theoretical framework addressing the CA and existing tools concerned with designing with emerging markets upon which the concept has been built. It further describes the development process of the tool to evaluate the capabilities and the findings from the case study in India with the Philips Chulha. It discusses the findings and ends with recommendations for the tool to encourage designers to consider capabilities and sociological impact while designing.

The introduction (chapter 1) is meant to generally set forth the initial motives of the author to start working on this project as well as providing the goals and ambitions. It also aims to give basic insight in the context of the project and the relevance to the field of product design.

The theoretical framework (chapter 2) covers the literature review both from a capability and from a designer's perspective. First existing tools are reviewed that focus on emerging markets. Then Amartya Sen's CA is discussed to show its relevance for development. It is followed by Kleine's Choice Framework to help understand the achievement of developmental initiatives. Bourdieu's Concept of Habitus is used as a framework to understand the differences in values and beliefs between individuals. The review ends with a proposition how the CA can be used in an evaluation framework.

The research questions & method (chapter 3) extracts the relevant information from the review and then provides a formulation of the design brief. After stating the envisioned usage the development of the framework and the reasoning behind it is explained. All used and developed techniques and materials for the different pilot studies are explained. The chapter concludes with a full in-detail description of the final tool box.

The case study on the Philips Chulha (chapter 4) took place in India. First the context within which the case study has been executed is explained. Then the design process is explained from initial development to current implementation and marketing strategies, as well as user feedback and evaluation studies. Then all involved stakeholders are introduced in order to get a feeling for the impact. After this the interview outcomes with the users and other stakeholders are explained.

In the discussion and conclusion (chapter 5) the experiences of using the tool box in the case study are discussed. Recommendations are formulated for improvement of the tool. Also the success of using the CA and the habitus to assess and understand the impact of product innovation is discussed. The thesis concludes with the implications this thesis work has for product designers in emerging markets.

CHAPTER 2

THEORETICAL FRAMEWORK

2.1 Emerging Markets and Design Responsibility

Human beings are human beings, wherever they live. (Galbraith, 1997, p. 2)

These arbitrary yet appealing and touching words were used by John Kenneth Galbraith in the introduction of his book *The Good Society* in which he pleaded to set forth the rights of human beings. He argued it to be morally unacceptable to stand by and do nothing, while huge populations are dying of starvation. Singer (2006) argued that if a child was drowning in front of a man, everybody would agree this man had to step up and save this child. Without help the child would drown. He continued by stating that huge populations in other countries do not have enough resources to survive and are thus dying, while an agency could prevent them from dying if this same man would support them. Letting a drowning child try to swim to the shore when it is unsure if he will make it, is morally wrong. Even though this man had nothing to do with these foreign populations, idly standing by should be just as morally wrong.

Today even huge amounts of people live from day to day in insecure living conditions. They have no certainty of food, health or education and have no prospects of that changing in the near future. These people live in the economic Base of the Pyramid (BoP) and have less than \$2,- to spend per day (Prahalad, 2010). It is the poverty of the people in countries in need that stands in the way of global justice (Galbraith, 1997), thus it is the poverty that needs to be resolved. Poverty can be assessed by focusing on monetary poverty, but also by the actual opportunities a person has. Justice in this case stands for a world in which each person receives what he truly believes to be his or her due (Jones, 1999). These rights are not to be limited by societal boundaries and thus some sort of development is needed (Jones, 1999). For almost one hundred years the rest of the world has been concerned with helping the BoP, which was later renamed as emerging markets, yet unfortunately achievements seem disappointing (Kandachar and Diehl, 2011).

Transnational Companies (TNCs) have attempted to reach the BoP through expansion of the consumption society. By use of seduction techniques, consumption has been promoted by relating products to being part of a better life (Wilk, 1994). The persuasion by hegemonic societies has always been communicated in such a way that it seemed more natural, more fair and fundamentally better than existing available alternatives (Sklair, 1991). As soon as a new need and/or desire has been created, the consumer portrays himself inside the actual world in complete and full possession of the desired object and receiving the pleasure and social

status he believes comes with it (Appadurai, 1996; Bourdieu and Passeron, 1990). Troubling is that a desire can become so strong that it clutters one's judgement (Wilk, 1994). Wilk (1994) argued that the obsession of achieving a certain social status through consumption can cause them to give up basic needs, such as healthcare, and economic prospects in order to purchase the object of their desire. However the object alone hardly ever fulfils the actual desire the consumer has created in his imagination fed by advertisements, often being a better life. Thus the tricked consumer is left with a feeling of emptiness which can only be filled by a new desire resulting in a never-ending loop (Belk et al., 2003; Appadurai, 1996). The main problem here is that there is no way back once the desires have been created (Hannerz, 1989). They have already been implemented through mass media and fulfilling one desire always creates new desires, also aided by the Diderot effect (McCracken, 2001). This creation of desires turn these "countries-in-need" to "markets" for the first world countries, thus newly "emerging markets" for the practices of TNCs, which is extremely interesting and profitable for them. Consumerism in countries in need however, can thus also be seen as a trap with no way-out and without alternatives, sometimes causing exploitation of the workers by TNCs (Sklair, 1991).

Prahalad (2010) argued that one of the reasons current organisations concerned with helping these markets fail, is because they are fragmented and often inefficient and unstable. A more structured and sustainable approach is required, which is among others found in a growing movement within the field of industrial design to also target the emerging markets (Kandachar and Diehl, 2011; Smith, 2007). This movement encourages development through design thinking (Smith, 2007).

In order to solve the unequal division of rights different practical attempts have been made, which can primarily be divided into charitable aid and profitable sales. The first is a selfless act of giving, independent of anything in return. Unfortunately, by pouring material products into a country it can become highly dependent on those resources, and when it stops for whatever reason, the country is more helpless than ever. On the long run setting up enterprises is a more viable solution, since it really incorporates those countries into the profitable society and has the ability to create a co-dependent relationship rather than a one way dependency (Sklair, 1991).

Product innovations can have a great added value for emerging markets, however currently many attempts to do so seem to have failed or had unforeseen side effects disadvantageous to the cause. When developing products from a Western perspective with people in emerging markets, a designer cannot simply ask for the needs or wishes a user expresses. There are two reasons why. The first reason is that the context of the envisioned user and the designer differs enormously. Both cultures have had a different past and therefore describe different beliefs, styles, norms, ideologies and values which can all influence their perception of what feels right, possibly endangering the acceptance and the usability of products designed by the West. The second reason we cannot simply ask envisioned users what would please them, is that most people's introspective abilities are not as strong as is often assumed, both in Western and in emerging markets. People often do not know how to ease their life circumstances and are unable to foresee the impact a product can have upon their well-being and the sociological or natural environment. It is therefore that designers have a moral responsibility to think and collaborate with the envisioned users in order to identify their true inner needs and map out the envisioned context including all of its stakeholders (Papanek and Fuller, 1972).

Several product innovations in emerging markets can be labelled successful, especially those

incorporating local business plans, as the capitalist system offers formerly luxury products in exchange for reasonable prices and, on top of that, many job possibilities for manufacturers or builders (Sklair, 1991). Yet another issue arises with the expansion of the global market to emerging markets. The products previously produced by the users themselves in emerging markets were familiar, part of their own culture and adapted to their individual preferences and social structures. By introducing Western creations inconsiderate of those preferences and structures, the popped up builders are likely to feel estranged from their creations (Marx, 1957). As Marx (1957) claimed “the worker becomes all the poorer the more wealth he produces, the more his production increases in power and size” (Marx, 1957, p. 28). The main argument here is that the labourer produces something that is not his, but just the result, or objectification, of his labour. He does not produce something useful, he just produces the means to buy something else he needs through money and thus the produced object is alien to him. Economic growth will take place and people will have more choice in the consumption of products, however this choice is forced upon them, since they may no longer be able to create the products they want to and feel alienated from the products they consume. Therefore, this may in fact decrease the opportunities they had and make them poorer in this sense even though from a monetary point of view they have become richer. The power structures and the changes upon the community should thus also be integrated when working with emerging markets.

Product designers can influence the impact, because it is in the design phase that the original roots of a product can be found. They can be considered agents who are responsible for keeping developmental initiatives profitable, but also for improving the living standards of the people. As much as designers however would like to believe that they are in control of the development of new products, they are also highly influenced by already existing artefacts around them (Csikszentmihalyi, 1993) and by their personal and socio-cultural preferences (Bourdieu, 1988). Products developed without considering the envisioned user’s preferences are almost never accepted, but either localized or rejected completely (Hannerz, 1989). However, even when localized these products remain partly alien to them. The introduction may cause any type of potentially harmful changes in the daily rituals, styles, beliefs, household situations or communal habits and sociological structure. Local producers are often not able to compete with the cheaper and more efficient designs and will have to start working in jobs that just now became available due to the same introduction. Even more in this case however, the product he sells is alien to him. Therefore, for every product design the designer should consider the possible consequences and impact as much as within his possibilities. Obviously a designer cannot foresee everything, but plausible harmful scenarios should always be considered. Sociologists, anthropologists and philosophers have identified these cultural challenges for decades, and now the time has come to abridge the gap between engineers and social scientists. Tromp (2011) argued it is the ethical responsibility of all designers to realise they are “shapers of society” [p. 19].

Whereas there are numerous successful product innovations in emerging markets, a major part of the attempts has failed. Iyer (2006) argued failure rate data of product innovations from the US are likely to be similar in India. Assuming he was right about 70-80% of the product innovations fail (Iyer et al., 2006). And worse is even that even those that are successful can have unforeseen side effects. An often quoted example, but unfortunately not the only one of its kind, is the introduction of breast milk by Nestlé to developing countries. The price was high, the users lacked facilities to keep the bottles sterilised and the mothers were unable to read the instructions due to illiteracy (Wise, 1997). This product caused a peak in

death amongst babies instead of a decline (Wise, 1997). Determining whether development is successful depends on definitions and criteria, many of which are unknown to product designers.

Product designers are often unfamiliar with sociological or anthropological fieldwork and are therefore less likely to be fully aware of the socio-cultural context they have to take into account when designing for a target group with which they are unfamiliar. Currently in theoretical work social science is discussed separate from other aspects such as material environments, whereas a better collaboration could benefit both fields (Margolin, 2009). Therefore in order to perform successful innovations in emerging markets, tools incorporating social science need to be developed for product designers to aid them in getting insight in emerging markets (Kandachar and Diehl, 2011).

2.2 Designing for Emerging Markets and Design Research Tools

Hart and Simanis (2008) stated that since it became clear that governments were unsuccessful in developing countries during the last five decades, corporations stepped up to develop from a profitable perspective, inspired by Prahalad's book 'The Fortune at the Base of the Pyramid'. Multinational companies (MNC's) attempted to penetrate the four billion people living in the base of the economic pyramid to capture this "fortune", but unfortunately by doing so forgot what development really was about - the improvement of lives of the poor themselves. Initially companies made the mistake that products used in Western countries ten years ago could simply be adjusted and sold in those countries now (London and Hart, 2004). However as it turned out not everybody wants to be and act like Westerners and these alien products were not well-received (London and Hart, 2004; Hart and Simanis, 2008). A deeper insight was needed into their actual needs (Hart and Simanis, 2008), to better take local social, economic and industrial structures into account (Crul and Diehl, 2008). Yet conventional marketing techniques that map the users' needs stayed very superficial whereas more in-depth ethnographic studies, such as observations and shadowing, were highly complex and time consuming (Von Hippel and Katz, 2002; PhilipsDesign, 2010). More focused methods therefore needed to be developed to obtain information about the contexts of people in emerging markets and the way they interact with products (Visser et al., 2005).

Classical techniques such as surveys, questionnaires, semi-structured interviewing and focus group discussion can provide useful data, however they are usually unsuccessful in encouraging the envisioned user in an enthusiastic way to participate (Gaver et al., 1999). In current design practice the interest in context mapping techniques has increased (Visser et al., 2005). Context mapping is a way of participatory design in which the main goal is not to extract all possible information, but rather engage with all stakeholders and make them feel empowered, which leads to a better understanding of their habits and situations (Gawler, 2005). Users are provided with tools and approaches and through generative techniques design opportunities can be discovered by awakening the aspirations, dreams and ideas of the envisioned users (Visser et al., 2005) (see figure 2.1). This process is usually started with a sensitizing session where the participants are "triggered, encouraged and motivated" (Visser et al., 2005) to think about their personal context, followed by generative sessions and discussions. The classical external evaluator that would objectively look at the data from interviews and questionnaires thus becomes a facilitator that promotes participation setting aside his own ideas and viewpoints (Gawler, 2005). Rather than just listening to the answers an interviewee pro-

vides, context mapping is about engaging in a deep dialogue where the participant can share his stories (Hart and Simanis, 2008).

Many context mapping techniques to get insight into users' habits, reasonings and values have been tested and used in developed markets (Crul and Diehl, 2008). They are not automatically applicable in different countries due to unfamiliarity of the researcher with the socio-cultural context of the participant (Kandachar and Diehl, 2011). Organisations concerned with developing products for emerging markets have therefore developed several tools. In developing such a tool, it is necessary to acknowledge the differences between Western structures and structures in emerging markets. In emerging markets much revolves around small local business and it is important to involve both them and all other possible stakeholders in the design research (Crul and Diehl, 2008; Hart and Simanis, 2008; PhilipsDesign, 2010; Larsen and Flensburg, 2011). From their knowledge and experience a differentiation can be made between what customers ostensibly need and what are the actual demands these people have (Bowman and Crews, 2009; PhilipsDesign, 2010; Larsen and Flensburg, 2011). Local stakeholders can also provide valuable insights in infrastructural issues, technological possibilities and general socio-cultural habits (PhilipsDesign, 2010). In order to increase the chance of success of entering emerging markets local institutions, both corporate and non-corporate, should be respected and envisioned users have to be involved from the very beginning (Visser et al., 2005). However, most important is to actually go to the envisioned users and engage into deep conversations in order to learn about the social and cultural context (Bowman and Crews, 2009; Crul and Diehl, 2008), people's habits, reasonings and values (PhilipsDesign, 2010) and co-dependent social phenomena (IDEO, 2011). This allows product designers to quickly get insight into how to work with the envisioned users in emerging markets.



Figure 2.1: Context mapping: Users create expressions of their experience, which are presented to - and discussed with their peers, 2011, *obtained from* <http://www.wikid.eu/images/5/5a/DDG-2-55.jpg>, 29 July, 2012

Because co-creating and co-evolving a design with the users has shown to have high potential

(Hart and Simanis, 2008), toolkits focusing on participatory research have been developed to help designers in emerging markets. By creating a toolkit that provides a way for the users to collaborate side-by-side with the designer a basis of trust can be established and hierarchical differences will vanish (see figure 2.2). By empowering the participants, their own evaluative capability can already be enhanced and they will learn and understand more when they are involved in the development (Gawler, 2005). The main benefit of a deep dialogue is that interviewees are more likely to tell the truth and underlying reasons can be uncovered (Gaver et al., 1999).



Figure 2.2: Co-creation: 3D participatory modeling, 2009, *obtained from <http://unitid.nl/wp-content/uploads/context4.png>, 29 July, 2012*

For participatory research the content of a toolkit requires proper preparation. In order to encourage creativity, reflection, intimacy and trust the interviewer can make use of different techniques such as card visualizations, historical timelines or social mappings (Gawler, 2005). Each technique works as a great icebreaker and also has different ways of encouraging reflection, stimulating discussion, organizing thoughts, communicating emotions and eventually identifying needs (Larsen and Flensburg, 2011). In order for the tools to be successful they need to be customary to the 'language' of the user so that the interviewer transforms into a facilitator and the audience is able to take over the interview and shares out of intrinsic motivation (Von Hippel and Katz, 2002). This means that illiteracy needs to be taken into account and that drawings are preferably generic or adjusted to local understandings (Larsen and Flensburg, 2011). Participants should receive enough freedom to share whatever they choose to share. However the possibilities of answering and availability materials also needs to be limited as to not overwhelm and confuse the participants (London and Hart, 2004; Von Hippel and Katz, 2002). That way the interviewer's influences diminish, allowing to learn more about local interests and habits.

Current tools however only tell what to do, not how to do it. Whereas they provide valuable

guidelines, methodologies, techniques and tools, specific topics to be discussed are still undefined and left to the researcher. Outcomes thus highly depend on what the designer decides to be of importance. Considering that designers are not generally trained to evaluate development such as philosophers, sociologists, anthropologists or even economists have done, this leaves a huge gap in current toolkits.

2.3 Product Design and Sen's Capability Approach as a Way to Define Development

Product designers are generally trained to think from a product perspective. In a typical design process designers consider users, market and technology as the most important aspects (Margolin, 2009). From a usage perspective naturally the envisioned use, misuse or abuse are considered, yet the actual impact a product has on a societal level besides the direct obvious effects are rarely considered. This unfortunately leads to design solutions with regrettable side-effects, such as the microwave, which was designed with the best intentions but eventually caused families to eat less together (Fine, 1980). Another example is the escalator meant to transport people faster but resulted in people standing still on the escalator, encouraging laziness. The lack of interest in the sociological impact is regretful when Western designers develop products with Western markets. However, in this case the context is familiar to them, so even if they don't consciously consider the impact, subconsciously they will still partly include the sociological impact just because it makes sense to them (IDEO, 2011). Designers lose this connection when they are unfamiliar with the context of the envisioned users, which happens when designing with emerging markets. It is therefore important that societal behaviour and impact is also considered when designing for developmental organisations.

Most product designer tools for emerging markets focus mainly on bringing new utilities or improving economic standards. By doing so designers assume that commodities or money will always improve living standards, while in fact they are only means to achieve those things that are valuable to a person. Rather than focusing on a way to help people make more profit, it might be better to focus on what people have reason to value.

Amartya Sen developed the Capability Approach (CA) in the 1980s as a response to traditional approaches to economic welfare (Sen, 1999). Sen (1933-present) is an Indian economist and philosopher. He is concerned with assessing poverty and inequality (Robeyns, 2006). Sen's main critique was that the focus in traditional approaches was too much on income inequality. Capitalist development has side-effects such as uneven distributions and dependency (Kleine, 2010). He argued it is not the income or commodities that are ultimately important, but what they allow us to do and to be, the kind of lives they enable us to live (Sen, 1999). Sen focuses on 'capabilities': the freedom of action and decision and the actual opportunities that people have. It is therefore that development should not focus solely on increasing income or resources, but rather on the freedoms that involved human beings value. It should target what these people truly value and whether they are capable of achieving this. Inequality is thus measured not in terms of income or other resources, but in terms of lack of choices and freedoms (Zheng and Walsham, 2008), or in short the central and basic things that people are unable to do and be (Burchardt and Vizard, 2007). Development can thus be defined as "a process of expanding the real freedoms people enjoy" (Sen, 1999, p. 3).

Sen considers the equality of human capabilities to be most important, however most ap-

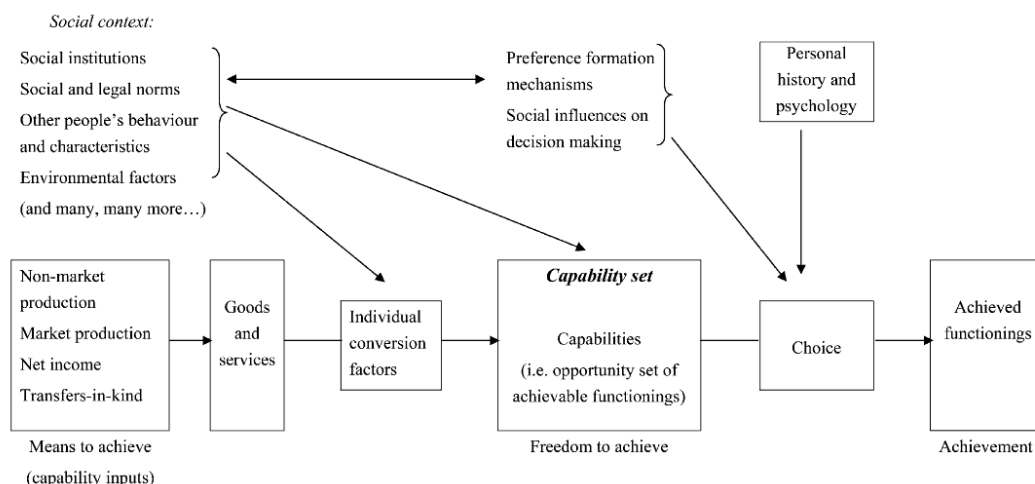


Figure 2.3: A stylised non-dynamic representation of a person's capability set and her social and personal context (Robeyns, 2005)

plied approaches assess either income, subjective well-being, liberty and/or primary goods (Burchardt and Vizard, 2007). Increase in income has been a very popular way of evaluating development as it is very easy to measure and even more easy to compare (Prahalad, 2010). Even though an increase in income has the potential to lead to a more prosperous life, whether people actually achieve this life is not being measured. Furthermore, solely focusing on income brings the danger of overlooking cultural differences, and unintentionally changing rituals which can be valuable to these communities. Subjective well-being goes beyond just income and is used quite often in utility based models. For measuring subjective well-being researchers often inquire about people's happiness and their preferences, and try to fulfil those (Gasper, 2007). By fulfilling the preference expressed by the users, the development would be considered a success. In this theory however it is not considered that most people cannot properly envision the total impact of a product and even though they express certain wishes, fulfilling them may not be beneficial even for themselves. Focusing on liberty seems to have quite some overlap with the capability approach, however it fails to take into account that different people have different needs, depending on for instance socio-economic and political circumstances. Primary goods, used in the Rawlsian approach, show what people can actually acquire with their income in terms of goods. Goods however are again only means to come to other objectives, as they always serve a certain purpose, be it utilitarian or aesthetic, and variations between what people can do and be with the same goods occur for many reasons (Sen, 1999). The capability approach in comparison focuses on valuable ends, rather than instrumentally valuable means.

Whatever life aspects people have reason to value Sen (1999) calls functionings, such as being healthy, having shelter and enjoying sufficient nutrition. The capabilities are the set of functionings a person is capable of pursuing in his life. Sen distinguishes two types of goals: well-being goals and agency goals (Robeyns, 2005). All aspects that result in the individual feeling better about himself, be it by pursuing goals for personal gain or by helping others, are considered to be well-being goals (Janssen, 2010). All other goals, that have no benefit to the individual himself, but are pure altruistic acts, are considered agency goals (Janssen, 2010). Whether a person is able to turn a functioning into an achieved functioning depends firstly

on whether the social context and individual means allow for pursuing this goal. If a goal is attainable, Sen (1999) calls this a capability resulting in a capability set, an opportunity set of achievable functionings. As soon as this person actually opts to fulfil this capability, which also depends on personal history and social influences, it turns into an achieved functioning. This full process has been illustrated by Robeyns (2006) (see figure 2.3).

Product design mainly focuses on improving well-being. However, design that encourages prosocial behaviour can also result in higher achieved agency. For instance a redesigned bike light that seduces by-passers to turn it off does not enhance the agency freedom, as with ordinary bike lights it is also possible to turn it off. Yet in this case it is more likely the achieved agency is higher: more people feel encouraged to turn off the light. In order to turn either of these freedoms into achievements however, not only the resources need to be provided, but also the individual must actually opt to use it. Kleine (2010) helps in understanding this process of choice, in creating a framework in which the user operates, which is discussed in the next section.

2.3.1 Achieving Development through Product Design explained by Kleine's Choice Framework

Achieving development through product design has great potential (Thomas, 2006). Kleine's Choice Framework (Figure 2.4) tries to make the CA operational by giving insight in the different steps that lead from designed products to development, and thus highlights the pitfalls (Kleine, 2010). Kleine (2010) uses the Degrees of Empowerment based on Alsop and Heinsohn's 'Process of empowerment'. It helps in understanding how users' choices influence the success of development. The four degrees that are differentiated are existence of choice, sense of choice, use of choice and achievement of choice. Understanding these dimensions of choice can help increase the adoption rate of product innovations.

Kleine (2010) explains the different dimensions as follows (see figure 2.4). The existence of choice links to Sen's definition of external capability, which is dependent on external institutions. It means that introducing a product alone is not enough, it should also be attainable by the envisioned users. Therefore the product should fit within the social structures and the user's agency such as financial resources, geographical resources and health. The second dimension, the sense of choice, describes whether people are able to grasp the full impact of the product on their lives and so if they are capable of weighing the benefits against the disadvantages. It also entails to what extent they understand what the main and side features of the product are. Based on the evaluation of the product the envisioned user can opt to acquire the product, which is entailed in the third dimension, use of choice. This decision also is based on the individual interests of the user. Finally the achievement of choice depends on the actual outcome. Here is determined whether the expectations match the actual use of the product, resulting in an achieved functioning. Here several issues could occur, such as misuse of the product so that the envisioned goals are not met or a misfit with existing products causing it not to be used at all. Yet even when the product is used properly it might not achieve the anticipated development. Kleine's Choice Framework helps especially in understanding the stages in which product innovations can become either a failure or a success.

Product designers generally are concerned with use and misuse surpassing the fact that all other dimensions of choices also need to be met. None of these choices can be tackled individually. In order to achieve successful innovation and development, all choices need to

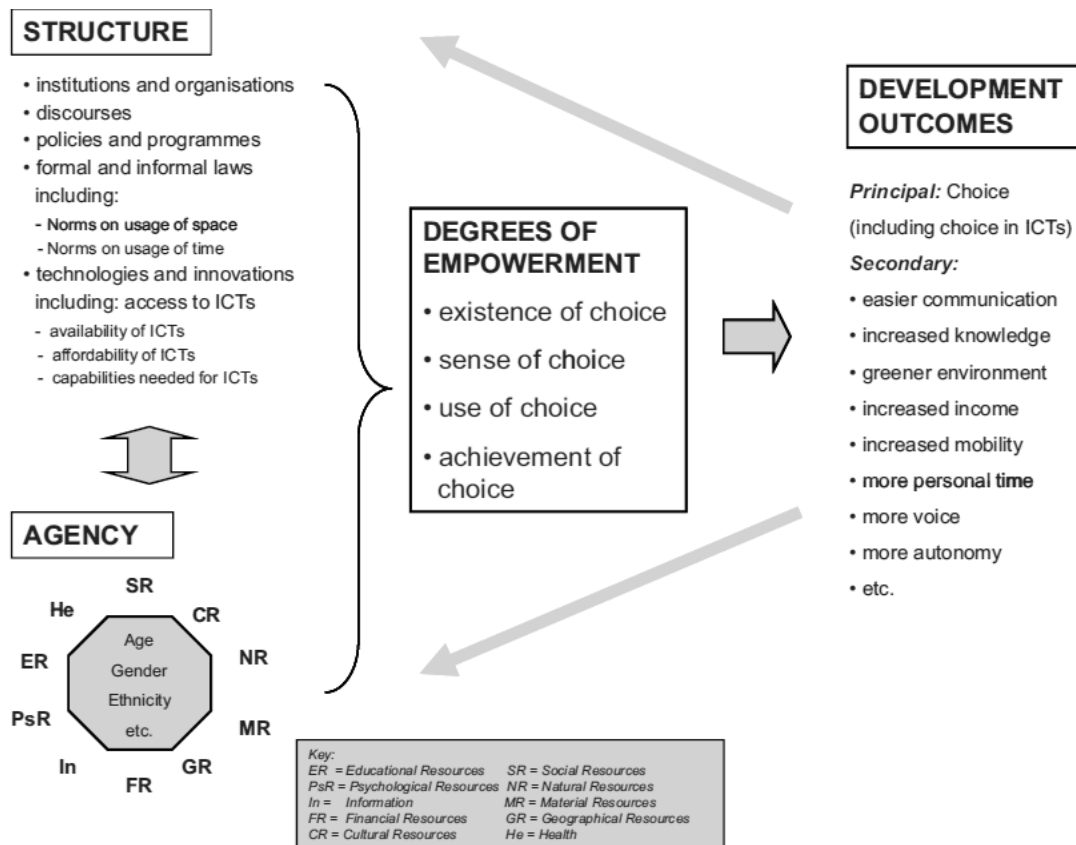


Figure 2.4: The Choice Framework (Kleine, 2010)

be considered in the design process. Getting a grip on the first three choices requires a deep understanding not only of the users' needs in terms of lacks of freedom, but also on their way of living, the underlying reasons that influence their thinking and the social structures that influences their decisions.

2.4 Understanding Individual Interests and Social Structures through Bourdieu's Concept of Habitus

One of the reasons it is difficult for designers from Western societies to design with emerging markets, is because a mismatch occurs in their cultural background. Bourdieu (1993) called this phenomenon the habitus. Bourdieu (1930-2002) was a French sociologist and a philosopher. In his work he aimed to show the relationship between the social structures, such as family, community, country, institutions and the reasons and characteristics behind individuals' daily rituals (Bowman, 2010).

The concept of habitus is used to explain why individual people behave different in the same situation. This habitus defines local intuitive actions and creates a joined perspective to evaluate the foreign world. It is, so he claims, what is usually perceived as common sense, but can be very different for various populations, since it has been created over time through shared memories of events. Bourdieu (1993) proposes it provides a population with a feeling of

solidarity and a combined sense of continuity as well as a common destiny. Bourdieu uses the metaphor of a game. The field and the rules represent the structures, which are subject to changes throughout time. The players represent all habitants, each fighting for their own position, accepting the rules of the game and thus strengthening the structures. However at the same time they play in their own personal way, shaped by an individual habitus. It is thus the combination of the shared history and the individual perception of or feel for it that defines an individual's interests.

The habitus withholds shared “beliefs, values, tastes, predispositions and common sense” (Bowman, 2010, p. 6). It explains what is experienced as normal and intuitive, what feels right. By understanding someone's habitus, one can understand the way his daily rituals work and the way he interacts with people, products and social structures. The concept is especially useful in the sense that it acknowledges the “contradictory goals” and “conflicting pressures” of individuals (Townsend, 2002, p. 3). This affects the choices that people make, like whether to make use of a product or not.

Respecting the concept of habitus by incorporating it into research design strategies has the potential to increase the adoption, satisfaction and success rate of product innovations (O'Shea, 1999). However the habitus as described by Bourdieu is only an abstract phenomenon and not much has been done to put the concept into practice (Dumais, 2002).

The link between the habitus and the CA including the Choice Framework feels natural, but can be better understood with the following visualisation (see figure 2.5). It depicts a person in his current socio-cultural context influenced by currently existing institutions, people and material. It also acknowledges the socio-cultural context throughout his history and how this has shaped his current ways of being, reasoning and acting, the habitus. The individual stands on an ever-existing crossroad of his life, full of opportunities. By choosing a specific direction, the individual chooses for a specific combination of capabilities, which he aims to turn into achieved functionings. Social structures influence the existence of that choice, the habitus influences the sense and use of choice. Whether the chosen direction actually lives up to the expectations depends on the individual and social structures. This entire organisation needs to be considered by product designers.

Product design can make a choice 'existent' by making certain facilities attainable to the user. Another way product design can have an impact on development is by helping people make the right choices so that they make use of choices already existent to them enhancing their achieved functionings and potentially open up more capabilities. This type of design is named persuasive or seductive design (Tromp et al., 2011). In both cases the designed product should fit the habitus and sustain all dimensions of choice in order for it to potentially be successful.

2.5 Operationalizing the CA

Even though the CA is a valuable framework, it does not offer a method for evaluating the freedoms a person has, let alone how to expand them (Chiappero-Martinetti and Roche, 2009). The difficulty is that it is almost impossible to measure a person's capabilities, because the introduction of a new product may seem to create extra freedoms, but due to socio-cultural circumstances it can still remain unavailable to a person and thus never become a functioning. Measuring the functionings also is unfair though, because an individual can also deliberately

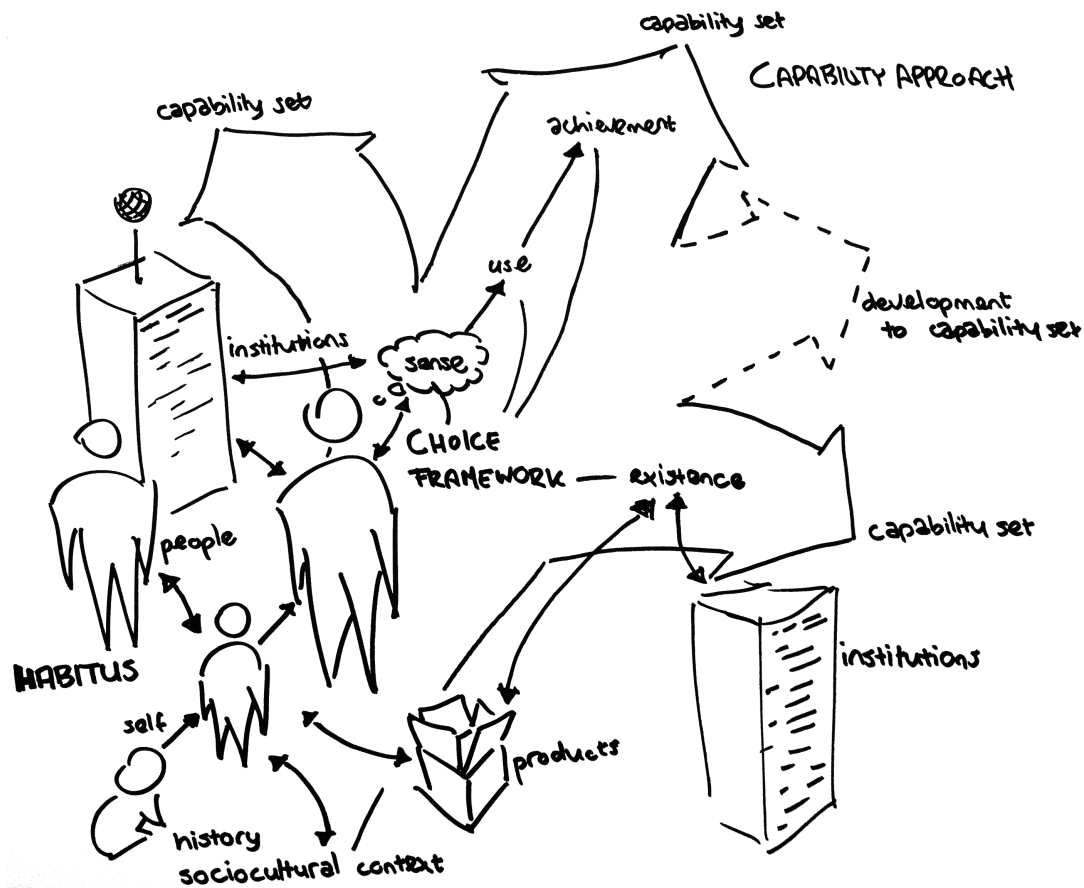


Figure 2.5: Visualisation Scheme of Habitus, Choice Framework and CA, 2012, *made by author*

choose not to make use of the offered freedom. Another issue is the development of the criteria that should be used. Sen has always refused to create a list, because he believes no universal list can be created and it should thus always be created involving the envisioned target group and depending on the core of the study (Alkire, 2007). Many agree with Sen it would be rather paternalistic to define for others what they should find valuable. However without creating a list all criteria depend on the opportunities people allow themselves to have. These may be limited due to their habitus, which causes people for instance to believe they cannot live without being oppressed. Nussbaum (2000) therefore did create a list, although she acknowledges it should always be evaluated with the local target group. Nussbaum argued the following ten capabilities should be used in assessing poverty and inequality: (1) Life, (2) Bodily Health, (3) Bodily Integrity, (4) Senses, Imagination and Thought, (5) Emotions, (6) Practical Reason, (7) Affiliation, (8) Other species, (9) Play, and (10) Control over one's Environment. However even with this predefined list, the CA still does not provide a way of evaluating these topics.

According to Sen (2003), people are responsible themselves to formulate their goals. He argued that development is only there to help to expand the freedoms of an individual so that he is able to pursue these goals (Sen, 2003). From this perspective it does not matter whether an individual's habitus has shaped his perspective in a way that withholds him from having certain dreams as it will not affect his sense of well-being (Sen, 1999). Every individual is en-

titled to his own beliefs and can decide for himself what he finds important. This shows again that providing resources and products are important to expand opportunities, yet whether they are successful from a developmental perspective always remains dependent upon personal, social and environmental conversion factors (Robeyns, 2006), the habitus (Bourdieu, 1988). For instance in sub-Saharan Africa PlayPumps were installed to introduce both a playing facility and decrease water-contamination (Mink et al., 2011). As Mink (2011) observed these pumps expanded the freedom for children to play, however for adults it was embarrassing to use and for elderly even impossible, yet they had no other option. The socio-cultural context was not well considered and thus the product, which was later redesigned, was initially no success.

Several attempts have been made to put the CA into practice. Many of them did not involve any empirical research but use existing or empirical findings and data sets (Robeyns, 2006). Because the data was not gathered from a capability perspective, these studies mainly focus on functionings, thus ignoring the individual's choice factor. Qualitative assessments have been empirically studied, by performing interviews with users and experts, ranking of functionings and group discussions (Robeyns, 2006). These studies however were all very open and unstructured and provide no method that allows for repetition in future studies or different areas. Anand (2005) did create a repeatable method by developing questions with multiple choice answers. The questions and answers, derived from an existing survey developed for British households, each represented a certain value in one of the capabilities based on Nussbaum's list. His questions allowed for quantitative research, but they also had a highly paternalistic character due to the values connected to the predefined answers. Therefore it was only applicable in societies close to the developers of the questionnaire as their view of a good life based on their habitus was incorporated into the questions and the answers. This did not obstruct Anand's research, as it was performed in England, Scotland and Wales (Anand et al., 2005), yet might cause problems when it is expanded to other regions of the world. Up to this moment no universal method to operationalize the CA has been developed.

2.6 Operationalization of the CA and the Field of Product Design

This philosophical, sociological approach is not well-known in the designer's world. This is no surprise as it is very difficult to translate this philosophy into working evaluative criteria. Aspects as efficiency or usability, generally used in design evaluations, are easier to evaluate than happiness or sense of self-determination. The CA however is valuable in the sense that it challenges the researcher to create a list of relevant human capabilities in collaboration with the envisioned users (Sen, 2003; Nussbaum, 2001). Several scholars have attempted to make the CA operational and created different lists, which allow for evaluation and reconsideration (Alkire, 2007). By probing people with questions of many different topics and asking them to reflect upon those topics it can give rich insights in their habits, freedoms and values, as well as underlying reasonings.

The CA can be used both in an evaluative way and in a prospective way by designers. Prospective here means that the CA can be used to create a mapping of the possible impact product innovation can have taking into account existing structures and habits. The CA can offer a way to uncover true needs, which is potentially more useful than traditional methods as it widens the designer's perspective and aids the designer to look beyond the initial and direct usage of a product. After the introduction of a product which is considered successful, mean-

ing it has been accepted and incorporated in the local ways of living, designers can use the CA to evaluate the impact. This impact is used to determine the actual success of a product innovation from a human perspective by identifying expanded human capabilities. In order to do so a practical framework is necessary to make the CA usable for designers.

This thesis work aimed to develop such a framework. In order to make a universally applicable framework, no presuppositions or judgments can be incorporated. For it to be useful for design researchers, no philosophical background knowledge should be required. A variety of users of whom many have not had any education needs to be able to understand it. Also it should allow for repetition providing both quantitative and qualitative data that can be used to compare. The challenge of developing this framework is that for it to be usable, it should be immediately applicable by product designers without prior training.

CHAPTER 3

METHOD

3.1 Introduction

3.1.1 Integration of the CA in a Research Tool for Product Designers

As discussed in chapter 2 incorporating the CA in an evaluation framework for product designers gives them the possibility to effectively identify true needs in emerging markets. Since operationalizing the CA is mainly done from an evaluative perspective, a first step is to explore whether the CA can be of use in evaluating product design to generate insights for a prospective use (Mink et al., 2011). Mink et al. (2011) studied two implemented product innovations theoretically which provided useful insights, but insights from practice might generate more insights (Mink et al., 2011). Field researchers who evaluated development through product innovation in the field, used unstructured interview methods that were developed on-site and are not easily repeatable without foreknowledge of the CA. Therefore these methods are of little use to product designers (Janssen, 2010; Boni et al., 2010). There is a clear need for a product evaluation framework to identify enhanced capabilities both on a personal and sociological level. This chapter aimed to develop such a tool in order to find out if applying the concept of habitus and the CA works for product designers so that it can later also be integrated into a prospective tool.

3.1.2 Aim

The aim of this study was to create an evaluative framework to extract achieved and valued capabilities and sociological implications as a result of product innovation in emerging markets. This evaluative tool was tested in a case study on the Philips Chulha, a stove developed and implemented in India, in respect to its impact on the users and the community. A close look was also taken at the used design process. Based on the experiences from the case study recommendations were formulated on how to improve the effectiveness of the Chulha. Also the effectiveness of the evaluative tool was discussed and suggestions for improvement were done, including recommendations on how to turn this into a prospective tool for product designers.

The main research question was “How can the Capability Approach successfully be integrated into an evaluative framework for product designers to measure the impact of product innovations in emerging markets?”.

3.1.3 Research Design

Five pilot studies were performed to develop the framework (see figure 3.1). In the first pilot study the general set-up was tested with two participants in The Netherlands, in which the capability domains and questions relevant to the field of product design were determined. The second pilot study, with two different participants in The Netherlands, focused on improving the interview questions and creating quantitative data as outcomes. The third pilot study was executed with a single participant in the actual context, India, with an interpreter and all the envisioned interview materials in order to identify relevant cultural differences. A refined interview flow was tested in the same region with four participants in study four. For the fifth pilot study the sensitizers were evaluated with five participants in a different region in India. These studies resulted in the development of a tool in the shape of a cross-cultural communication tool box.

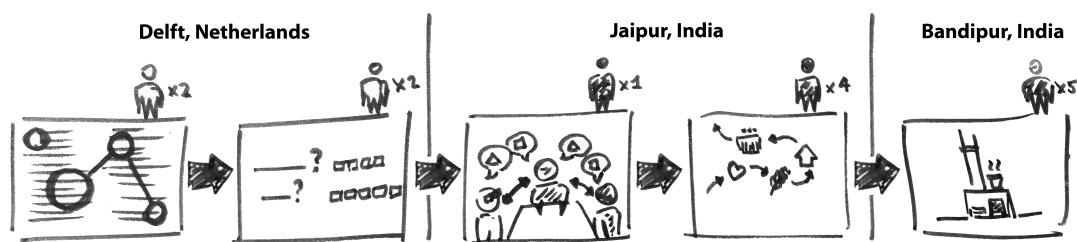


Figure 3.1: Visualisation of Five Studies Performed to Develop Framework, 2012, *made by author*

This sixth study was a case study on the impact of the Philips Chulha. In this research an explorative, empirical case study on the impact of an actual product was chosen in order to find out whether an actual link between capabilities and product innovation could be found using the developed framework. Also the possible role of Bourdieu's concept of habitus and Kleine's Choice Framework in this framework were evaluated. One-to-one interviews were used for execution of the research. Questionnaires would have allowed for larger numbers of interviewees and easily analysable data, but was not an option due to high amounts of illiteracy of the envisioned target group (Gawler, 2005). Furthermore interviews had the possibility to provide deeper and richer views into behaviours, reasoning and personal lives since straightforward answers were not anticipated and gave the opportunity to inquire about other stakeholders (Bowman and Crews, 2009). The interviews were semi-structured to enable a free and open dialogue with the participant (Bowman and Crews, 2009).

3.1.4 Defining Categories and Questions

For the field of product design a list of relevant capability domains had not yet been created. In order to measure the impact of a product innovation, a predefined list with key topics to be discussed throughout the interviews can be highly beneficial (Larsen and Flensburg, 2011). In order to create a list of capability domains relevant to the field of product design all lists mentioned by Alkire (2005) were combined in one complete list. This list contained both abstract phenomena, such as leisure or freedom (Max-Neef et al., 1989) and very specific activities, such as having food and work (Narayan et al., 2000).

This complete list was discussed in a focus group of the author and his supervisor, respectively a Master student and PhD student at the faculty of Industrial Design Engineering, both familiar with the CA. The topics mentioned in the lists were categorized. Each category was labelled and the question “To what purpose would one want this?”, was asked. In the case of ‘educational resources’ it was for example possible to answer this question with ‘education’, indicating the educational resources are the means to a higher end, education, and thus no capability domain in itself. This was continued until one list of fourteen capability domains was created (see figure 3.2). The defined list of capability categories was categorized in

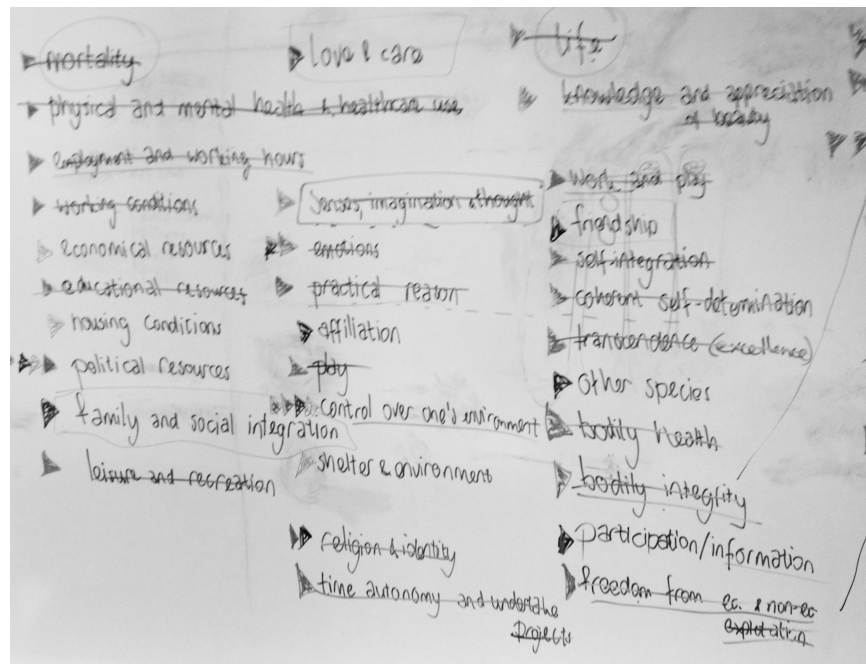


Figure 3.2: Impression of Brainstorm Session to find Capability Domains, 2012, *made by author*

Body (physical being), Mind (mental being), Activities (doing) and Social Context (social being). Product design examples that could improve a person’s living condition for every capability category to show the relevance of these capability categories for product designers, can be found in table 3.1.4. For a detailed description of all domains, see appendix E. The categories support the structure of the interview, yet are of course also mutually dependent (IDEO, 2011), as is depicted in figure 3.3.

In order to capture the impact of product innovation on these categories questions have been developed mainly using Nussbaum’s (2001) definitions and Anand’s (2005 & 2009 & 2010) questions. Introductory questions were asked first, such as “What do you eat in the morning, afternoon and evening?”¹ followed by more personal deeper questions such as “Do you have sufficient food to feed your family?”. This was done in order to avoid overwhelming the participant (IDEO, 2011). These questions were not meant to be final, but to be used as a basis for the first pilot study.

¹ From category Nutrition

Table 3.1: Eleven Identified Capability Domains

BODY	MIND	ACTIVITIES	SOCIAL CONTEXT
Life <i>incubator</i>	Health <i>mattress</i>	Political <i>radio</i>	Acceptance <i>community centre</i>
Health <i>smokeless stove</i>	Education <i>light</i>	Meaningful work <i>agricultural equipment</i>	Integration <i>games</i>
Safety & security <i>house</i>	Self-awareness <i>books</i>	Mobility <i>bicycle</i>	Recognition <i>games</i>
Self-determination <i>chatbox</i>	Self-determination <i>pepper spray</i>	Leisure <i>street bench</i>	To be cared for <i>mobile phone</i>
	Identity <i>church</i>		To care for others <i>mobile phone</i>

3.2 Pilot I. Creating the General Set-Up

3.2.1 Piloting the Interview Set-Up

The first study was based on an experimental method that tried to evaluate whether the defined capabilities worked to get in-depth information from participants concerning changes in their life over the past three years. It was not linked to the acquisition of a product yet in order to avoid the product experience overshadowing the evaluation of the tool. Sensitizers were used to start off the interviews, since gathering much personal information is known to have the potential to scare off the participant (Gawler, 2005). Sensitizers are tools used in research design practices to provoke participants to think about their life and the changes that have occurred in the previous years (Gaver et al., 1999). By using sensitizers that were linked to the categories, the interviewer could make use of them to ask more in-depth questions during the actual interview part (see figure 3.4).

Two interviews were conducted, one by the author and one by the daily supervisor of the author. Two people close to the interviewers were asked to participate. They were chosen because they would be open enough to share personal information and because they would take their time to evaluate the pilot study with the interviewer afterwards. This number was large enough to get a first impression on the effectiveness of the method.

After conducting the interview the participants were asked to evaluate the interview together with the interviewer.

3.2.2 Description of the Interview Session

Participants were given prepared sensitizing sheets after the main aims of the pilot were explained. On the sheets they had to draw a picture of themselves and describe or draw mappings of their house, family, friends, household and environmental context. They also had to draw their daily and weekly rituals on timelines (see figure 3.5). This was used as an icebreaker to open up the interview and also as a way to already discuss the personal contextual changes and needs of the participant without firing many questions at the participant such as is done in

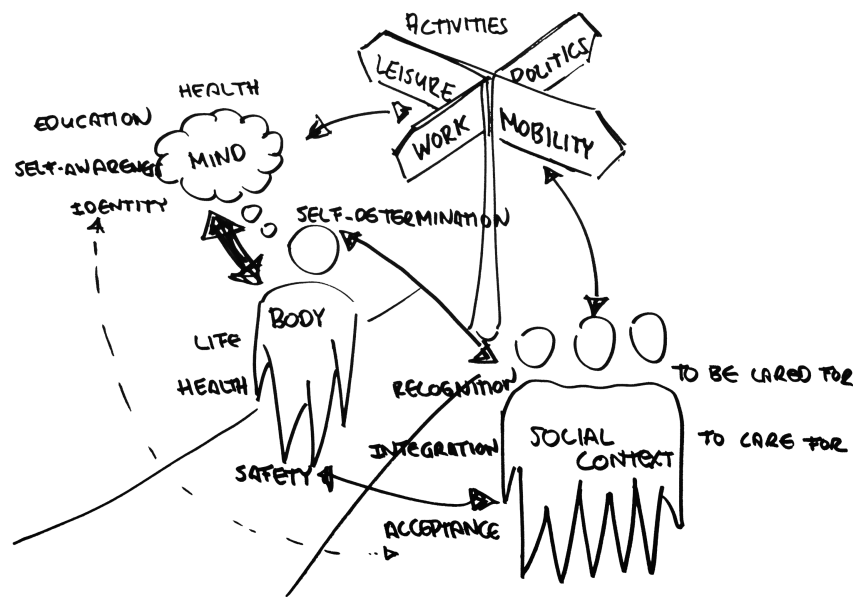


Figure 3.3: Visualisation Capability Categories, 2012, *made by author*

traditional interview methods (Larsen and Flensburg, 2011). Mappings especially were useful in detecting community relations, networks, power structures and perceptions of the community in order to stimulate the discussion or finding other stakeholders (Larsen and Flensburg, 2011; Gawler, 2005). The timelines were capable of encouraging reflection and organizing thoughts of the participant (Gawler, 2005), and it gave insight for the interviewer in daily activities, products used, resource flows and existing challenges (Larsen and Flensburg, 2011). Both helped in removing assumptions and showing existing social and inner relations (IDEO, 2011). The information participants shared during sensitizing phases were not used for the analysis, but functioned purely as a way to inspire the participant and allow for a more open interview setting (Gaver et al., 1999). The sensitizers remained clearly visible to both the participant and the interviewer during the rest of the interview.

Answer sheets were also prepared per capability category on which the participant could write down the answers on the questions (see figure 3.6). The questions were asked verbally both in respect to the current situation and that of three years ago. Wherever possible the created mappings and timelines were used. The fourteen categories developed in the focus group entailed over eighty questions which was expected to be too overwhelming for the participants. Therefore the categories were merged into a total of eleven categories² (see figure 3.7). The semi-structured nature of the interview prescribed a dialogue which justified skipping certain questions and asking further wherever necessary (Hart and Simanis, 2008). Questions were either removed or joined into more general questions. Since it was argued paternalistic influence should be minimized, it was left up to the participant to decide what he found valuable (Alkire, 2005). For every category the participant was asked to indicate the importance on a Likert scale from 0 (not important at all) to 7 (very important). The rankings were used, because in the final interviews they would be able to be used to show what people value and how this differed between individuals (Larsen and Flensburg, 2011).

² (1) Health, (2) Nutrition, (3) Accommodation, (4) Education, (5) Meaningful work, (6) Leisure, (7) Mobility, (8) Friends, (9) Beliefs, (10) Partnership and (11) Safety

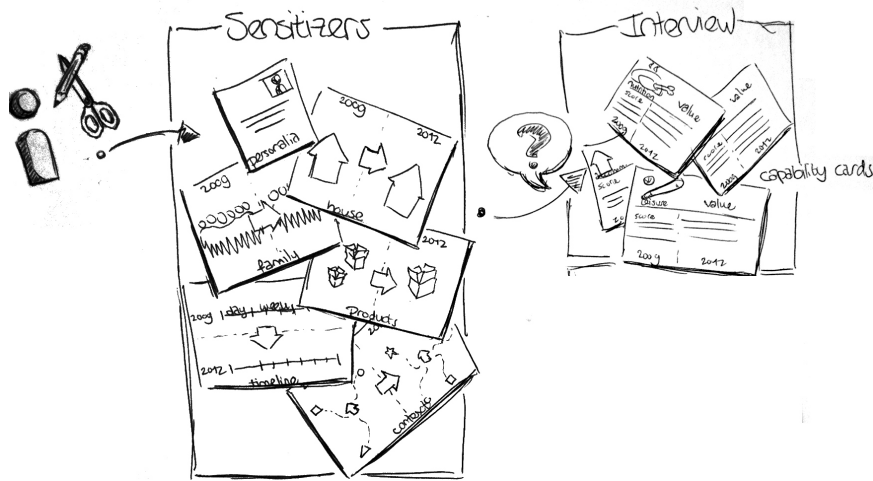


Figure 3.4: Visualisation Interview Flow Pilot 1, 2012, *made by author*



Figure 3.5: Impression of Pilot 1. Filling in Sensitizers, 2012, *made by author*

3.2.3 Evaluating the Set-Up

Based on the two interviews the interview was evaluated in consultation with the participants. The participants gave feedback on the sensitizing sheets, the questions and the ranking exercise as well as an over-all evaluation. These evaluations were discussed and compared by the two interviewers to define relevant findings. The relevant findings are followed by suggestions for improvement.

The participants felt encouraged to share information while drawing on the sensitizing sheets, especially when specific questions were asked regarding their drawings. Throughout the interview more and more elements were added to the sensitizing sheets creating rich insights into the participants' contexts. The sensitizing sheets did leave a lot to the interpretation of the interviewee, which incidentally made the participants insecure about what they should draw. This may have been because they were given too much freedom (IDEO, 2011). It was unclear for the interviewer how to help or assist without colouring the outcomes. Unchanged situations were of interest to the interviewer as it shaped a better understanding of the habitus

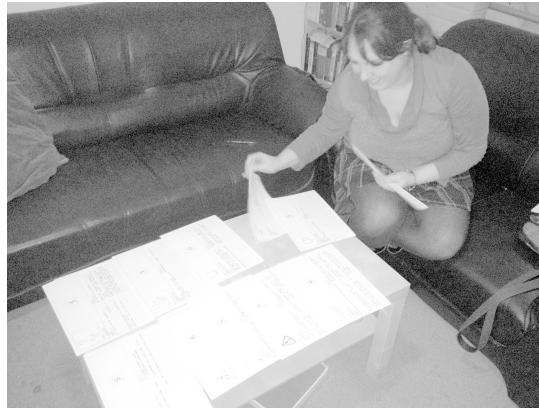


Figure 3.6: Impression of Pilot 1. Sorting Answer Sheet with Capability Domains, 2012, *made by author*

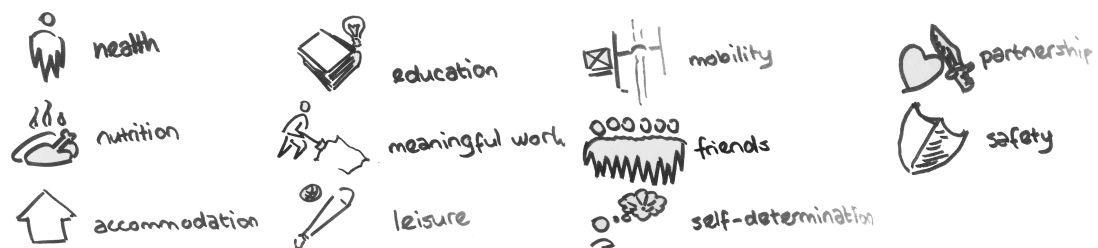


Figure 3.7: Visualisations Capability Categories Pilot 1, 2012, *made by author*

of the participant, yet participants were reluctant to draw everything twice and rather focused on the changes.

All questions could be asked due to the personal bond between the interviewer and the participant, yet quite a few questions needed revising for several reasons. First of all when a topic was very unstable in the participant's life, thus just picking two points to indicate the change not always reflected the changes they had experienced. The interviewer then asked all the questions verbally which the interviewee had to answer for the current situation and the situation three years ago. Also not for every capability category underlying reasons were asked through the questions, which is why it was always important to inquire about explanations for answers. More specifically questions such as "Do you ever go far away?"³ could not be asked for three years ago since a time element was already included in the question itself, so they had to be changed. Some questions enquired about factual capabilities, such as "Are you able to have children?"⁴ whereas other questions better took the participant's perception into account, such as "Do you feel you have sufficient spare time?"⁵. The second question was preferred as it left more up to the participant what he felt to be sufficient, rather than the interviewer defining beforehand what he should find aspirational (Alkire, 2005), in this example the ability to have children. Personal questions, such as "Even if you don't need or have never needed any of the following, are you prohibited from using contraception, abor-

³ From category Friends

⁴ From category Health

⁵ From category Leisure

tion or infertility treatment for any reason (e.g. religious beliefs, family pressure)?”⁶ were answered truthfully, yet evaluated by the interviewees as too personal and inappropriate for an interview where the interviewer is not close to the participant. In order to generate insight into these sensitive topics, the format of these questions could be changed to a third person perspective, for example “Do you think people in this community feel prohibited from using contraception, abortion or infertility treatment?” (Fowler, 2009). The mentioned questions are only a few examples, but based on these findings all questions could be properly revised.

In ranking the categories on importance participants expressed difficulty. From the participants’ perspective most of the categories were important and it was unclear whether the ranking should reflect their aspirations or whether it already had a high priority in their lives. Currently achieved priorities are already fulfilled, even though they remain of high importance to the participant. Aspirations are of greater interest, because they reveal possible design opportunities (Larsen and Flensburg, 2011). Participants should express their aspirations whenever they feel like it during the interview. For the ranking exercise however, participants should rank the importance on their existing priorities.

Filling out all the forms turned out to be time-consuming. This was not considered an issue according to the participants. A long interview was also necessary considering the purpose of the interview was meant to gain insight into the mental world of the participant and to understand his daily habits and reasonings as well as his possibilities. Such rich insights cannot be obtained in short interviews because people generally don’t spend their days reflecting upon their lives (McCracken and McCracken, 1988). Participants thus need time to activate their introspective abilities.

3.3 Pilot II. Improving the Interview Questions

3.3.1 Reflecting upon Questions and Adding Scales

The second pilot aimed to reflect on the questions and quantifiable answer scales, which, as mentioned earlier, were based on Anand’s (2005) scales. In order to focus on the questions, only the second part of the interview was tested, without the sensitizers (see figure 3.8). Two interviews were conducted, one by the author and one by the daily supervisor of the author. Two people close to the interviewers, different than the ones used in the first pilot, were asked to participate.

During the case study research rural women in India were interviewed. It was anticipated that their husbands would also want to be present during the interviews. For pilot 2 both participants had partners, who were asked to attend the interview to evaluate whether the presence of an audience would affect the participant (IDEO, 2011). This influence would probably not be the same as the influence of a husband present in India, but it could give an indication of potential problems.

After conducting the interview the participants were asked to evaluate the interview together with the interviewer.

⁶ From category Beliefs



Figure 3.8: Visualisation Interview Flow Pilot 2, 2012, *made by author*

3.3.2 The Interview from Open to Quantifiable Answers

For every category the interviewer started by asking introductory questions. These questions had been added to help the participants to introspect (IDEO, 2011). The category 'Beliefs' was separated into 'Beliefs', describing political, cultural and religious beliefs and 'Self-awareness, self-determination and self-expression' in order to get better insight in the individual and social habitus. After the introductory questions the capability questions were asked. In order to quantify the changes, answer scales were added to all questions. Every question was first asked open and then narrowed down to one of the options on the scales. This was all done verbally without providing the interviewee with an overview of the possible answers, because the envisioned participants for the case study research were likely to be illiterate.

For every category the participant had to answer whether their personal circumstances fluctuated or were generally stable per capability category. Participants were also asked to rate the importance.

3.3.3 Evaluating the Questions and Answer Scales

During the interview three challenges were identified. These were the order of the questions, the formulation of the questions and the differences between the scales. For each of these challenges solutions were suggested for implementation in the next pilot.

The order of the categories was evaluated as random and incoherent. Due to the fact no material in the form of sheets was used in this interview the interviewee did not know what to expect next. This made it difficult to create a framework within which the questions should be answered. An answer sheet describing the different categories was added to help to visualize the interview structure for the interviewees.

Participants were sometimes asked to make comparisons with other people such as "Do you

ever feel lonely compared to other people of your age?”⁷, whereas others were asked without this comparison, such as “Do you feel you have sufficient spare time, in which you can decide what to do?”⁸. Comparing with others should not be necessary since the capability approach focuses on the aspects of life an individual has reason to value to be or do (Sen, 2003). These comparisons were therefore removed from the questions. Participants had difficulty understanding the scales. Some asked participants for a comparison between now and usual⁹, for example concerning stress levels. Other questions were about the adequateness of a certain life aspect¹⁰, for example concerning accommodation. Some questions even had a scale completely specified¹¹ to one question, for example concerning the obtaining of a home. Participants considered this to be confusing and experienced difficulty to give proper answers. Besides that the answers were predefined which was partly paternalistic. The questions were therefore all adjusted to whether the participant experienced a certain life aspect to be sufficient.

Besides these challenges one important life aspect was identified as missing from the interview. There were no inquiries towards social status and appreciation in day-to-day activities. The category friends covered some social aspects, yet not acceptance, appreciation, recognition in order to feel dignity as an end in itself, rather than a part of friends. This category was also used by other scholars who operationalized the CA, among others (Andrews, 1974; Allardt, 1993; Rokeach, 1973).

3.4 Pilot III. Adjusting the Tool to Indian Context

3.4.1 Changing Location to Jaipur Foot Organisation

A third pilot was conducted to find out whether the tool would work in an emerging market. Due to cultural differences this could have an effect on the tool. It took place in Jaipur, India (see figure 3.9), at Jaipur Foot Organisation (JFO). At JFO a year ago another student of Delft University of Technology had performed his graduation project, which meant they were open to foreign researchers. JFO provides foot prostheses free of cost for all those in need. All expenses are funded by donations and government support. Most beneficiaries are uneducated and would be unable to pay for a prosthesis.

One interview was conducted in this pilot. Present during the interview were the two interviewers, the interpreter and the participant. A participant who came for his second prosthesis was selected in the waiting room. Beneficiaries who came for their first prosthesis naturally had not had any experience with the prosthesis and were thus excluded, beneficiaries who came for their third prosthesis were considered to be less likely to be able to remember the initial impact of the prosthesis. After interviewing the first participant it became clear many adjustments needed to be made to the interview, which is why no more interviews were conducted as part of pilot 3.

⁷ From category Health

⁸ From category Leisure

⁹ Yes, more so than usual - Yes, same as usual - Yes, but less than usual - No

¹⁰ Inadequate, hardly liveable - Inadequate, too small - Adequate, minor complaints - Adequate, completely satisfactory

¹¹ Own money - Shared with partner - Shared with other occupant - Loan - Parents bought it - Partner bought it



Figure 3.9: Map of India, 2012, *obtained from <https://maps.google.nl/>*

3.4.2 Testing Sensitizers and Questions without Paternalistic Judgment

Based on the results of pilot 1 and 2 the flow of the interview had changed. The sensitizers were replaced to save time. The questions were adjusted according to the comments. This lead to a slightly different interview flow (see figure 3.10).

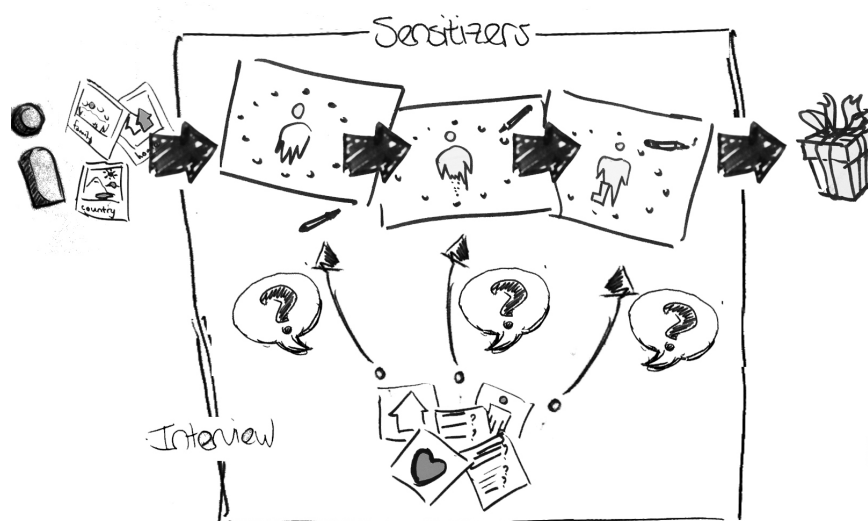


Figure 3.10: Visualisation Interview Flow Pilot 3, 2012, *made by author*

The interview started with the interviewers explaining their background and intentions and showed pictures of themselves, their family, hometown and country to make the participant feel more at ease and allow for a more open dialogue (Larsen and Flensburg, 2011). The purposes of the interview were thoroughly explained. This introduction had as a secondary role to get used to communicating through the interpreter (Larsen and Flensburg, 2011). Some questions regarding the prosthesis were asked to start the interview.

Due to the time-consuming sensitizing phase in pilot 1 a new sensitizing exercise was tried. Instead of using different sensitizing sheets that were used to create mappings of the changes of different aspect of his life, three identical sensitizing sheets were used all with visualisations of every capability category¹². to indicate how many question categories there were (see figure 3.11). The participant was asked to draw mappings of his life while answering the questions related to the categories: (1) before the amputation, (2) before receiving the prosthesis and (3) after receiving the prosthesis.

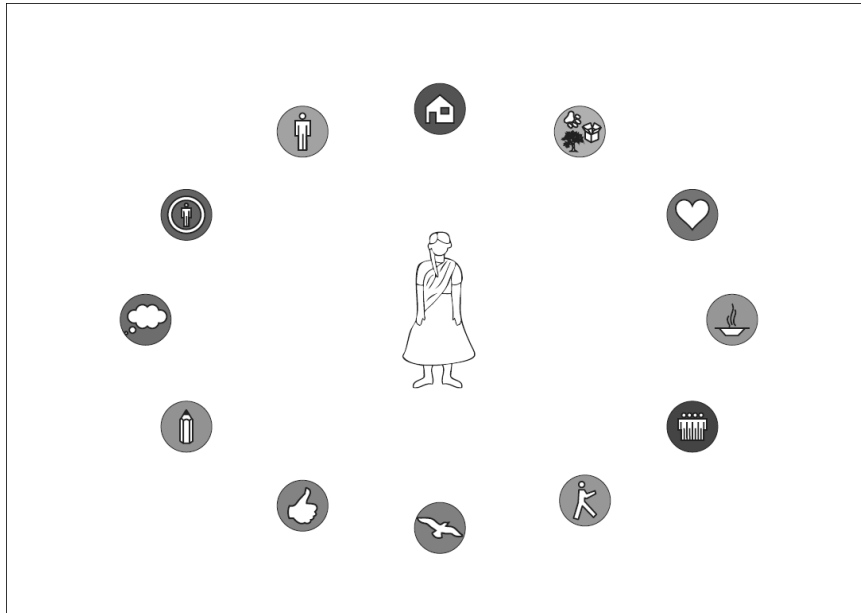


Figure 3.11: Sensitizing Sheets Pilot 3, 2012, *made by author*


The three sensitizing sheets were explained and the participant was given the first sheet and several markers. All questions were then asked one category at a time. The order of the questions was chosen carefully in order to not start with the most sensitive questions but start with the easiest ones and smoothly go from one category to the other to create a pleasant dialogue rather than a cross examination (IDEO, 2011). However the interviewer kept the freedom to skip categories to go to another and come back to it later if the situation seemed suitable for that. For every capability category a question card was created, with the visualisation of the category depicted on the back corresponding to the visualisation on the sensitizing sheet to show the link between the sensitizer and the questions (see figure 3.12¹³). All questions were restated to the format “Do you feel...”. The semi-structured nature of the interview still allowed for factual questions, but it was left up to the participant to judge the sufficiency based on his own perception. The scales were changed to similar five-point formats¹⁴. To each answer a value was connected from 0 to 4. Due to anticipated unfamiliarity of the participant with scales and the complexity this would entail the participant was not asked to indicate this himself but filled in by the interviewer based on qualitative answers.

The list of questions was extended with introductory questions since the questions derived

¹² Around the clock, starting at the top: Accommodation, Attachment, Family, Nutrition, Friends, Mobility, Leisure, Meaningful Work, Education, Self-Determinations, Safety and Health

¹³ Example of Nutrition

¹⁴ Yes, completely - Yes, mostly - Neutral - No, hardly - No, not at all



Nutrition

1. Do you feel you have sufficient food to feed yourself?
 Now Yes, completely (4); Yes, mostly (3); Neutral (2); No, hardly (1); No, not at all (0)
 Before product Yes, completely (4); Yes, mostly (3); Neutral (2); No, hardly (1); No, not at all (0)
 Because _____

2. Do you feel you have sufficient food to feed your family?
 Now Yes, completely (4); Yes, mostly (3); Neutral (2); No, hardly (1); No, not at all (0)
 Before product Yes, completely (4); Yes, mostly (3); Neutral (2); No, hardly (1); No, not at all (0)
 Because _____

3. Do you feel you can enjoy a meal whenever you need one?
 Now Yes, all the time (4); Yes, often (3); Neutral, sometimes (2); No, hardly ever (1); No, never (0)
 Before product Yes, all the time (4); Yes, often (3); Neutral, sometimes (2); No, hardly ever (1); No, never (0)
 Because _____

4. Do you feel you can eat enough meat, chicken or fish?
 Now Yes, completely (4); Yes, mostly (3); Neutral (2); No, hardly (1); No, not at all (0)
 Before product Yes, completely (4); Yes, mostly (3); Neutral (2); No, hardly (1); No, not at all (0)
 Because _____

5. Do you feel you can eat enough vegetables?
 Now Yes, completely (4); Yes, mostly (3); Neutral (2); No, hardly (1); No, not at all (0)
 Before product Yes, completely (4); Yes, mostly (3); Neutral (2); No, hardly (1); No, not at all (0)
 Because _____

Importance 1=Very unimportant; 2=Unimportant; 3=More unimportant than important; 4=Neutral;
 5=More important than unimportant; 6=Important; 7=Very important

Figure 3.12: Capability Card of Nutrition used in Pilot 3, 2012, *made by author*

from Anand's list (Anand et al., 2009) were of a personal nature and quite complex. The introductory questions replaced some of the capability questions. They could also help warm up for the actual questions (IDEO, 2011).

The questions were repeated for the second and third sensitizing sheet in order to find out where changes had occurred. Afterwards the participant was asked to use the question cards to rank the categories according to their importance.

The interview ended by thanking the participant and asking whether he wished to share more information. To thank the participant, he received a small set of ceramic clogs, typical to the home town of the interviewers (Larsen and Flensburg, 2011).

3.4.3 Evaluation of the Flow of the Interview

Several issues occurred during the interview. Some were related to the new interview setting including an interpreter and some related to the new interview flow. Most important was that the interview took too long. For all challenges recommendations have been formulated.

The interview material was experienced as messy and overwhelming. Because only a glass door separated the interview room from the waiting room, other beneficiaries followed the interview from outside. This may have affected the interviewee (IDEO, 2011). The surroundings can influence the participant, so a quiet and spacious interview room should be selected for the remaining interviews.

The interpreter had a big influence. The introduction was not fully translated causing the interviewee to feel confused about which answers to provide (Larsen and Flensburg, 2011). The interviewers tried to persuade the interpreter to give the introduction, but he made it clear he found it unnecessary and the interviewers folded. The interpreter should be better instructed to make him understand his role in the interview.

Due to a lack of instructions, the interpreter required explanations of the questions during the interview. The interpreter sometimes expressed surprise as a response to the questions asked, which may have been reflected in the answers the interviewee provided. The interpreter felt the need to give examples, for example in health-related questions such as “Do you feel your health limitations obstruct you in your day to day activities?”¹⁵. The interviewee was directed towards these examples (Gawler, 2005). This may have been due to cultural differences. The interpreter could find the questions too vague or personal. Questions should be reconsidered and formulated in an easy unambiguous way to avoid misinterpretation.

The participant was reluctant to draw while answering the questions. He only drew a blueprint of his house (see figure 3.13). The visualisations of the categories were unclear to the participant and therefore caused confusion instead of support. His expression showed shyness and confusion rather than being empowered. In order for the sensitizers to work the drawing needs to be more collaborative. One of the interviewers can draw while the other asks the questions (IDEO, 2011; Larsen and Flensburg, 2011).



Figure 3.13: Overview Results Pilot 3, 2012, *made by author*

¹⁵ From category Health

The interview took two hours, which was experienced as way too long. The participant lost his concentration and interest in the interview, decreasing the value of his answers. Having to go through all the questions three times was experienced as tiring by both the interviewee and the interpreter. The interview flow should be adjusted so that the interviewer only has to go once through all the questions in order to save time.

3.5 Pilot IV. Reducing the Interview Length

3.5.1 More Interviews at Jaipur Foot Organisation

During the fourth pilot four interviews were conducted at JFO. All the participants were at JFO for their second prosthesis (see figure 3.14). The aim of the fourth pilot was to shorten the length of the interview without losing valuable information, yet keeping the interviewees focused. This was done by asking a question and then ask about the differences per situation¹⁶, rather than asking every question three times in every situation. This resulted in a similar, yet slightly different interview flow (see figure 3.15).



Figure 3.14: One of the Participants at JFO in Pilot 4, 2012, *made by author*

The second aim was to better instruct the interpreter to diminish his influences.

3.5.2 Interviewing per Capability Category

The participant was presented with three sensitizing sheets: (1) before the amputation, (2) before receiving the prosthesis and (3) after receiving the prosthesis. These sensitizing sheets no longer displayed the visualisations of the categories, to avoid confusion (see figure 3.16).

¹⁶ (1) Before amputation, (2) After amputation, before prosthesis, (3) After prosthesis)

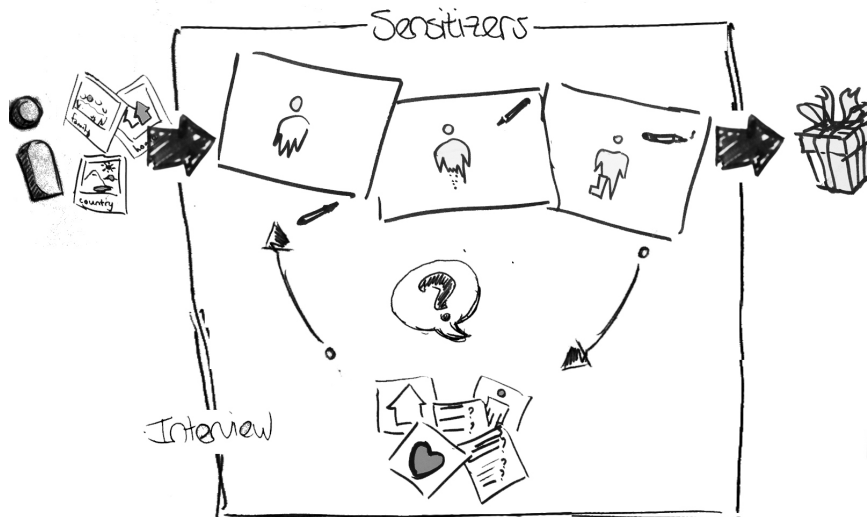


Figure 3.15: Visualisation Interview Flow Pilot 4, 2012, *made by author*

One of the interviewers visualised the answers of the participants on these sheets visible for the interviewee. This made it fun, interactive and enjoyable without demanding too much from the participant (Larsen and Flensburg, 2011; IDEO, 2011). Also the drawings worked as a way to inspire the interviewee more and as a mnemonic for the interviewer (Gawler, 2005).



Figure 3.16: Location and Set-Up Pilot 3 and 4, 2012, *made by author*

All interview questions were asked once. After asking the question, the interviewer would point at the first sensitizing sheet, before amputation, and after having received the answer, he would inquire the same in relation to the second situation, after amputation, and then the third sensitizing sheet, after acquisition of the prosthesis. Wherever changes had occurred,

the participant would be asked to explain underlying reasons.

3.5.3 Evaluating the New Interview

New challenges were discovered with the new interview flow. Some of these were still related to the interpreter, others to the questions and the material of the interview. Wherever necessary, recommendations were formulated to solve the issues.

First the interpreter was unwilling to listen to the instructions and therefore the same implications occurred as in pilot 4. The interpreter translated the introduction again not properly. This caused one participant to attempt to leave several times during the interview. It is impossible to fully assess his influence, since his dialogues with the interviewees were mainly in Hindi. It was obvious however that he used assumptions and examples in his translations and that he translated only part of the interviewees' responses. Sometimes he even answered the questions without asking the participant. The interpreter was impatient and rushed the interview. This probably caused participants to share fewer stories (Larsen and Flensburg, 2011). It could be beneficial to take the interpreter apart beforehand and instruct him by going through the questions together (IDEO, 2011).

Second questions were still difficult to understand and the amount of questions seemed to overwhelm the participant. Underlying reasons were not always uncovered, as not every participant was capable of expressing them. This caused the interviews to generate answers with different levels of richness, yet all provided useful data from a capability perspective. The semi-structured nature of the interview allowed the interviewer to change the order or content of the questions during the interview which kept the dialogues pleasant (Gawler, 2005).

Having one of the interviewers draw worked, despite the fact that it was time consuming. The drawings worked well to check the answers and to encourage the participants to elaborate on their stories. It fulfilled both the function of memory and reference for the interviewer. However the participants seemed not much involved in the drawing, losing the collaborative process that was aimed. This was meant to create a more lively interview and stimulate the participants (Gawler, 2005; IDEO, 2011; Larsen and Flensburg, 2011). Shifting between the sensitizing sheets and the situations they represented for every question also caused confusion because the participants had trouble differentiating situation 1 (before amputation) and situation 2 (after amputation, before prosthesis). This third challenge could be solved by creating premade generic visualizations. The participant would then only have to put them on the sheet. This could also increase his understanding of the interview set-up (Larsen and Flensburg, 2011).

Ranking the capability categories caused a fourth difficulty with the participants because they could not recall what the visualisations represented. Remembering eleven categories turned out to be very challenging, so only the most important ones were selected. Providing them with a visual ranking scale could help here.

Over-all participants experienced the interview as enjoyable. The ceramic clogs they were rewarded with for participating were very well received and showed to other beneficiaries at JFO with great interest. With the suggested improvements, the results suggested the interview set-up would work.

3.6 Pilot V. From Drawing to Card Placing

3.6.1 Shifting to the Case Study Area

The fifth pilot was conducted by the author only in the region of the larger case study. The aim of this pilot was to check if the created tool box was capable of extracting the impact of the Philips Chulha, a small wood stove made of clay, from a capability perspective. Five participants were selected on availability. All were habitants of Chik Yel Chetti, where the researcher and interpreter stayed with one of the local builders (Ravi) of the Philips Chulha. Participants were only willing to cooperate after introduction and recommendation by Ravi. The interviews were with the main cooks, but other family members were always around since the interview took place at their homes (see figure 3.17). This allowed them to feel at ease (IDEO, 2011). Participants were only available in the morning before work and in the evening after work.



Figure 3.17: Participant at Home in Pilot 5, 2012, *made by author*

In order to avoid overwhelming the participants, a box was created which could hold all the interview materials such as question cards, sensitizing cards, markers and instruction sheets. The box was meant to present the tool in a pleasant, curiosity stimulating way (see figure 3.18).

3.6.2 Testing new Sensitizing Cards

Because now only two situations were compared, before and after acquisition of the Chulha, the interview flow slightly changed (see figure 3.19). In order to support the sensitizing sheets sensitizing cards were developed and to ease the ranking importance cards were created. The new interview flow was in experience mainly the same.

After the introduction the participant was first asked several questions about the product. While asking questions, the participant was also asked to show the Philips Chulha in order to get a feeling for the physical context (Larsen and Flensburg, 2011).

In order for the interviewer to ask the questions, question cards were developed. The capability questions for which a scale was used were printed in bold at the top (see figure 3.20).



Figure 3.18: Tool Box Pilot 5, 2012, *made by author*

These were the questions the interviewer eventually wanted to be able to answer. From the experiences of pilot 3 and 4 it had become clear that these questions could not always be asked. Below the bold questions were therefore more general questions that could be asked to sensitize the participants. The background showed the words “then”, “why” and “more”, serving as a memory for the interviewer to ask about the past, the underlying reasons and any other possible answers apart from the one the participant just gave. According to Gawler (2005) it is ethically most important to make the participant feel comfortable at all times. Not all capability questions necessarily had to be explicitly asked, it was up to the interviewer to make a judgement call depending on the situation.

The participants were provided with sensitizing cards. The cards depicted drawings of activities, stakeholders, resources, surroundings, emotions and many other items (see figure 3.21). For every capability category often occurring items were visualised and printed onto transparent cards. Every capability card set was printed in a unique colour so that it was clear which pictures belonged to which category. The cards took away the need to draw allowing for participants to lay them down on the sensitizing sheets, same as the ones used in pilot 4, in collaboration with the interviewer. This created a sense of co-creation. According to Visser (2005) a sense of co-creation makes the interviewee feel empowered. The pictures were made in a generic way to allow for multiple interpretations and modifications in the interview session (Larsen and Flensburg, 2011). Empty cards were also provided to make it possible to add missing items. Putting down the cards provided a visual check whether the answers of the interviewee were interpreted correctly. The sensitizing fields containing the mapping remained visible to the participant throughout the interview.

For the ranking of the categories the participants were asked to put a capability card of each capability category next to one of the four importance cards. Importance cards were created depicting “.”, “!”, “!!” and “!!!” (see figure 3.22). These symbols corresponded to respectively 0, 1, 2 and 3 in the analysis.

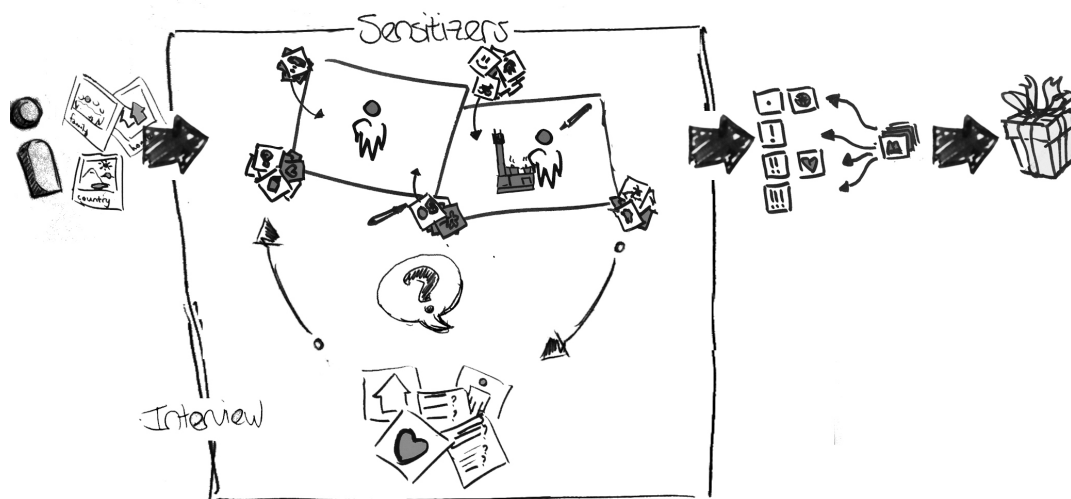


Figure 3.19: Interview Flow Pilot 5, 2012, *made by author*

3.6.3 Evaluating the Context of the Interpreter and Participants

The interpreter was properly instructed and had seen and discussed all the questions with the interviewer beforehand. However misunderstandings still occurred which resulted in confusion and hesitation by the participants. The interpreter sometimes believed himself to be the interviewer, stopped translating and changed or made up questions. He refused to translate everything, but made his own selections on what he believed to be of importance to the interviewer. Also he often changed open-ended questions into multiple-choice questions, strongly directing the interviewees. Clearer instructions for the interpreter thus needed to be developed.

Participants were anxious to go to work due to the fact interviews took place in the morning. The interview length, one hour to one and a half hours, appeared to be too long for the participants to remain calm and concentrated. Three interviews were conducted in half the time, yet those interviews were rushed. As Larsen (2011) already argued, results from rushed interviews hardly ever provide rich data. There was a clear need to create a shorter interview flow.

The tool box and the sensitizing cards were considered intriguing. The participants however did not use the cards, because the amount was too overwhelming. Therefore the interviewer put down all the cards as a response to the answers of the participants, in order to confirm the responses and surpassing the interpreter's influence (see figure 3.23). Due to the decreased collaboration and the abstract representation of their lives the participants after a while lost their interest in the mappings. By decreasing the complexity caused by the abstract level of the mappings a more collaborative way had to be developed. Changing the blank fields to a timeline on which they can indicate their daily rituals would be easier to understand and still give insight into their activities, products used, stakeholders, resources and values (Larsen and Flensburg, 2011).

Participants were able to put the capability category cards next to the importance cards and expressed enjoyment while doing so.


	<p>Do you feel you have sufficient food to feed yourself?</p> <p>Do you feel you have sufficient food to feed your family?</p> <p>Do you feel you can enjoy a meal whenever you need one?</p> <p>Do you feel you can eat sufficient meat, chicken or fish?</p> <p>Do you feel you can eat sufficient vegetables?</p> <p>What is your diet? When do you eat?</p> <p>What do you drink? Where do you get pottable water?</p> <p>Do you have a stock of food in your house?</p> <p>Do you feel you have sufficient food to feed yourself?</p> <p>Do you feel you have sufficient food to feed your family?</p> <p>Do you feel you can enjoy a meal whenever you need one?</p> <p>Are you a vegetarian?</p> <p>Do you like to eat fresh meat, chicken or fish?</p> <p>Do you feel you can eat sufficient meat, chicken or fish?</p> <p>Do you like to eat fresh vegetables?</p> <p>Do you feel you can eat sufficient vegetables?</p>
	<p>4</p>

Figure 3.20: Questions Card Nutrition Pilot 5, 2012, *made by author*

3.7 Description of the Interview Tool Box

3.7.1 Testing the Tool Box in a Case Study

The case study was meant to verify whether the developed tool box was capable of extracting the impact of a product from a capability perspective and whether this was a better way of evaluating development by product innovation than traditional methods. This explorative empirical research was executed by observations and conducting semi-structured interviews in Bandipur area, India, with users, builders and other villagers to identify changes in their lives since the Philips Chulha, a smokeless wood stove, had been implemented.

The Philips Chulha was chosen because it was considered a successful innovation and had been adopted by many users. The initial developers, whose habitus is very different from that of the target group, claimed to have considered the habits and rituals of the envisioned users thoroughly.

Bandipur was chosen as a research area because over 200 Chulhas had been installed in several tribal villages over the past two years under guidance of non-governmental organisation (NGO) Junglescapes. An interpreter was arranged through the help of Mysore University, who could provide a student that had been doing research in this exact same area before.

3.7.2 Research Questions of the Tool Box

The case study aimed to answer the following questions:

- What were the reasons for the initiators, developers and implementers to get involved with the Philips Chulha?
- How can those reasons be interpreted in terms of habitus and the Capability Approach?

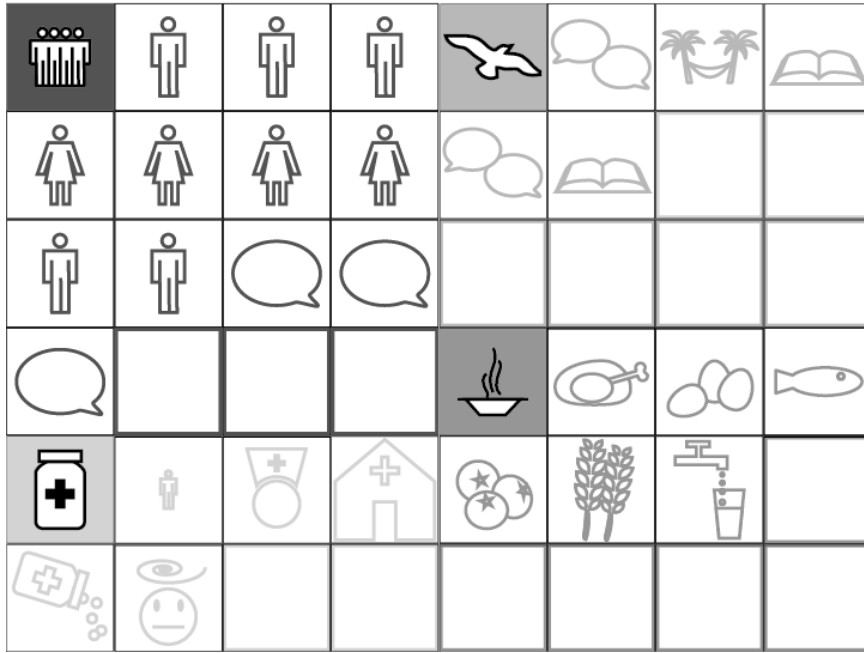


Figure 3.21: Sensitizing Cards Friends, Health, Leisure and Nutrition Pilot 5, 2012, *made by author*

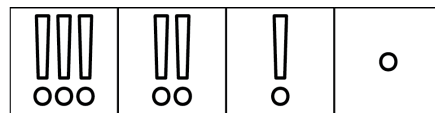


Figure 3.22: Importance Cards Pilot 5, 2012, *made by author*

- Who have been affected by the implementation of the Philips Chulha?
- What has been the impact of the implementation of the Philips Chulha on those stakeholders?
- How can that impact be interpreted in terms of the habitus and the Capability Approach?

3.7.3 Interview Questions Capability Categories

The tool box suggests using a one-to-one interview technique to measure the impact. This technique has the potential to give deep and rich insights into behaviours, reasoning and lives (IDEO, 2011), covers questions regarding the product and the following capability categories mainly derived from Nussbaum's (2001) list and existing lists of other scholars (Alkire, 2005) (see figure 3.24). Questions were derived from Anand (2009) and range from general factual enquiries such as "What type of house do you have?"¹⁷ which are used as sensitizing questions to specific personal experiences such as "Do you feel you were involved enough in choosing your home?" which are called capability questions. Some capability questions are easy to ask such as "Do you feel properly educated?"¹⁸ whereas others are highly sen-

¹⁷ From category Accommodation

¹⁸ From category Education



Figure 3.23: Overview of Interview in Pilot 5, 2012, *made by author*

sitive such as “Do you feel prohibited from using contraception, abortion or infertility treatment?”¹⁹.



Figure 3.24: Capability Categories: Accommodation; Attachment to animals, plants and products; Education; Meaningful work; Health; Family; Nutrition; Self-determination; Cultural values; Friends; Mobility; Leisure; and Safety, 2012, *made by author*

Not all questions necessarily have to be asked. They serve as a guideline to gain insight in the individual and social habitus of the users and measure the impact of product innovation. It is up to the researcher to make an appropriate selection or add questions during the interview based on the provided answers. Most important is to enquire both about the current situation and that of the situation before acquisition of the investigated product.

3.7.4 Supportive Materials in the Tool Box

The tool box contains the following materials (see figure 3.25).

- Instructions interpreter; to inform the interpreter of the nature of the study, the envisioned outcomes and the role he plays in the interviews
- Interview set-up; to use as a guideline for the researcher to set out the interviews

¹⁹ From category Self-determination

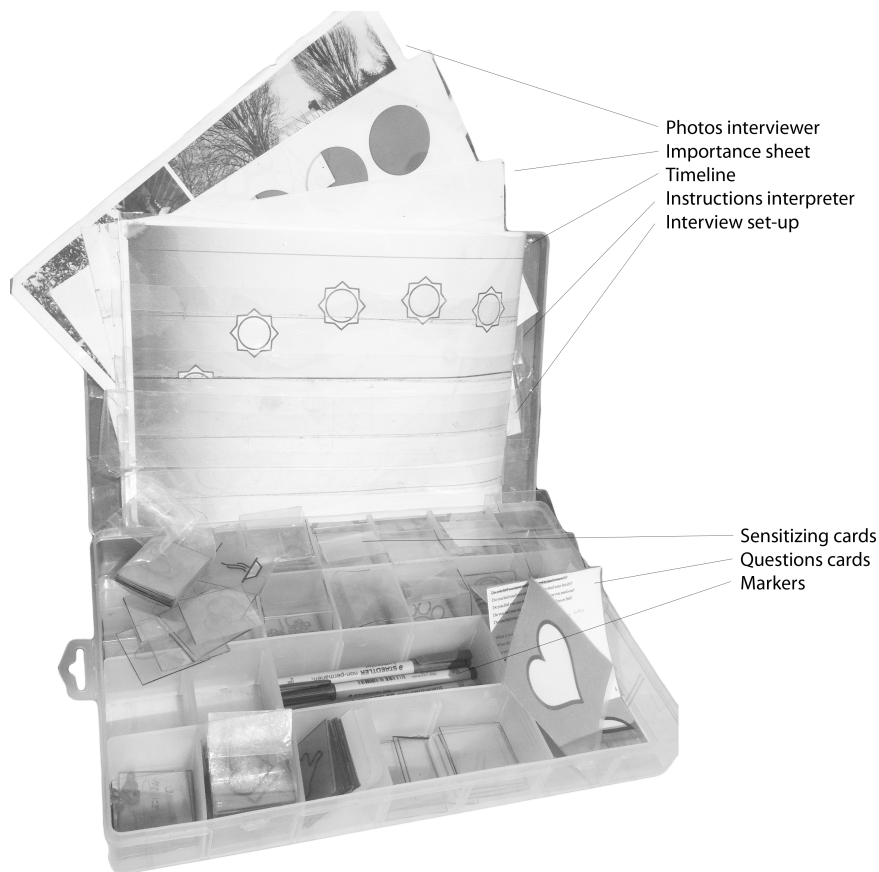


Figure 3.25: Content of the Tool Box, 2012, *made by author*

- Recorder, camera, notebook and pen; to record the interviews and take notes for retrospective analysis
- Photos interviewer²⁰; to make the participant feel at ease (Larsen and Flensburg, 2011)
- Timeline; to uncover daily rituals, product used, stakeholders involved, resource flows, local values and chains, current challenges and hotspots (Larsen and Flensburg, 2011)
- Sensitizing cards; to visualize the answers on the timeline, to generate curiosity, to break the ice, to communicate emotions
- Markers; to allow for adjustments to the sensitizing cards and generation of additional sensitizing cards dependent on the identified needs
- Question cards; to use as a guideline for the researcher to make sure all relevant categories are questioned
- Importance sheet; to learn what and how people value, identify differences in individuals and groups, perceptions, knowledge and understanding (Larsen and Flensburg, 2011)

All these materials can be found in Appendix F. Figure 3.25 also shows all the materials.

²⁰ Photos of the interviewer, family, hometown and homecountry

3.7.5 Interview Procedure

Present at the interview are the interviewer, a local interpreter and one participant. The interpreter must be someone the interviewer can relate to but also someone the participants trust, so participants dare to be open and honest in their answers. It is very important the interpreter understands the reasons behind the questions. Training needs to be given by the interviewer to the interpreter in which all content of the tool box is discussed before the first interview. The interpreter can also help explaining local customs. It is better if the interpreter is not related to the design or implementation organisation as to maintain impartiality.

The participant is either a user of the product or a distributor, local developer, or any other stakeholder that is uncovered during the research. Participants are preferably interviewed when they are alone so they are not influenced by an audience (IDEO, 2011). Sensitive questions have to be well considered when an audience is present.

The interviews are to be conducted at the participant's home to make him feel at ease and to allow for the interviewer to gain insight in his way of living and be able to refer to his surroundings (IDEO, 2011). Preferably a time is chosen in consultation with the interviewee when enough time is available. The interview session consists of five parts:

1. Introduction
2. Finding daily rituals
3. Acquiring capabilities data
4. Relating to product data
5. Closing

3.7.5.1 Introduction

The introduction is partly functional to start off and ask permission to record the interview. Also during the introduction the interviewer gives a personal introduction showing pictures of himself, his hometown/country and his family. This is argued to create an open, trustful and comfortable environment (Gawler, 2005; IDEO, 2011; Larsen and Flensburg, 2011). After this the interviewer explains the participant he would like to get a complete overview of his current life and how this changed since the acquisition of the product. This way the participant knows what to expect (see figure 3.26).

In order to kick off the interview, first some introductory questions regarding the product are asked, regarding acquisition and use in order to get some basic insights and get the participant thinking of the product. As these questions are all factual and do not require the participant to introspect much it allows for all parties to get familiar with the way of conversation through the interpreter. It serves as the starting point of the sensitizing session.

3.7.5.2 Finding daily rituals

The participant is presented with the timeline (see figure 3.27). This timeline was used in study I and II but discarded because the participants indicated their daily rituals were too different every day. In the rural areas people generally do the same every day, which is why

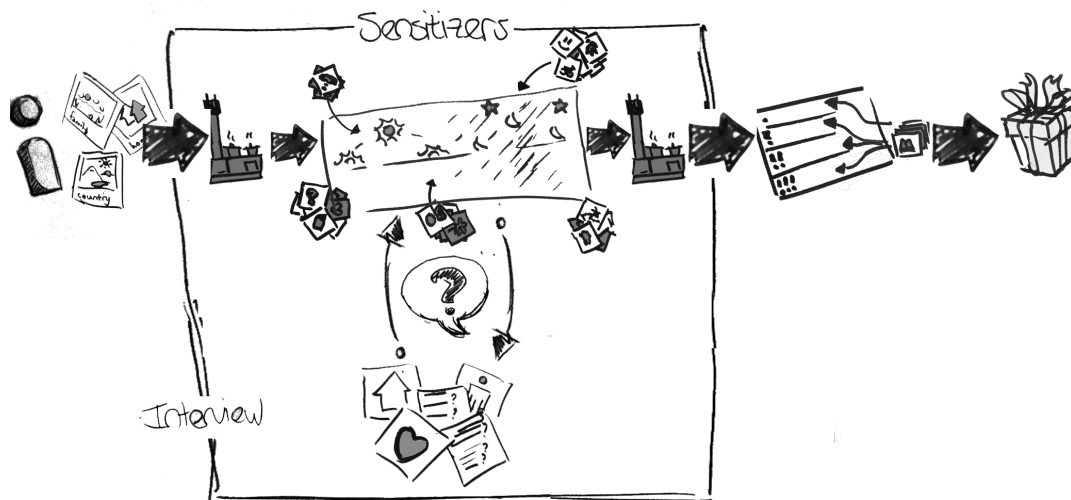


Figure 3.26: Visualisation Interview Flow Case Study, 2012, *made by author*

the timeline works in this context. The participant is asked to describe what he does on a normal day from the moment he gets up until he goes back to bed. During this description the interviewer can already ask many questions from the question cards, but the main aim is to get a feeling for what keeps the participant busy on a daily basis. Everything the participant tells, is visualized on the timeline with the sensitizing cards by the interviewer. This way the participant feels more involved and it is a check on whether the interpretations have been correct.

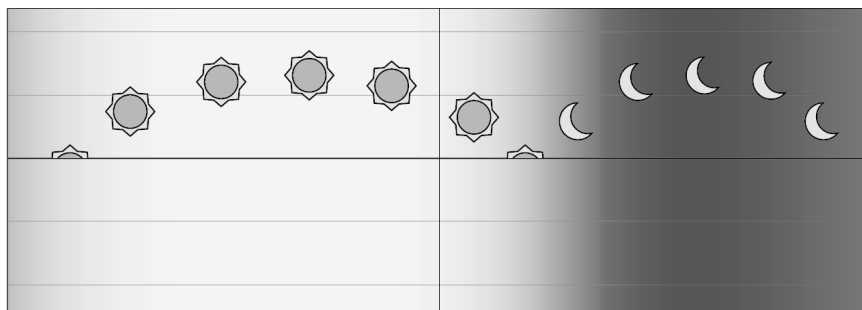


Figure 3.27: Timeline, 2012, *made by author*

3.7.5.3 Acquiring capabilities data

After discussing the daily rituals, the other categories can just be taken from the box and discussed further on. After getting a grip on what their lives entail, the factual and emotional changes in their lives can be discussed.

After having discussed the day, the interviewer uses the question cards to go through all questions from the different categories. Wherever possible sensitizing cards are added to the timeline.

When a scale question is asked, the participant is presented with the scale sheet on which he can indicate to what extent he feels something. Every time the scale sheet is used, the meaning of the different options is explained to make sure the participant still understands.

After answering all the questions the participant is asked for every category to indicate on the importance scale how important he believes it is for him personally.

3.7.5.4 Relating to product data

Finally some more questions regarding the Philips Chulha are asked. Also is asked whether certain before-mentioned changes were influenced by the implementation of the stove. This way the acquired capability data can be linked to the product innovation.

3.7.5.5 Closing

During the closing the participant is thanked and asked whether he wishes to share more information. The participant is also given a set of ceramic clogs to thank him for his participation.

3.7.6 The Tool Box and Already Existing Tools

Most design tools provide frameworks, methods, techniques, tips and tricks, yet little attention is paid to what type of questions can be asked (see paragraph 2.2). The value of this tool box is that it combines the techniques of existing tools with a set of conceptual questions. The tool box fills the identified gap in existing design tools by providing question categories including sample questions to direct the researcher in order to define development.

CHAPTER 4

CASE STUDY: PHILIPS CHULHA

4.1 Description of the Context of the Case Study on the Background of the Philips Chulha

The developed tool was used to perform a case study on the Philips Chulha. The Philips Chulha is a stove developed from a Western perspective for rural areas in India. Currently it is being used in Bandipur area. The habitus of the designers, Philips Design Delhi, is therefore very different from the habitus of the users, women in rural areas. In order to understand the way the product was developed, first the socio-cultural context needed to be understood. Only after understanding the context and the development process, the case study on the users can be read in the right context.

4.1.1 The Cultural and Social Context of Bandipur Area in India

4.1.1.1 Brief history of India

India currently is one of the biggest countries in the world with a total population of over 1,2 billion people (WorldBank, 2011). According to the World Bank (2011) even today India has the highest concentration of people living below the poverty line of \$1,25 per day. This means they belong the economic Base of the Pyramid (Prahalad, 2010). Especially in the impoverished rural areas people still live in uncertainty and without prospects of improvement.

India has been conquered by the Portuguese, the French, the Dutch and the British. Arguably the impact of the British was the highest. The conquest of the British India, which began in 1757 and ended in 1858, resulted in the occupation of India until 1947. The modernization of the country during British colonization was focused on metropolitans, inhabited by the Indian elite, whereas most Indians, currently around 70% according to the World Bank (WorldBank, 2011), lives in rural areas (Banerjee et al., 2005). The areas formerly under direct British control still do significantly worse than the areas that were only indirect under British control (Banerjee et al., 2005). This can be attributed to the British introduction of the ‘divide and rule’ policy where landlords were given pieces of the land creating a still existing conflict between peasants and landlords (Banerjee et al., 2005). The British domination caused an uneven distribution of the welfare in India (Banerjee et al., 2005).

India has been independent since 1947 and established a democracy. The government has since then begun consistently improving the living standards of the population. It has grown

out to be one of the world's fastest growing economies (Nadkarni et al., 1991). The state, with the help of some private organisations, has provided educational institutions, health care centres, water sources, electric power, transportation facilities and communication infrastructure to most of these regions. However divisions in India are still the highest in the world.

India has no state religion and provides every citizen to freely choose their own religion. Over 80% of the Indians call themselves Hindus (Government of India, 2012). However Muslims, Christians, Sikhs, Buddhists, Jains and other smaller religions are also practiced. Hinduism has many different ways of practicing, because it has no predefined set of beliefs, but embraces different philosophies (Georgis, 2010). This makes the religious rituals different in every region.

Castism defines the social position an individual holds within the society. The caste system is still very common in India. The government is currently trying to change it, and gives people from a lower caste special reservations on education and jobs as a form of positive discrimination. Within the rural areas however the traditional hierarchy as prescribed by the caste system is still present.

4.1.1.2 Description of Bandipur area

The case study took place in one region, Bandipur area. Therefore only the habitus of the people in this region was studied. Other regions in India are likely to all have a different habitus. The assessment of the development is thus also different for every region and context (Comim et al., 2008). In order to understand the mapped impact of the Philips Chulha, first the region needs to be understood.

Bandipur is a jungle area in the southern part of India. It is one of the most famous protected forest areas of India and provides living space for elephants, tigers, bizzons, monkeys and lots of other wildlife (Venkataraman, 2011). The area withholds several villages, the biggest being Lokkere, Chik Yel Chetti, Guddukkere, Madhalwadi, Anajundi, Burdurundy, Adinakanive, Balawadi, Upkara and Karemala. Even within this small region, the villages show local differences. Lokkere consists of mainly middle class small landowners. Each habitant owns a piece of land, whereas the land in Chik Yel Chetti is owned by only two landowner families. Most other families in Chik Yel Chetti hire themselves to the landowners and live from a daily payroll. Villagers from both villages sell part of their harvest on the market in the bigger cities closeby and use that money to improve local living conditions. Guddukkere is a village where the inhabitants choose to remain isolated from the other villages fearing unknown human contact and surviving solely on what they find in the forests. Between the villages is also little contact, because most people need to walk from one village to another and the villages lie about two hours walking distance from each other. Every village however, is partially dependent on government's help regarding accommodation and food. This makes all villagers face uncertainty to some extent.

In their aim to improve the living conditions of the villagers, both state- and private-funded initiatives have been implemented in this area. Those who cannot afford to buy sufficient food receive coupons from the government allowing them to get free rice from a nearby government facility. The state has provided all villages with proper housing, drainage and electricity. Houses however, are typically small, usually less than 10 square meters including cooking and sleeping area occupied by an average of four people (Venkataraman, 2011). Water supply is

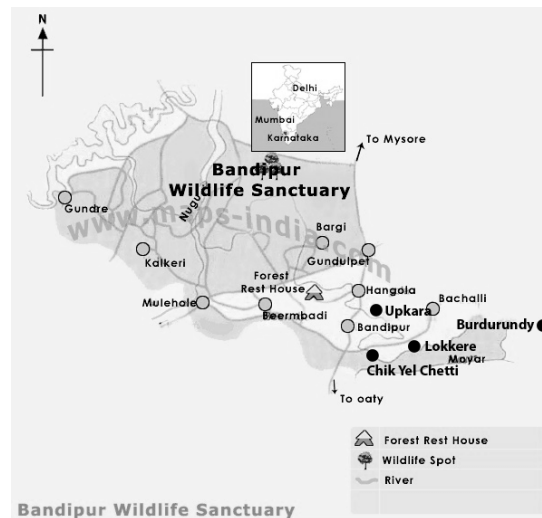


Figure 4.1: Bandipur Area, 2012, obtained from <http://www.maps-india.com/karnataka/karnataka-map>, 17 July, 2012

present in every village through hand pumps and storage tanks. Electricity has been made available in most houses, however, power cuts happen daily and last usually for several hours. This is due to accommodate the heavy equipment used by the landowners. A bus service is present to take children to educational facilities in the morning and bring them back in the evening. Most villages only provide education for children up to twelve years old. A free-of-charge medical facility is about 20 km away reachable by foot. The nearest government hospital, also free of charge, can be reached by bus. Development programs are still in progress in this region.

The region is not very safe and living conditions are tough. Due to the high density of wildlife, human-animal conflict is quite common, either when the people go into the forest to collect firewood or when animals come to the villages to raid the crops. Therefore owning a private farm is financially risky which is why most villagers nowadays work as wage labourers on large farms owned by urban settlers (Venkataraman, 2011). The landowners, lacking knowledge of the ecology of the region and driven by making money, exploit both the land and the workers regardless of the impact on the local communities, the forest and the wildlife (Venkataraman, 2011). Most wildlife living in Bandipur National Park is protected, which is why the State Forest Department plans to declare Bandipur an eco-sensitive zone (Mukherjee, 2012). This causes distress for the local villagers, because they fear to be relocated to a different area. Despite the tough living conditions they would prefer to stay in the area where they grew up.

Within the district both a national and traditional power structure is present. From tradition the villages each have a separate chief. Chiefs were appointed by the regional priest a long time ago and since then this post transferred from father to son. The current priest, Subanna, ranks above the chiefs as the priest belongs to the highest cast, making him and his son, Ravi, extremely influential in this region. Villagers from all around the region come to the temple which is located in front of Subanna's house in Chik Yel Chetti. People not only come for praying but also for sharing daily struggles and asking advice or help. Prophecies expressed by the priest are highly respected and valued. Besides a priest, Subanna is also a

Table 4.1: Overview of Four Villages

	Chik Yel Chetti	Lokkere	Burdurundy	Upkara
Households	30	25	21	60
Implemented Chulhas	25	20	21	38
Chulhas in use	18	5	20	<i>unknown</i>
Installed by	Ravi	Nagendra	Ravi	Both
Relative wealth	Low	High	Low	High
Access to water	Pump & basin	Pump	Pump	Pump & Basin
Access to power	Most (net)	All (net)	All (solar)	All (net)
Access to bus	Two daily	Two daily	Two daily	Two daily
TVs	Few	Most	Few	Many

big landowner in the region, employing many villagers from different villages.

Landowners get more respect in the villages than hired farmers. Side jobs such as basket weaver or furniture maker do not contribute to the respect a person receives. No difference is made between men and women, all are equal and share responsibilities in working, cooking and other household activities. Since Lokkere is inhabited mainly by small landowners, they consider the other villages to rank below them. Villagers of Lokkere enjoy more advanced living conditions and even though they acknowledge the traditional power structures, they themselves focus more on modern national structures. They participate in a Village Forest Committee which was formed by the State Forest department to take care of the forest allowing them to harvest non-timber forest (Venkataraman, 2011). The State Forest department is a local organisation concerned with protecting the forest. All villagers from all villages acknowledge both the national and traditional power structures.

The local non-governmental organisation (NGO), Junglescapes, uses a developmental approach different from the government aiming to empower the communities (Venkataraman, 2011). They collaborate with the villagers in afforesting degraded forest areas, managing eco-tourism and providing trainings to make furniture and living with nature (Venkataraman, 2011). All work in this region is done in consultation with the Forest Department (Venkataraman, 2011). Junglescapes also is the initiator and subsidizer of the implementation of the Philips Chulha, a small wood stove, in the Bandipur area.

4.1.1.3 Description of Habits, Rituals and Beliefs

During their free days the villagers will sometimes visit family and friends in neighbouring villages. Castism however, prevents people from going wherever they want to go, as people from a lower cast are not allowed in the houses of those of a higher cast. Villagers who hang out with people from a lower cast are also often no longer welcome in higher cast areas. Even the priest's son, Ravi, being empathic with the villagers in Chik Yel Chetti who belong to the lowest cast and helps them in any way possible, is being scolded in Lokkere. This is why he avoids visiting that village. During festivals hierarchies disappear. Nobody works those days and everybody cooks special treats which are shared by all casts near the big temple in Chik Yel Chetti.

Cooking is considered a sacred ritual in Bandipur area not to be seen by any other person than the cook, which is why most stoves, around 80-85%, are hidden behind small walls inside the house (Venkataraman, 2011). Before the introduction of the Philips Chulha people were using different types of simple firewood stoves. These were either open, consisting of three stones on which the vessel would be positioned, or closed, made of mud. Very few were using a more advanced stove similar to the design of the Chulha with two holes for vessels, but without scientific heat flow or chimney like the Philips Chulha. The responsibility for collecting firewood and cooking is sometimes shared between men and women, yet in most households it is usually the men who gather firewood and the women who cook. Firewood is gathered from the forest which creates the risk of animals attacking, which is why men usually go in groups. Before introduction of the Philips Chulha they went around three or four times a week bringing an average of 32,5 kg per person. While cooking, the women traditionally squat, only very few prefer to cook standing. While cooking, usually all other family members leave the house. Once married women learn how to cook from their mother-in-law. Most people cook vegetarian out of principle, yet those who are willing to eat meat seldom do so because of the high price. Due to their limited income not many people have a stock of food in their house, but they live from day to day, adjusting the amount of food they receive based on their earnings.

4.1.2 Development of the Philips Chulha

4.1.2.1 Involved Organisations Case Study

Many people are involved with developmental projects such as the Philips Chulha in India (see figure 4.2). The Dutch Embassy, represented by Vikas Kohli and Freek Jan Frerichs, closely follow all initiatives in order to make sure all gained knowledge is shared and put to use by all who need it. They are therefore also in contact with Abhimanyu Kulkarni and Praveen Mareguddi from Philips Design. With the help of the NGO ARTI in Pune they developed the Philips Chulha. Even though Philips Design currently no longer interfered with the development of the Chulha, they were still in touch with important stakeholders such as Junglescapes to learn from the experiences they had. Junglescapes, a non-governmental organisation (NGO) lead by Ramesh Venkataraman, implemented over 200 Philips Chulhas in Bandipur Area. Philips had asked Junglescapes in 2010 to do an environmental impact study, which they executed with Mysore University, under supervision of Professor Belagali from the Environmental Studies department. One of professor Belagali's students, Rajanna, had performed the research in Bandipur area. Rajanna therefore knew the area and the local builders, Ravi and Nagendra, which made him very valuable as interpreter in the case study. Ravi and Nagendra also implemented the Philips Chulhas and were willing to ask users to participate in the case study. In order to define whether the impact of the Chulha corresponds to the envisioned impact, first the background of the involved parties and development process need to be understood.

4.1.2.2 The Product Initiator: Koninklijke Philips Electronics N.V.

Koninklijke Philips Electronics N.V., commonly known as Philips, is a multinational company with a large scala of products, aiming on improving people's well-being through healthcare,

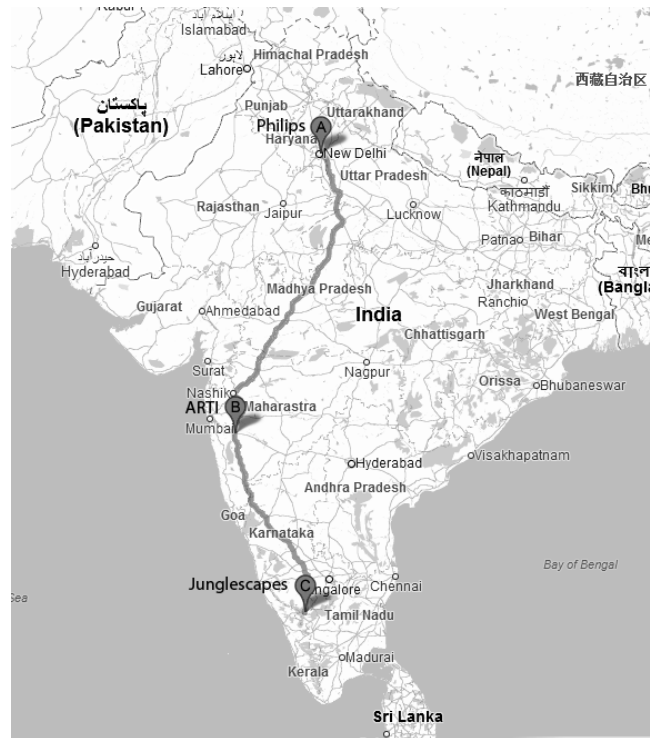


Figure 4.2: Involved Organisations Case Study, 2012, *obtained from <https://maps.google.nl/>*

lifestyle and lighting. It was founded in Eindhoven, the Netherlands, in 1891 starting out with just light bulbs, adding different types of products throughout the years. Currently Philips is active in over 60 countries with about 120.000 employees worldwide.

Philips aims to enhance people's lives, both in developed regions and those of the underprivileged. Philips believes proper healthcare and education is important for everybody and thus stimulates its employees to also pursue their aspirations towards non-profitable solutions that can make a difference in people's lives. These projects are gathered under the in 2005 launched initiative Philanthropy by Design (Rocchi and Kusume, 2011). The aim of this program is "to promote fresh thinking in envisioning solutions which could improve the quality of life in the most fragile categories of our society" (Rocchi and Kusume, 2011).

4.1.2.3 The Initial Reasons of Developing the Chulha

In 2005 Philips Design held a design convention, 'A Sustainable Design Vision - Design for Sense and Simplicity', with people from Philips as well as representatives from NGOs all over the world, in order to "promote fresh thinking in envisioning solutions which could improve the quality of life in the most fragile categories of our society" (Rocchi and Kusume, 2011, p. 12). Participants were assigned design tasks in small groups related to current issues such as pneumonia (Rocchi and Kusume, 2011). One design team, of which Praveen Mareguddi was a member, came up with the initial idea of a smokeless stove, a chulha¹².

¹ Hindi for stove

² From Interview with Mr. Mareguddi, Product designer Philips Chulha, April, 2012

The development of the smokeless stove needed to be funded from within Philips Design². According to Praveen it never was supposed to generate money or awareness for Philips. The initial design requirements for the stove were to decrease the fumes in the houses and to decrease the fuel use. The decrease of fumes was to improve the envisioned user's health. A decrease in fuel use was added to make an investment profitable so that the stove would pay itself back in time. Therefore from a multiple year perspective the Chulha would not be as costly as it seemed at first.

The project team within Philips Design responsible for the Philips Chulha consisted of Simona Rocchi, Creative Direction; Bas Griffioen, Program Manager; Neha Garyali, Project manager; Unmesh Kulkarni, Product designer; Praveen Mareguddi, Product designer; and Koel Chatterjee, People researcher (Philips, 2012). Designing of the Chulha started at Philips Design Delhi, under supervision of Abhimanyu Kulkarni, Creative Director and Location Manager. Within this research both Abhimanyu Kulkarni and Praveen Mareguddi were interviewed concerning the design and development process of the Philips Chulha.

4.1.2.4 Development of the Chulha with an Indian Partner

India is a big country with many regions each with different habits³. Designing a stove that would work for every region would be highly complex, thus an already implemented stove was located that could be improved in order for it to be implemented in more regions. In 2006 Praveen contacted the NGO Appropriate Rural Technology Institute (ARTI), located in Pune, which has been concerned with rural development such as designing, developing and implementing stoves since 1996 (ARTI, 2012; Rocchi and Kusume, 2011). Within ARTI Mr. Deshmukh, Director Office Pune; Mr. Zendre, Director Field Station Phaltan, and Mr. Imtiyaz, Second Designer and Interpreter, were interviewed.

An existing design developed by ARTI, the Laxmi stove (see figure 4.3), was adopted for improvement to create the Philips Chulha⁴. Initially the Philips design team did an extensive study, with hired help of ARTI, in which they looked at the context of living, storage and habits of cooking⁴ (Rocchi and Kusume, 2011). They also gained other cultural insights. Trying to change the habits of the users was not expected to be well-received, even when there are clear advantages⁵.

The results of the study suggested a stove was considered the centre of the house and had to be perfect. Stoves that cracked during usage were therefore considered an important issue⁵. The Chulha was therefore designed as a modular stove of thirteen pieces which could all individually be replaced⁶. An additional benefit of making the stove modular was that it was easier to build the Chulhas in one central place. Transporting the separate parts and assembling them on-site appeared to be easier than transporting the 45 kg weighing Laxmi stove⁷. The Laxmi stove was made out of cement and crust and was rather bulky, whereas the Philips Chulha was made of a special type of ceramic cement which kept more heat inside.

³ From interview with Mr. Mareguddi, Product designer Philips Chulha, April, 2012

⁴ From interviews with Mr. Zendre, Director ARTI Field Station Phaltan, March, 2012; and Mr. Mareguddi, Product designer Philips Chulha, April, 2012

⁵ From interview with Mr. Mareguddi, Product designer Philips Chulha, April, 2012

⁶ From interviews with Mr. Deshmukh, Director ARTI Office Pune, March, 2012; and Mr. Mareguddi, Product designer Philips Chulha, April, 2012

⁷ From interview with Mr. Zendre, Director ARTI Field Station Phaltan, March, 2012



Figure 4.3: Laxmi Stove, 2012, *taken by ARTI*

The new design would produce less emission of fumes, yet a chimney was also added so that all fumes would be directed out of the house⁸.

Philips asked ARTI to build six stoves in collaboration with tribal women in self-help groups⁹ (see figure 4.4). Creating the moulds appeared highly complex and the stoves all broke quite quickly, which is why the design was rejected by ARTI⁹. However burning, smoke emission and efficiency tests showed the Philips Chulha did have potential in saving fuel, time and decreasing smoke emissions⁹. Also user feedback was generally positive⁹.



Figure 4.4: Self-Help Group making Chulhas, 2007, *taken by ARTI*

A new design was developed with even more parts to make the production and replacement of broken pieces easier. A long life span and easy maintenance were also incorporated in this design¹⁰. Nine people received this Chulha from Philips and ARTI in order to get user feedback. The user feedback was positive, however, because the new design required more moulds, the starting up costs became too high for people living in rural and tribal areas¹¹.

⁸ From interviews with Mr. Zendre, Director ARTI Field Station Phaltan, March, 2012; Mr. Deshmukh, Director ARTI Office Pune, March, 2012; and Mr. Mareguddi, Product designer Philips Chulha, April, 2012

⁹ From interview with Mr. Zendre, Director ARTI Field Station Phaltan, March, 2012

¹⁰ From interview with Mr. Mareguddi, Product designer Philips Chulha, April, 2012

¹¹ From interview with Mr. Deshmukh, Director ARTI Office Pune, March, 2012

According to Praveen the initial costs were high, yet money could be gained by reduced fuel costs, reduced cooking time and reduced health expenditures due to less smoke. They hoped this would make it profitable for people to invest in the stove.

4.1.2.5 Final Design of the Chulha

In the end of 2007 two final variations of the Chulha were developed: Sampoorna (see figure 4.5) and Saral. The first includes a steamer, whereas the second was a more basic version (Rocchi and Kusume, 2011). Both versions allowed for faster cooking and resulted in a decrease in fuel use as well as a weight reduction of the stove. The chimney directed the fumes out of the house and could easily be cleaned. A soot collector which could easily be taken out for cleaning filtered half of the soot from the smoke.



Figure 4.5: Philips Chulha (Rocchi and Kusume, 2011)

The aim was to keep the price of one Chulha around INR 900 (which corresponds to €20,- and approximately 9 days of labour work). Unfortunately material costs rose from INR 600 to INR 1200 in four years¹². The only way to reduce the costs would be by increasing the production. The metal grate responsible for the strength of the Chulha is currently the most expensive part. Centralizing the production of this part could make the Chulha cheaper.

¹² From interview with Mr. Mareguddi, Product designer Philips Chulha, April, 2012

4.1.2.6 Future Development of the Philips Chulha

Since it has been five or six years, Philips now has decided to leave the development of the Chulha up to others. All information regarding the design, development and implementation have been put on-line and are free to use by all. With small adaptations the Chulha can be adjusted to different regions. Praveen trained two local entrepreneurs from NGO Junglescapes. One of those entrepreneurs is now training other people in Goa and Tamil Nadu. A local entrepreneur in Kenya started producing the Chulhas based on the information he got from the website. Both happen without further involvement of Philips Design, which is how it was meant to be¹³.

4.1.2.7 Design Considerations from a Capability Perspective

Philips did not have the CA or Bourdieu's concept of habitus in mind while developing the Chulha. However the initial motives and the development do show some similarities. Initially Philips developed the Chulha out of a health perspective in order to enhance people's well-being. Philips put the design and the building plans on-line. This gives many people in different regions all over the world the opportunity to start making Chulhas. People thus have the possibility to decide upon their own development, increasing their agency. By immediately involving local women in the design process, the women could to a certain extent determine their own development, increasing their agency. While developing the Chulha the design team acknowledged their habitus was different from their target group's. By using an existing design developed in the target area they attempted to use the incorporated historical component of the habitus in the Laxmi stove for the Chulha. Furthermore this would enhance the chance that the sense, use and achievement of choice were met. The main challenge was found in the first dimension of choice, the existence of choice. The price was very high, which made it unattainable by the target users. The design team did consider it with a long-term calculation, however the target users generally had no savings to do these type of investments.

4.1.2.8 Implementation of the Chulha

Philips took the moulds back from ARTI after the use feedback study¹⁴. Because the final design required quite a few moulds, the starting up costs became very high. The price of a Chulha thus had to be high as well, which was unacceptable for people in rural and tribal areas according to ARTI¹⁵. ARTI never invested in new moulds, therefore they never implemented another Chulha.

Better Future, an organisation concerned with bringing sustainable impact, for instance to rural areas in India, also attempted to introduce the Philips Chulha. Michel Barth, managing partner at Better Future, was interviewed for this research. He experienced that local entrepreneurs found the starting costs of building the moulds too high. Whereas from his perspective the Philips Chulha was a nice product which could have an important impact, it was only feasible with subsidies.

¹³ From interview with Mr. Mareguddi, Product designer Philips Chulha, April, 2012

¹⁴ From interview with Mr. Zendre, Director ARTI Field Station Phaltan, March, 2012

¹⁵ From interview with Mr. Deshmukh, Director ARTI Office Pune, March, 2012

Junglescapes is an organisation that focuses on creating sustainable wildlife protection around Bandipur, a tribal area in Karnataka, India. Under guidance of Ramesh Venkataraman Junglescapes succeeded in implementing around 200 Philips Chulhas, partly or fully subsidized by external parties¹⁶. The Chulhas were built by local entrepreneurs in the area that were trained by Praveen. Junglescapes asked village chiefs if their villagers were willing to pay or work for the Chulha and if they were, they received them. Whenever one of the entrepreneurs received a request for Chulhas, they passed this request on to Junglescapes who then decided whether implementing the Chulha was possible¹⁷.

Junglescapes initially implemented the Philips Chulha from a health perspective as was intended by Philips, but soon it became clear the stove also reduced cooking time and fire wood consumption tremendously (Venkataraman, 2011). This encouraged Junglescapes to continue, because this meant that the forest could be better preserved more by the implementation of these Chulhas, which was also one of Junglescapes' main aims. Less firewood also meant fewer human-animal conflicts, since the men would not have to go to the forest as often as they used to. Due to the decreased amount of time needed for cooking they expected the women could relax more after work or spend their time otherwise. The improved health would cause women to be able to work more and have lower medical expenses. Another benefit experienced by Junglescapes was that the villagers became more aware and involved in environmental activities.

The costs of a single Philips Chulha was around INR 1300 (€20,-). Of this INR 1300 about INR 800 goes to the raw materials, 300 to the mould and transportation and 200 to labour and profit. Optimizations in the materials costs could reduce the total costs by about Rs 200, but it would remain an investment too high for the envisioned users. Subsidies thus remain essential to implement this product.

In the current situation Ramesh Venkataraman from Junglescapes decides which villages are to receive the Philips Chulhas. Junglescapes also involves the Forest Department in this decision. Usually Junglescapes picks a village and then convinces the villagers to work for Junglescapes for two days in order to earn the Philips Chulhas. If villagers hear from for example family members about the Philips Chulha, they can request one of the builders to ask Ramesh Venkataraman to consider their village for the next batch. If the villagers do not agree to do the work, they will not receive them.

4.1.2.9 Benefits Envisioned by Implementer Junglescapes from a Capability Perspective

Although Junglescapes also did not use the CA to determine benefits, their reasons can be linked to the CA. Initially they only saw an enhancement of the health of the women. This, they anticipated, would result in an improvement of their working conditions. Thanks to the reduced cooking time women would gain extra time, which they would be free to spend however they decided, increasing their agency freedom. This could lead to an increase of various other capabilities. The safety of their husbands was expected to increase as a result of less human-animal conflict now that less fuel wood needed to be collected. Finally Junglescapes reported an increased attachment to nature by the women as a result of the implementation.

¹⁶ From interview with Mr. Kulkarni, Location Manager Philips Design Delhi, February, 2012

¹⁷ From interview with Ravi, builder, 14 April, 2012

Junglescapes decided to use local field workers. By doing this Junglescapes acknowledged the existing power structures and worked from within the habitus of the villagers. Also extra work was provided for the local people.

The existence of choice needed to be met, since the Chulhas were too expensive for the users. Therefore Junglescapes decided to subsidize them. The local builders also made the Chulhas geographically available. However, Junglescapes decided upon the implementation, which was at times forced without proper consultation with the users. This caused the sense and use of choice to be overruled. People thus had no time to decide for themselves whether they wanted the Chulha. This could reduce the chance of adoption on the long-term.

4.2 Discussion of Interview Outcomes

4.2.1 Execution of the Interviews

Now that a proper understanding has been gained regarding the development of the Chulha and the sociocultural environment, the actual impact results from the case study can be viewed within that context. 44 interviews were executed, all at people's homes (see figure 4.6). Most interviewees were women, although men were usually around during the interview. Of these interviews 3 people had never received a Chulha. Their responses were only used to get a general understanding of why people considered the acquisition of the Chulha aspirational. A total of 153 Chulhas had been implemented in this area (see figure 4.7). 29 households out of 41 installations were still using the Chulha. All 44 interviews were used to determine which capability categories they believed to be valuable. Only the people who were using or had been using the Chulha for a long time were asked about the impact.

Initially competitors or salesmen of fuel wood were also expected to have been affected but they appeared to be non-existent. It turned out only the builders, the users and their fellow villagers experienced an impact.

Present at the interview were the interviewer, the interpreter, one of the builders and the interviewee. The interpreter, Rajanna, was a PhD student in the Environmental Sciences department at Mysore University. He had done an impact study on the Chulha one year earlier from an environmental perspective. He had also been involved in the installation of some of the Chulhas. He was therefore familiar with the surroundings, the people and he knew how to approach the people. He originally came from a very poor farmer's family himself, so he could relate to the tough living conditions of the participants. The fact that both the interviewer and the interpreter were men, may have caused the women to feel less comfortable and not speak their mind fully. However, this could not be verified. The villagers were initially wary about the interviews. Therefore one of the builders was always present during the interviews. Without their recommendation people were unwilling to participate in the interviews. The presence of the builder may have caused people to answer more positively regarding the Chulha as to not offend the builder. This was only true for the first interviews in every village, as people later all began to trust the interviewer and the interpreter without the introduction of one of the builders.

All interview results are discussed from a capability perspective. Only the interviews from



Figure 4.6: Example of an Interview Setting, 2012, *made by author*

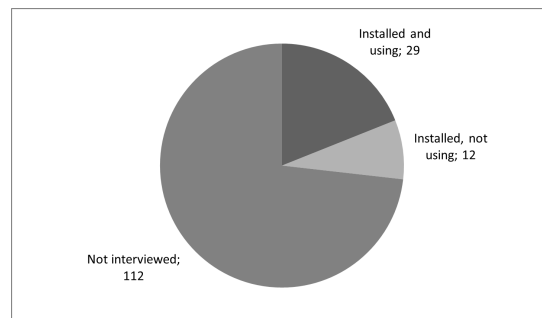


Figure 4.7: Number of Installed Chulhas, 2012, *made by author*

Chik Yel Chetti have been fully transcribed¹⁸ and coded¹⁹. Therefore the quotes are mainly from those interviews. All data from all interviews was used in the analysis. The responses people gave while using the importance scale were translated into numbers. Here very important (!!!) corresponded to a value of 3, important (!!) corresponded to 2, slightly important (!) to 1, and unimportant (.) to 0. From this quantitative data averages were calculated (see figure 4.8). The averages were used to determine what different stakeholder groups found important.

¹⁸ Transcription was done with Express Scribe Free v 5.51, obtained from <http://www.nch.com.au/scribe/index.html>, accessed May 2012

¹⁹ Coding was done with Atlas.TI 7.0.71, TUDelft license

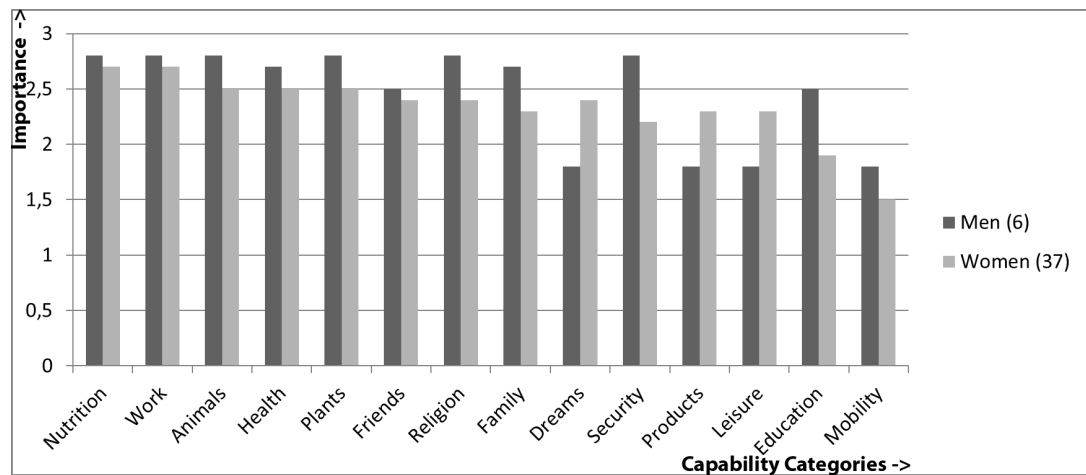


Figure 4.8: Average Importance as Indicated by All Interviewees divided by Men and Women, 2012, *made by author*

4.2.2 Limitations of the Case Study

The case study has many limitations. Many have been taken into account while developing the tool box, yet reducing their impact to zero is almost impossible. From the knowledge derived from the context of the case study even more limitations were discovered. Here the four most important limitations, within which the results of the case study should be evaluated, are mentioned.

The first limitation of this case study was that the information was very contextual. The data was gathered in only one region using the same interview and the same interpreter which makes it difficult to verify the results. In order to draw more certain conclusions more case studies would need to be done.

The second limitation was that people gave pleasing answers. They were only willing to participate in the interviews because the interview was recommended by the builders and they believed by participating they would get more help in other ways. By giving the right answers they thought, they would be more likely to receive this aid. The introduction clearly stated these assumptions were not to be made. However, participants would still be hesitant to be critical towards the Chulha.

The third limitation was the language difference between the interviewer and the interviewees. None of the interviewees spoke English, which is why an interpreter was hired. This made the interviews less direct. Whether the interpreter changed the questions or guided the participants was unclear. The interpreter's English was not perfect which caused confusions. To what extent his dialect differed from that of the local villagers and whether confusions occurred there as well, was unclear. The interpreter was instructed to translate everything as close to the original wording as possible, but it was clear he had a lot of difficulty doing so.

The fourth limitation was that the interviewer was inexperienced in doing sociological research and was unaware of the research context. The mind set and presuppositions may have influenced the execution and interpretation of the interview outcomes.

Also participants had little time to sit down for the interview. They either had to get ready for work or they were already tired from a full day of work. This decreased their eagerness to participate. This may have caused them to quickly give the answers just to finish the interview in a short time.

4.2.3 Changes to the Interview Set-Up and Content

All questions were discussed with Rajanna, the interpreter, and Ravi, the local contact who builds the Chulhas based on their knowledge and experience with his area. They named the questions they believed would not be well received. These questions were eliminated from the research.

First of all the personal questions were discussed. Questions regarding affection, happiness and possibility of abandoning partners were removed. Almost every marriage in this region was an arranged marriage and it was anticipated to be offensive to inquire regarding these topics. Use of contraception, abortion and infertility were considered too strong a taboo to bring up in an interview setting. According to Ravi every single person was prohibited from using any of the mentioned treatments. Furthermore, topics as life expectation and the ability to have children he considered to be improper to be asked. All questions that were considered too personal were removed from the question cards.

Second their currently was a conflict between the forest dwellers and the government. Asking about elections and party preferences would result in hesitation since they would fear their response would be used against them. The conflict could have as outcome that many villagers would be forced to leave their homes, so accommodation was also a sensitive topic in this region. Questions regarding politics and accommodation were therefore at this moment also removed.

The removal of questions slightly changed the categories. The capability category cultural values, which entailed politics and religion, became now solely religion. Self-determination was sensitive because they were not completely in charge of how their lives would continue. It was therefore changed to 'dreams and life-planning'.

The gift was considered insufficient. Rajanna believed it would be good to not only give the participant ceramic clogs, but also something useful. A cup and a spoon were added to the gift. The combination of these three gifts was gift-wrapped in order to create curiosity with the participants.

4.2.4 Builders of the Chulha

4.2.4.1 General Description

There are two official Junglescapes field workers in Bandipur area, Ravi and Nagendra. They build, distribute and install the Philips Chulhas as told by Ramesh. Ravi, native to Chik Yel Chetti, was selected because he is a key person in this area. He and his family are very influential, because his father is the local priest. Whenever Ravi recommends something to the villagers they are very likely to agree, either because they trust him or because they work

on Ravi's lands. Ravi was interested in the training because it would expand his income²⁰ and it would allow him to see more houses. Ravi hired a villager, Ragendra, to build the Chulhas for him. Ragendra, a hired farmer who during the morning and evening takes care of Ravi's cattle, gets paid INR 50,- per Chulha. Ravi has installed over 60 Chulhas in three villages²¹. The second field worker is Nagendra, from Lökkere. He was selected because he has shown eagerness to cooperate and learn in other projects set up by Junglescapes. He comes from an average family according to the living standards in Lökkere, which are slightly higher than the surrounding villages. Nagendra's mother was also affected by her son becoming a Chulha builder so she has also been included in this group. Nagendra has installed over 90 Chulhas in a total of six villages²².

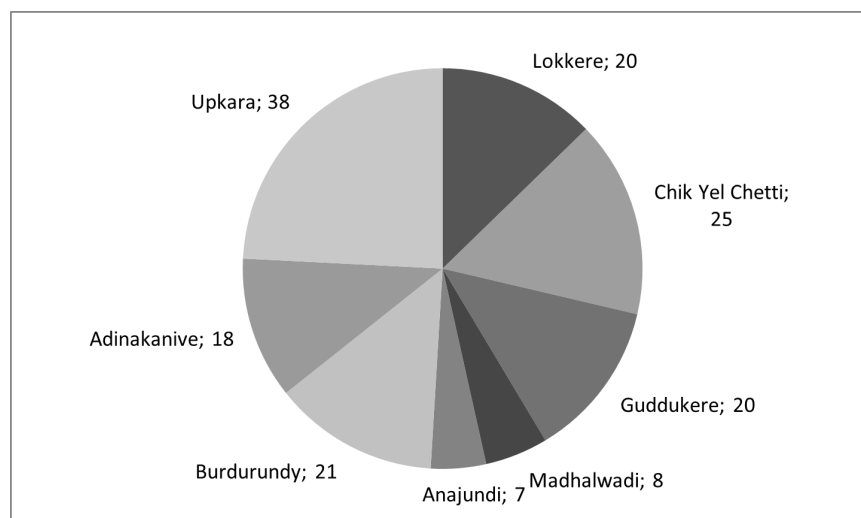


Figure 4.9: The Number of Installations per Village, 2012, *made by author*

4.2.4.2 Capabilities Enjoyed by Builders

The basic capabilities of the builders increased enormously. Because they were supplying this aspirational product they received more respect from their family and friends (see figure 4.11). The results suggest the builders benefited more from the implementation of the Chulha than the users. It was up to the builders to decide who received the Chulha first and which amount of money they had to pay. This created a power shift in the region as villagers became dependent upon the builders. Ravi already was very influential, yet Nagendra gained an enormous increase in his status making him the chief of his village. This was also reflected upon his family. His parents received more respect from the villagers and their amount of friends has increased, as well as their possibilities in the village. For Ragendra it was important that his income increased drastically, because “everybody give respect, [to] those who are getting more money”²³. He was also able to provide more food for himself and for his family. He decided to invest extra money in a local banking system, improving his life prospects and decreasing worries for the future.

²⁰ Per Chulha the builder receives INR 100,-

²¹ Chik Yel Chetti, Burdurundy and Upkara

²² Lökkere, Guddukere, Madhalwadi, Anajundi, Adinakanive and Upkara

²³ Ragendra, builder Chulha, interview, April 7, 2012

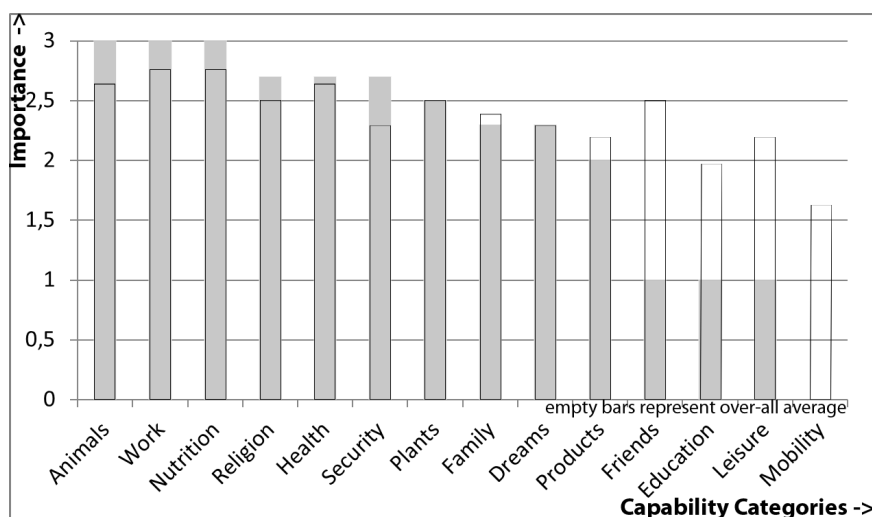


Figure 4.10: Importance of Capability Categories as Indicated by 4 Builders, 2012, *made by author*

All felt their knowledge had increased due to the trainings they received. This knowledge, according to them, opened up new possibilities for improvement of their lives. Both Ravi's and Nagendra's mobility increased because they were given motor bikes by Junglescapes in order to go to different villages for installation of the Chulhas. Nagendra even was taken to villages in different states to give training to future builders in other regions, improving both his mobility and his knowledge.

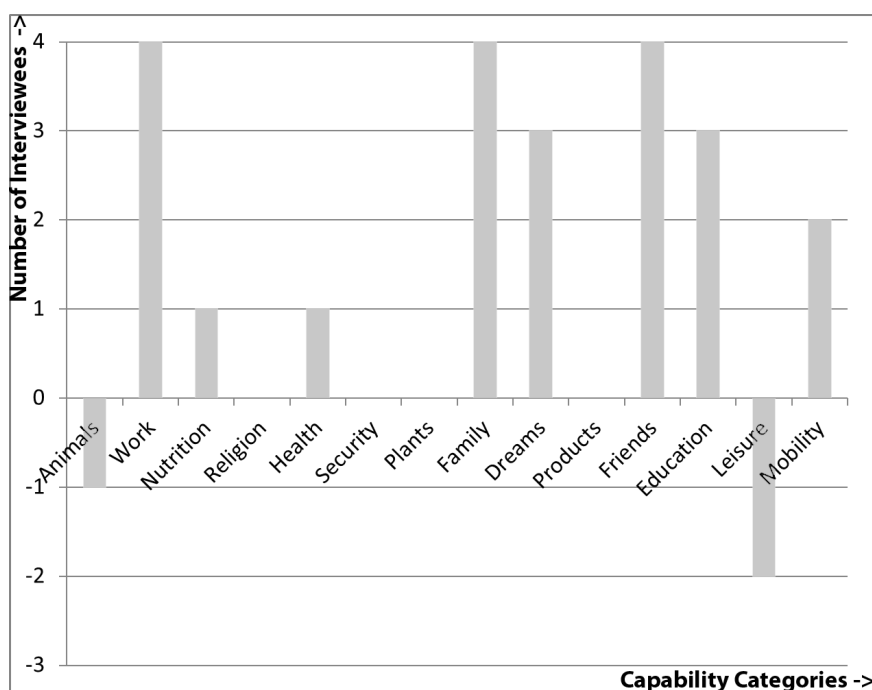


Figure 4.11: Number of Builders that Indicated a Capability Category to be Enhanced, 2012, *made by author*

Free time however was decreased for all and they reported an increase in stress. According to Ragendra, “if is there any urgency that time he gets stress, more stress compared to previous cases.” However they all agreed they were now happier than before and the implementation of the Chulha had been beneficial for them.

4.2.5 Users of the Chulha

4.2.5.1 Defining the Users of the Chulha

The research has been conducted in Chik Yel Chetti (18), Lökkere (5), Burdurundy (15) and Upkara (4). All these villages are considered tribal communities. Tribes each have their own identity and culture. They are usually all born and raised within the tribe and have little interaction with the world outside the tribal villages. Most families are uneducated, very poor and have no mentionable property so both the men and the women have to work on the landowner’s farms as daily wage labourers in order to survive. Many families are also dependent on food coupons provided by the government. However recently there has been an enormous decrease in the amount of food provided for food coupons. The villagers all live in insecure living conditions.

Most families cannot afford gas stoves, especially because that means they periodically would have to buy new gas. Even buying the already subsidized Chulha is a challenge for some people, which is why Junglescapes offers them a two day unpaid job in exchange for a Chulha. However, this of course means they cannot work on the field at the same time and thus make less money. Buying food is a challenge for some during those days.

The distribution of the Philips Chulha is not based on individual requests. Usually installations are executed per village to increase efficiency and thereby limit costs in labour hours. This means that people who are not home on the day Chulhas are being installed, do not receive one. It also means that people who are unfamiliar with the Chulha are forced to accept this product even though they are not sure whether it will be beneficial. It was clear that many people also did not use the Chulha anymore for various reasons.

Users of the Philips Chulha were initially not very eager to participate due to recent other interviews conducted in the area. A group of activist from the Forest Preservation interviewed the villagers asking about every aspect of their life pretending they were looking for ways to help. Later on however, it turned out these interviewers were mapping their lives. They used the data from their interviews to prove the tribal communities had a harmful living style towards the forest and started a trial to declare the zone eco-sensitive which would cause the inhabitants to have to relocate. Even though the outcomes of that trial were still uncertain, during the time this research was conducted, participants were quite anxious and suspicious as they thought this research was again a shadow research to define what their new way of living should be like.

Besides this, some users were also scared of allowing foreigners into their houses in order to watch their Chulha. This was because of a prophecy that had just been communicated which stated that letting a stranger pass your door step would cause a close relative to suddenly die. This made it more difficult to find out how people used the Chulha. Also it made it more challenging to get acquainted with the participant.

In general participants responded quite well mainly because Ravi and Nagendra asked them to participate. Even though some participants were anxious in the beginning, as the interview progressed most appeared to open up and started to enjoy the interview. Some differences were experienced between the different villages.

In Chik Yel Chetti people were eager to participate, especially after a few days. When only a few had been interviewed, other people started requesting to be interviewed as well. The fact that every participant received a gift also played a role here. Especially the ceramic clogs were very well received.

In Lokkere the implementation of the Chulha could hardly be called a success compared to Chik Yel Chetti. Only five out of twenty beneficiaries still used the Chulha. People in Lokkere are generally richer than those in the other villages and thus cared less about these type of projects. The reason people no longer used the Philips Chulha was because they had switched to using gas stoves. Thereby, because the villagers had heard people in Chik Yel Chetti, who belong to a lower caste, were interviewed before them, they would no longer allow their houses to be entered, as they felt insulted people from a lower caste had been given priority before them. Therefore, even the five users were not very talkative in the interviews.

Villagers from Burdurundy were often unsure about why they received the Chulha in the first place. All Chulhas were installed on the same day, not only by Ravi, but also by some students from Bangalore sent by Junglescapes. Nobody requested the Chulha in Burdurundy, but they accepted the stove because Ramesh had told that it was an improved stove recommended by Ravi. However, because it all happened in one day, the villagers experienced the implementation as very rushed. They did not have time to get to know the benefits before acceptance. The villagers however did respond very well in the interviews. Many interviews were conducted in the same house, because Ravi had the villagers line up outside the house ready to start the interview as soon as the previous one was finished.

In Upkara participants were highly suspicious in regard to the nature of the interview. The chief of this village interrupted one of the interviews and had to be convinced by Ravi that the results of the interviews would not cause any harm whatsoever. Only after Ravi gave his word, the chief allowed continuation of the interviews. People were friendly and willing to cooperate, but they would not share much information. Especially the questions regarding firewood were not well received, and made them hesitant to continue. It was not possible to interview a single person longer than half an hour as suspicion grew by the minute.

Considering the sensitive circumstances in the area over-all the interviews went well. Most participants were willing to talk and share their stories. They also understood most of the questions and were able to indicate which capabilities they enjoyed, which were enhanced and which they considered to be important.

Even though in-between the villages differences were detected in the implementation and the way the interviews were conducted, from a capability perspective the best way to differentiate between the different interviewees was per occupation. Most people in the villagers were hired farmers, some were housewives, land-owners and a few were cattle caretakers, cook or student (see figure 4.12). The differentiation was based on what these groups value. The analysis suggested there was a strong correlation between the occupation and the valued capability categories. Therefore the results were analysed and discussed per occupation.

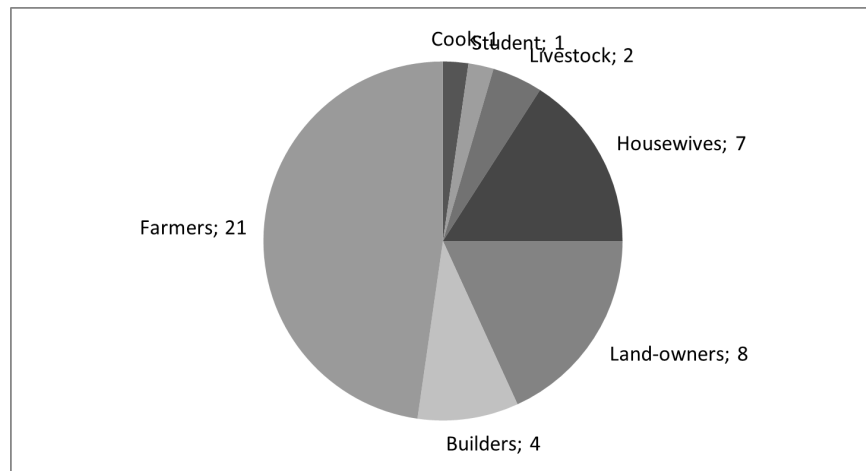


Figure 4.12: Occupations of the Interviewed People, 2012, *made by author*

4.2.5.2 Capabilities Enjoyed by Nineteen Hired Farmers

Twenty-three hired farmers were interviewed. Nineteen of these twenty-three were still using the Chulha or had been using it up till recently and could thus still express the impact. Most interviewed hired farmers lived in Chik Yel Chetti (see figure 4.13).

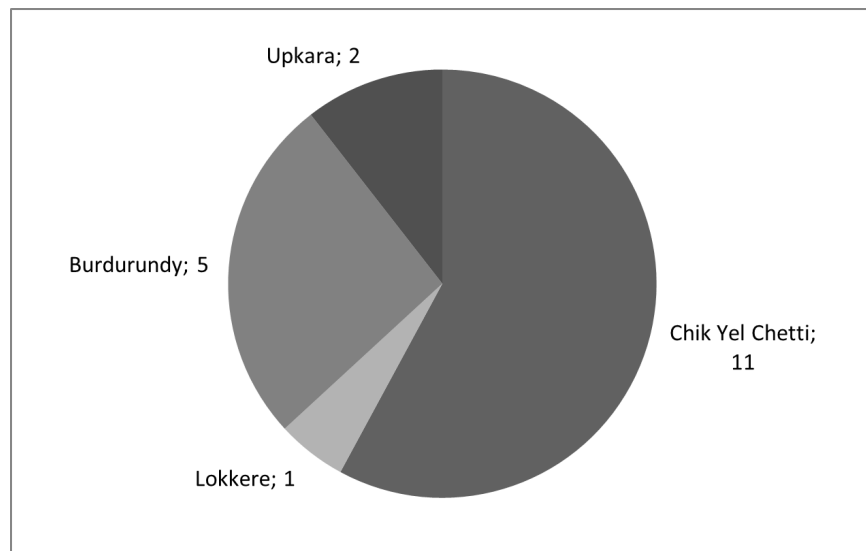


Figure 4.13: Division of Hired Farmers over the Villages, 2012, *made by author*

All farmers work for four or five days a week. The other days are often used to do household activities such as laundering, shopping and cleaning their personal field around their houses. No distinction is made between week days and weekends, every hired farmer decides per day whether it is a working day or a free day. On working days the hired farmers prepare a hot meal for breakfast and then go to the landowners to inquire about the working possibilities. If no work is available, there are no other job possibilities. People work between 10 AM and 5

PM with a one hour lunch break in between. Lunch is usually provided by the landowners. If the work is not finished at 5 PM the workers have to continue until the landowner is satisfied in order for the workers to receive their daily wage. After work the farmers prepare a meal in their houses and enjoy dinner with their family. In the evenings villagers rarely leave their houses fearing snakes, tigers and elephants. If power is available, villagers join to watch TV in one of the houses - only few have a TV. Afterwards they will go to sleep.

The results suggest four out of five hired farmers consider work to be the most important one of all capability categories. This may be due to the fact that without work these people have no income and are unable to provide food for themselves and their families. Kalsattru indicated they sometimes do not have sufficient food, because “they’ll provide a ration from the society. [...] Before one year they are going to supply 25 kgs. But now they are only going to supply 12 kg. [...] [We]’re [saying] not sufficient food.”²⁴. Their health is also considered vital. Rajamma explained that when “[I] get sick [I] won’t work, [I] take relax”²⁵. Animals are favoured in this region, as Ratnamma stated, “[...] instead of providing some plants, better to give some cow or some goat, they keep on multiplication.”²⁶. All participants interpreted animals as livestock used for work. Dreams, or life-planning, was a sensitive topic in this region as most participants expressed the wish as Nagamma “to construct [...] houses”²⁷ next to their own houses as extensions. Since they are threatened to leave this region by the Forest Department their plans may have become more important to them.

None of the farmers expressed the wish to go far away, because like Belamma they “don’t like [...] to go to other places further away”²⁸. They walk to nearby villages such as Bachalli or go by bus to Tamil Nadu, but expressed “no need”²⁸ for a bicycle, motorbike or auto. The results suggest Education is of little importance in this region as almost every participant indicated like Rajeshweri to have “sufficient knowledge”²⁹.

Ten out of nineteen of the participants felt they were healthier since the implementation of the Chulha. They experienced, amongst others expressed by Rajeshweri “less cough[ing], less eye irritation” and “fewer headaches”²⁹. Fourteen farmers indicated that due to the quick heat and less consumption of fuel, which Ratnamma explained decreased the need to “keep going to [the] forest”³⁰, they gained some time. This extra time opened up their agency to do whatever they believed to be valuable. Half of the farmers were “doing some household activities or keep on sitting.”³¹, just like Doddamma, and indicated the Chulha enhanced their leisure. However the gained time also allowed them to spend more time with family and friends, which was both indicated by five farmers. By allowing farmers to spend more time together, two farmers also expressed they had gained more knowledge by exchanging experiences. Two farmers spent the extra time on taking better care of their cattle and working more hours on the farm land and two others decided to spend the extra time on expanding their own business, weaving baskets. This way they may have experienced an increase in their self-value as well as in their income. Ratnamma used her increased income to buy items allowing her to visit the temple more often. Siddamma used her freed up time directly to devote herself to religion by using that time to clean the fields around the temple more often.

²⁴ From Interview with Kalsattru, hired farmer, Chik Yel Chetti, interview, 9 March, 2012

²⁵ From Interview with Rajamma, land-owner, Chik Yel Chetti, interview, 7 April, 2012

²⁶ From Interview with Ratnamma, hired farmer, Chik Yel Chetti, interview, 5 April, 2012

²⁷ From Interview with Nagamma, hired farmer, Chik Yel Chetti, interview, 13 April, 2012

²⁸ From Interview with Belamma, hired farmer, , Chik Yel Chetti, interview, 14 April, 2012

²⁹ From Interview with Rajeshweri, hired farmer, Chik Yel Chetti, interview, 14 April, 2012

³⁰ From Interview with Ratnamma, hired farmer, Chik Yel Chetti, interview, 5 April, 2012

³¹ From Interview with Doddamma, hired farmer, interview, 4 April, 2012

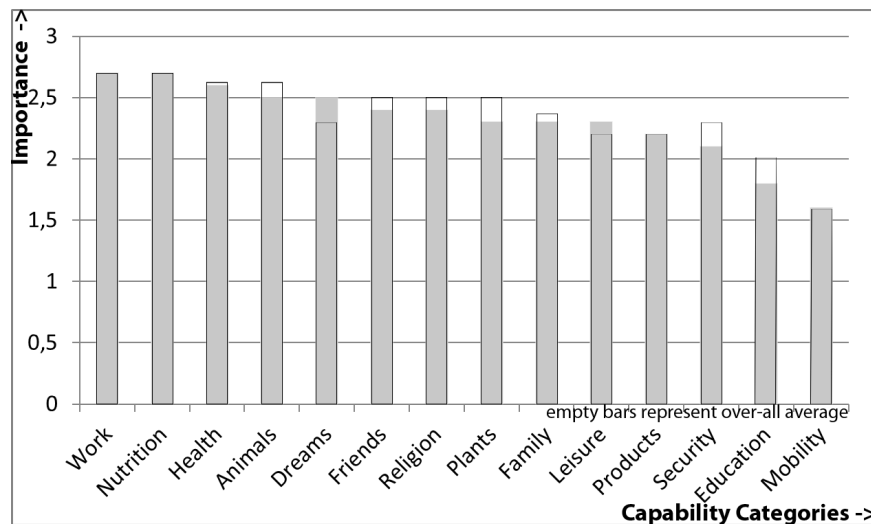


Figure 4.14: Importance of Capability Categories as Indicated by 23 Hired Farmers, 2012, *made by author*

The Chulha also allowed for preparation of new types of food that took too long to prepare on their previous stove. This led to more varied food and two also indicated it increased the respect they gained from their family. Because the Chulha required less fuel wood, it was not necessary to go into the forest as often as before, increasing their sense of safety, which was indicated by one farmer.

Many farmers enjoyed an increase in their basic capabilities and indirectly also other capabilities were enhanced. Five farmers did not notice any other changes besides a health impact. Shiva for example indicated that “whatever [we] are doing previous one year, even [we] do same thing also”³². One farmer experienced no effect because her chimney broke during the installation. Other farmers did not experience an impact because they already had an efficient stove before the Chulha and since the Chulha is quite big in size, it actually used more fuel and time.

4.2.5.3 Capabilities Enjoyed by Seven Housewives

Seven housewives were interviewed. Six of these were still using the Chulha or had used it long enough to still be able to evaluate the impact. One housewife replaced the Chulha by a gas stove. Most housewives lived in Burdurundy (see figure 4.16).

The housewives differ from the hired farmers in the sense that they do not go out to work in the field. They spend their days working in and around the house where they, like Mashamma expressed, “take care of kids, and [...] will do household activities such as washing”³³ and preparing food for their family. They did not label this as work, which could explain why they valued meaningful work lower than the hired farmers. They are not supposed to leave the house area during the day. This may cause six out of seven housewives to agree with Mashamme they “like taking care of the trees”³³ around their houses. Gathering fuel wood,

³² From Interview with Shiva, hired farmer, Chik Yel Chetti, interview, 5 April, 2012

³³ From Interview with Mashamma, housewife, Burdurundy, interview, 13 April, 2012

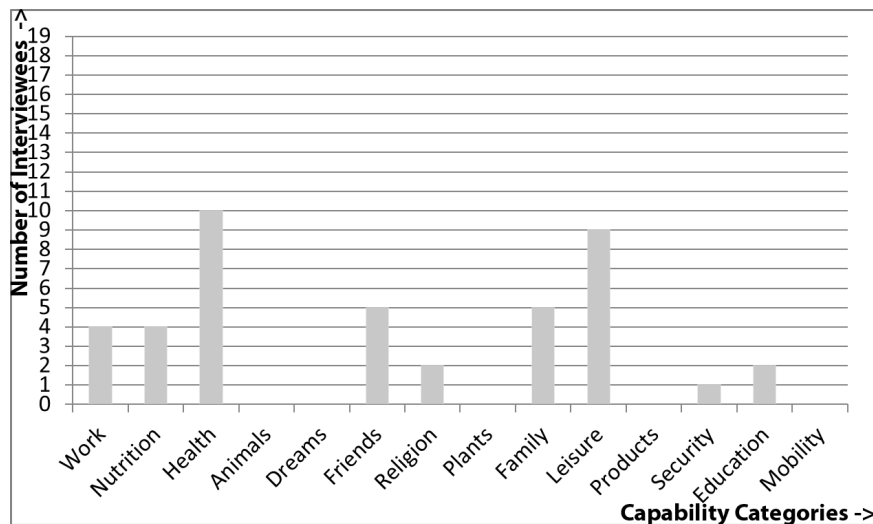


Figure 4.15: Number of Hired Farmers that Indicated a Capability Category to be Enhanced, 2012, *made by author*

usually done by men, but in the case of housewives by the women, is a risky venture due to wild animals such as snakes, which is why most housewives go together with friends to enhance their sense of safety. If their husbands allow it, they also go to the temple in the village. The housewives enjoy the comfort of their neighbourhood. Only one participant expressed the aspiration of going to places further away, but felt obligated to do her cooking chores. Despite the fact that the housewives spend most their time taking care of the family, they indicated their family to be of little importance. This may be due to the fact that most of them were very young when they got married and had to drop out of school in order to provide food for their husbands and kids. Their responses show they value education quite highly. However, none of the participants explicitly expressed the reason for valuing family so low.

Half of the participants indicated they feel less sick now, due to less emission of fumes. They spend a lot of time in the house around the Chulha. Two housewives said they value the aesthetic appeal of the Chulha more compared to their old mud stoves, which makes them feel more attached to the new Chulha. Only two participants indicated the Chulha opened up the possibility to make special treats providing them with a more varied diet. The gained time was not highly valued, since they all already had sufficient time before the acquisition of the Chulha. The housewives had trouble indicating how they spent the gained time. Three housewives hesitantly told they felt they spent a bit more time with their friends nowadays. The results suggest that free time thus hardly is an advantage. This may be attributed to the limited possibilities these women have to spend their time.

4.2.5.4 Capabilities Enjoyed by Nine Land-Owners

Nine land-owners were interviewed, of which seven were using the Chulha. Most of them inherited the land from their parents. Despite what the graph suggests (see figure 4.19) there were more land-owners in Lokkere than in the other villages. However, they were not willing to participate in the interviews.

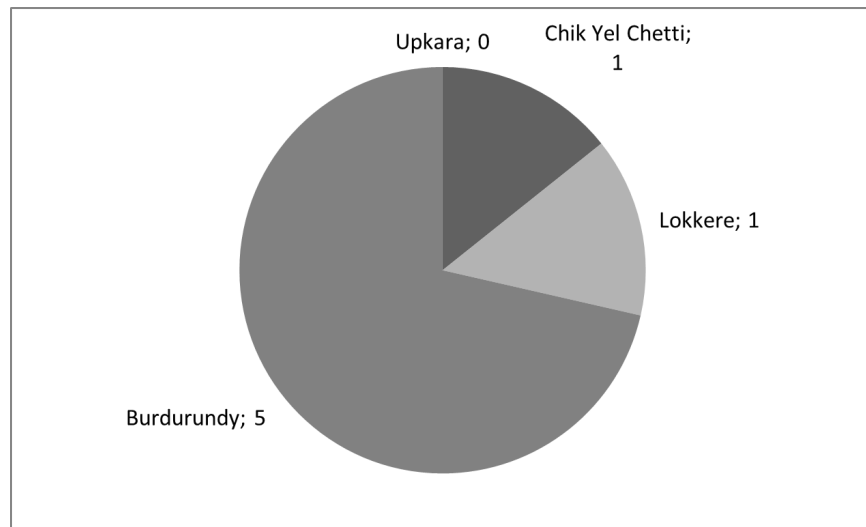


Figure 4.16: Division of Housewives over the Villages, 2012, *made by author*

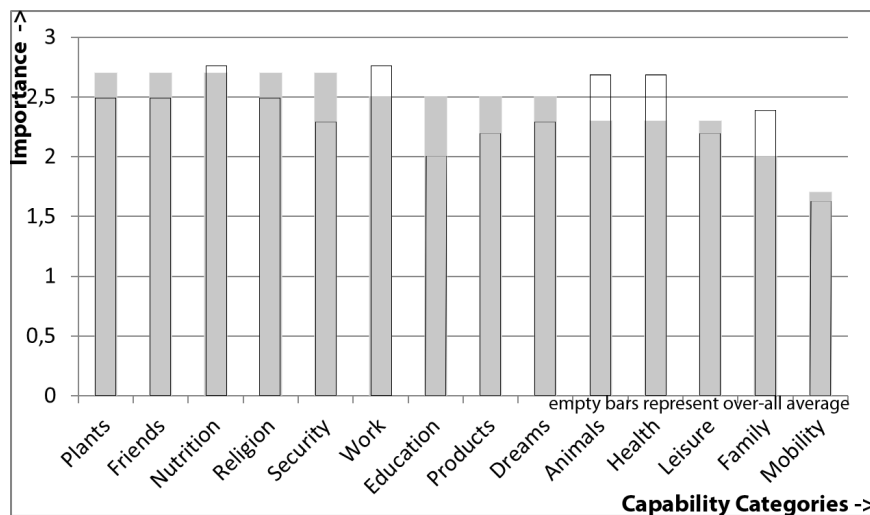


Figure 4.17: Importance of Capability Categories as Indicated by 6 Housewives, 2012, *made by author*

Land-owners are similar to hired farmers, considering they also spend their days working in the field. However, rather than having to work on other people's fields they work on their own field, often with the help of hired farmers. They generally spend more time working on the farm lands than hired farmers and do this with their near family. Most land-owners also have some farm animals which they either take care of themselves or have taken care of by a livestock caretaker. Depending on the success of their harvests they occasionally also work on other people's lands, especially when they are in need of a direct income. Their farm land and cattle are their main source of income. They indicated plants and animals to be of the highest value in their lives. Due to their busy lives, they all indicated like Rajamma to only talk to friends "during agricultural activities"³⁴. They have less contact with the community,

³⁴ From Interview with Rajamma, land-owner, Chik Yel Chetti, interview, 7 April, 2012

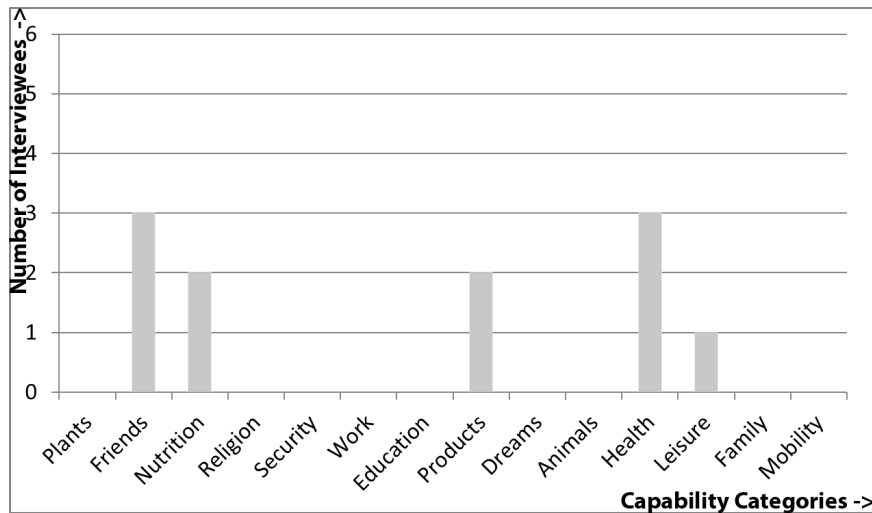


Figure 4.18: Number of Housewives that Indicated a Capability Category to be Enhanced, 2012, *made by author*

and consider their workers to be friends. None of the land-owners wanted to go to other villages. They are required to take care of their lands which one land-owner indicated to be the reason he did not want to go to other villages. The land-owners believe they live their life quite satisfactorily, which could explain why attribute less value to dreams.

The benefits of the Chulha for land-owners are more than for the hired farmers, because as Chikamarashtty for instance indicated, all land-owners also “provide food for the workers”³⁵. They cook this food themselves. Subsequently the higher burning efficiency and the quicker heating result in a relatively bigger time gain. Only one land-owner expressed no impact, because he was already using a gas stove. The results of the other land-owners clearly show their leisure time has greatly improved, allowing to do “[h]ousehold activities”³⁵, such as “[b]ringing water and washing vessels”³⁵, as was indicated by four land-owners. Besides household activities one land-owner expressed they were also able to rest more, and one watched more TV. Three land-owners spent more time with the family. Four land-owners, Rajamma amongst others, indicated they “will do more work in the agriculture field”³⁶, because they spend less time on cooking. It also indirectly improved their connection with the workers, causing two of them to enjoy their friendships more. Talking to the workers according to four land-owners also enhanced the land-owners’ knowledge, as they were able to share more field experiences. By allowing land-owners to focus more on their farm field, they experienced an increase in their income which five of them indicated to spend on food to feed themselves, their families and their workers.

Six out of seven land-owners experienced an increase in their health. The reason was explained by Chikamarashtty: “The old stove, more fumes will come, eyes burning. This stove, less fumes, less eyes burning. That’s the change.”³⁷.

³⁵ From Interview with Chikamarashtty, land-owner, Chik Yel Chetti, interview, 13 April, 2012

³⁶ From Interview with Rajamma, land-owner, Chik Yel Chetti, interview, 7 April, 2012

³⁷ From Interview with Chikamarashtty, land-owner, interview, 13 April, 2012

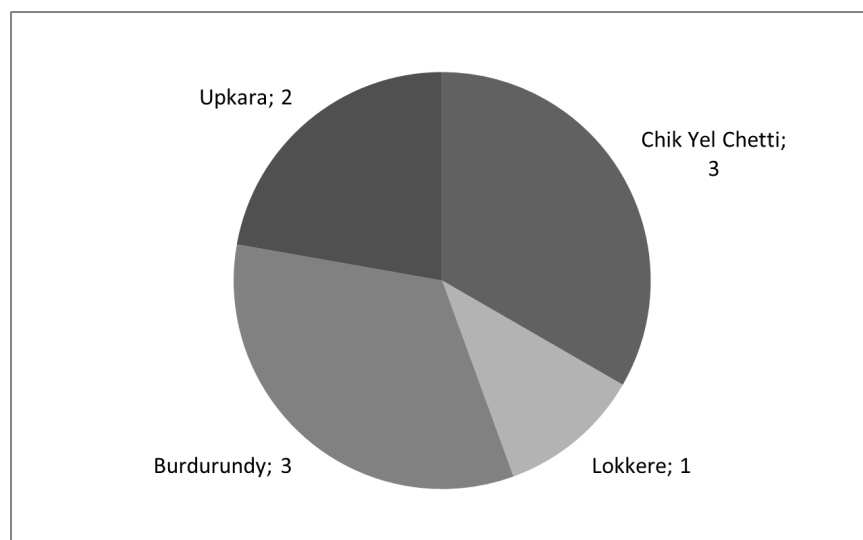


Figure 4.19: Division of Land-owners over the Villages, 2012, *made by author*

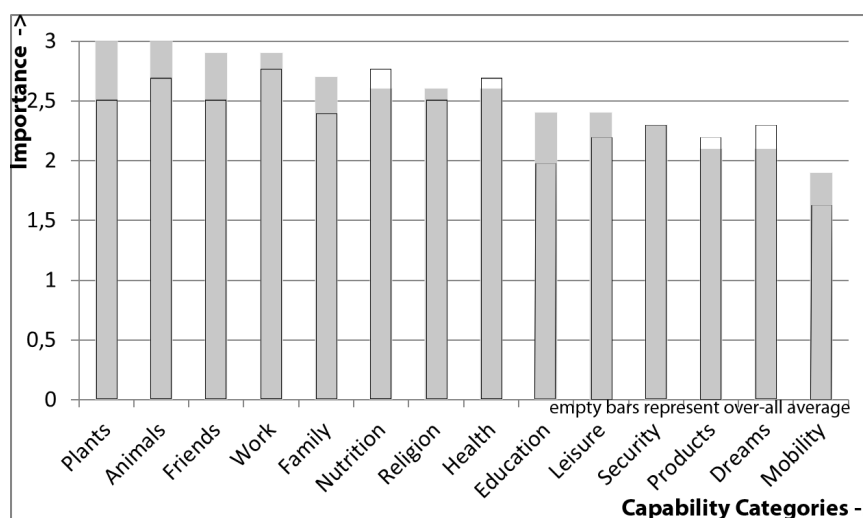


Figure 4.20: Importance of Capability Categories as Indicated by 7 Landowners, 2012, *made by author*

4.2.5.5 Capabilities Enjoyed by Two Livestock Caretakers

Two livestock caretakers were interviewed, Belamma and Pinnithayamma. Belamma lived in Chik Yel Chetti, Pinnithayamma in Lökkere. Both were females.

The livestock caretakers take care of cattle. Pinnithayamma took only care of her own cattle, Belamma took care of all the villagers' cattle during the day. She had to get up early in the morning and make a round past the houses to collect cows. With the cattle both caretakers walk daily to the forest. At the end of the day they bring the cattle back to the village. Belamma indicated animals were not of outmost importance to her. This may be due to the fact that she did not have any animals of her own.

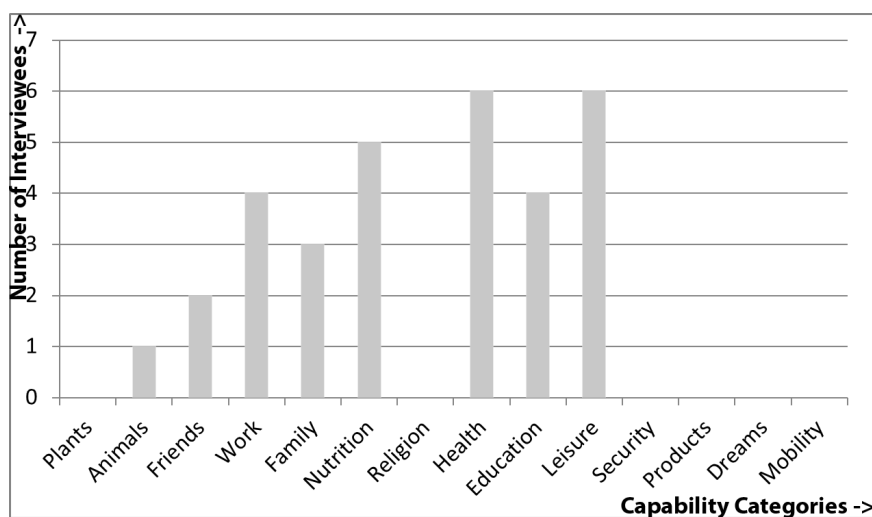


Figure 4.21: Number of Land-owners that Indicated a Capability Category to be Enhanced, 2012, *made by author*

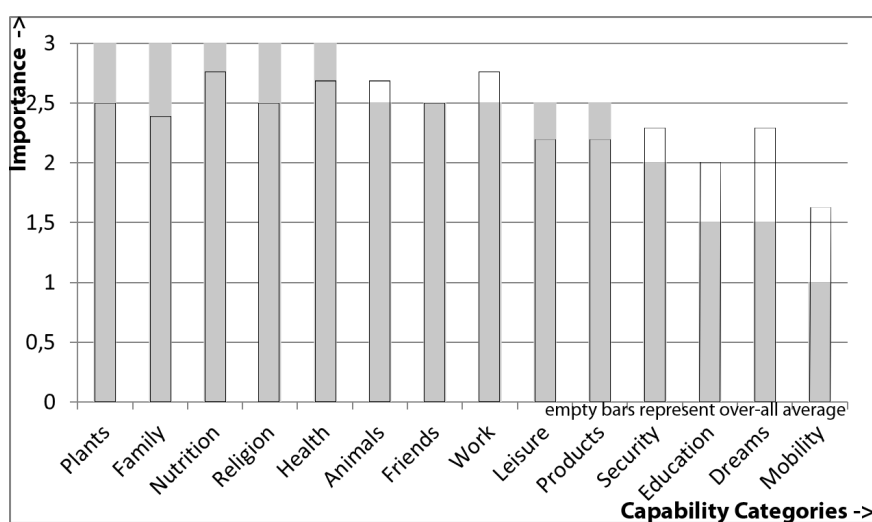


Figure 4.22: Importance of Capability Categories as Indicated by 2 Livestock Caretakers, 2012, *made by author*

Both livestock caretakers hardly experienced any impact from the Chulha. They indicated that there was no effective time gain. One of the caretakers did express that her eyes burned less due to the fact that the fumes went through the chimney outside of the house. Both caretakers removed the Chulha. They both indicated they were currently extending the house and were afraid of damaging the Chulha. They said they would install the Chulha again after the constructions were completed.

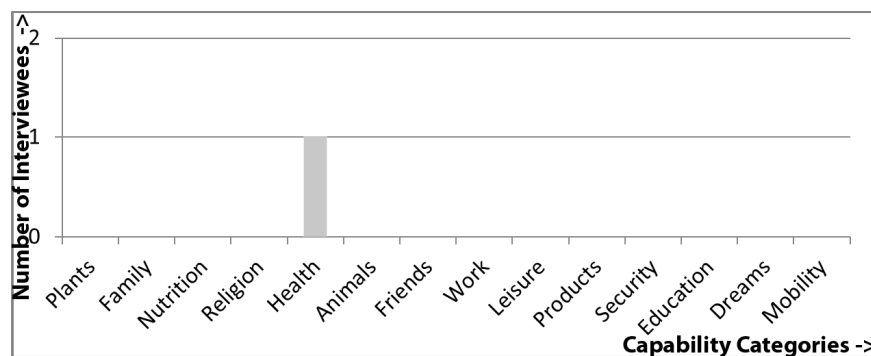


Figure 4.23: Number of Livestock Caretakers that Indicated a Capability Category to be Enhanced, 2012, *made by author*

4.2.5.6 Capabilities Enjoyed by One Student

Ashok is a student in the village who lives with his grandparents. He is in charge of all household activities, but during the day he goes to school. The results suggest he considered almost every capability category to be very important.

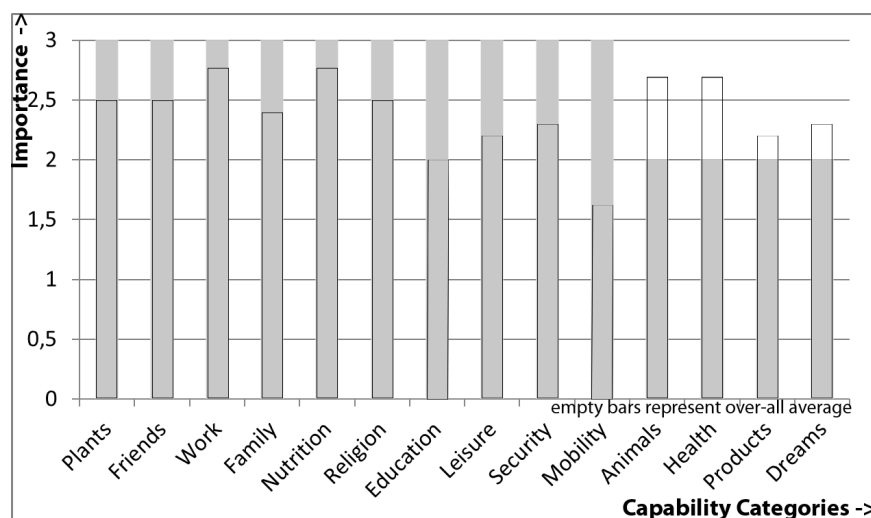


Figure 4.24: Importance of Capability Categories as Indicated by 1 Student, 2012, *made by author*

The introduction of the Chulha gave Ashok extra time which he mainly spent on studying. He felt his studying results had improved. This subsequently reassured his faith in a better future for himself.

Aside from the time gain he also indicated he was able to make papar, a type of bread, now, which took too long before to make.

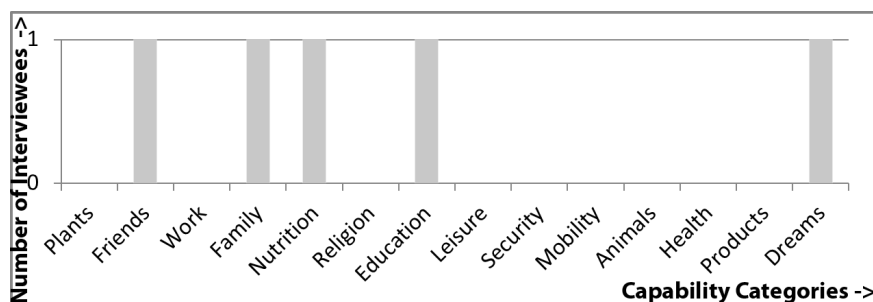


Figure 4.25: Enhanced Capability Categories as Indicated by 1 Student, 2012, *made by author*

4.2.5.7 Capabilities Enjoyed by One Cook

Siddama is a cook in a local school. She used to be a farmer, but became too old for the physically heavy farm work. She still works six days per week, and spends Sundays to wash and gather fire wood. At home she uses a Chulha, in the school she uses another type of stove which is bigger but without a chimney. She would like to have a Chulha there also. Due to her age she no longer has many dreams for the future.

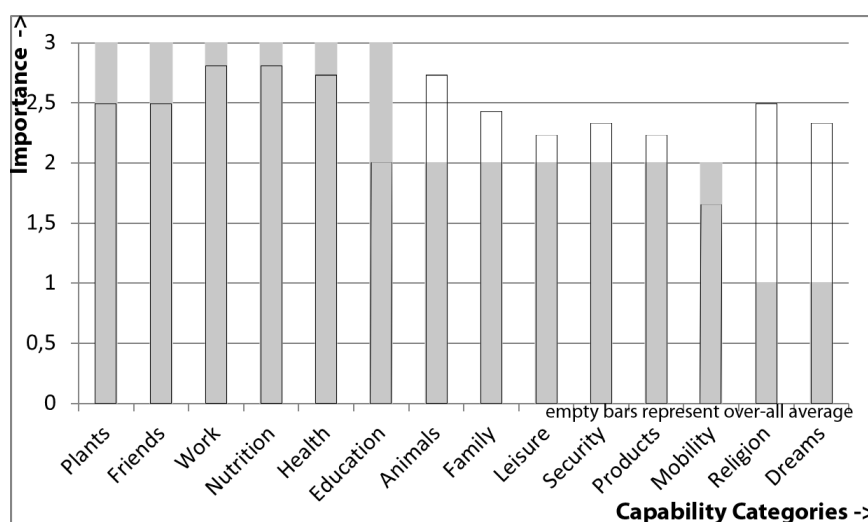


Figure 4.26: Importance of Capability Categories as Indicated by 1 Cook, 2012, *made by author*

The impact of the Chulha is very little for her, because she still cooks on an open stove in the school. However she did feel more attached to this Chulha and she notices her eyes were burning less than before.

4.2.6 Viewpoints of the Local Medic

There are three medical facilities in Bandipur area. Closest to the tribal villages is Mangala Clinic, where all villagers go with everyday complaints. A bit further away, in Bachalli, is a doctor's office for more serious injuries or long-term diseases. An actual hospital is located in

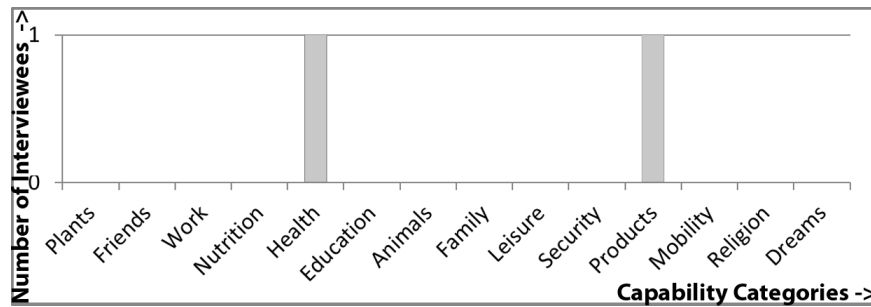


Figure 4.27: Enhanced Capability Categories as Indicated by 1 Cook, 2012, *made by author*

the nearest city, Gundlupet, about one and a half hour away by bus. For respiratory problems most people walk to Mangala Clinic.

Mangala Clinic is a clinic consisting of one medical officer, one pharmacist and four nurses. Doctor P. D. Kumar is the main doctor. Every day he helps about 30 to 50 patients with simple complaints such as headaches, fevers and coughing.

He believes the Philips Chulha has had no contribution to solving respiratory problems. The coughing, according to doctor Kumar, does not find its origin in inhaling fumes, but in allergies they are unaware of. The dusty areas, insecticides, pollen and cow dung effect their respiratory capabilities. The Chulha, he acknowledges, does succeed in reducing eyes burning and it also increases the users' life spans. The doctor however did indicate some positive influences of the Chulha. Because less energy is wasted, fuel wood is saved, which he believed to potentially have a positive impact on the surrounding area.

4.2.7 Communal Impact

When inquiring about the impact of the Chulha on the community, most villagers, Ratnamma being one of them, replied with "they're happy, that's only change"³⁸. The introduction of a new product in the region has created a buzz causing the people to interact more with each other not only within the villages, but also between the villages, leading to an enhancement of their friendships and mobility.

As soon as a few villagers had installed it, many other requested the Chulha, as expressed by Shiva: "Anybody installed. So [we] also requested to install. That's why they provided [us] that Chulha"³⁹. Like Shiva, many interviewees were unable to express why they initially believed the Chulha would be an improvement compared to their old stove. People did not immediately experience the benefits of the Chulha. This may be the reason 9 out of 41 interviewed households discarded the Chulha after installation.

The builders were in charge of the distribution and thus were also able to decide who receives a Chulha and what they had to pay. Chikamarashtty for instance indicated the Chulha was "free, [...] [we] would like to give, [...] [but we] didn't given so far [...]. Ravi and [us], very,

³⁸ From Interview with Ratnamma, hired farmer, Chik Yel Chetti, interview, 5 April, 2012

³⁹ From Interview with Shiva, hired farmer, Chik Yel Chetti, interview, 5 April, 2012

very close. That's all.”⁴⁰. At the same time other people, such as Ratnamma “requested”⁴¹, but Ravi's response was “when Chulha will come, then we will install”⁴¹. At the time of the interview they had already been waiting for 1,5 year. The results suggest that both Ravi's and Nagendra's power in the region had highly increased as well as their capabilities.

Also due to the way of implementing the Chulha, another impact was observed during the interviews. The Chulhas were highly subsidized and people were usually told to install it rather than asked whether they wanted it. The villagers in this region had in the same way received housing, power and drainage from the government. This makes them expecting more gifts and highly dependent on aid. During the interviews many participants requested new roofs, TVs and gas stoves, indicating that they believed all would just be given to them.

4.3 Actual Impact compared to the Envisioned Impact

The impact of the Chulha has been different for various stakeholder groups. Builders experienced an impact mainly due to the gained possibilities of an increased income. Users indicated enhanced capabilities as a result of a gain in time. Both income and time are abstract, which only become valuable when put to good use. Since the decision on how to spend the income or time was left up to the villagers themselves, they became in charge of their own development. This meant the agency freedom of all stakeholders increased.

An increased agency freedom however cannot always be turned into valuable capabilities. Possibilities still depend on available resources and existing circumstances. This explains why the villagers did not always pursue those aspects in life they indicated to be important.

Philips and Junglescapes both had their reasons for pursuing the Chulha project. Philips initially developed the Chulha to enhance people's health. Junglescapes implemented the Chulha to enhance health and to indirectly improve their working conditions due to better health. Junglescapes anticipated they would spend their time in various ways. Due to the reduction of fuel wood, Junglescapes anticipated the safety of the villagers would increase, as they did not have to go into the forest as often. However, neither of them had done a study to find out if these envisioned goals were actually met.

41 interviews with people from household where the Chulha had been installed were conducted. 21 out of those 41 participants reported health improvements in the form of less eyes burning and less coughing. That only half of the participants indicated this, may be due to the second pot hole in the Chulha. When the Chulha is fired without a pot covering the second hole, the fumes still go out inside the house (see figure 4.28). The local doctor found the health improvement in general unlikely to be true. Participants may have reported health improvements, because they were told their health would improve because of this Chulha. In order to satisfy the implementer, they therefore provided the answers they believed the interviewer wanted to hear. However, it could also be the Chulha did in fact improve their health, but not significantly, because as the doctor indicated many causes for respiratory problems can be identified in this region. Asking some additional questions about using the Chulha gave some new functional insights that also affected the actual impact, because “when rain

⁴⁰ From Interview with Chikamarashtty, land-owner, interview, 13 April, 2012

⁴¹ From Interview with Ratnamma, hired farmer, interview, 5 April, 2012

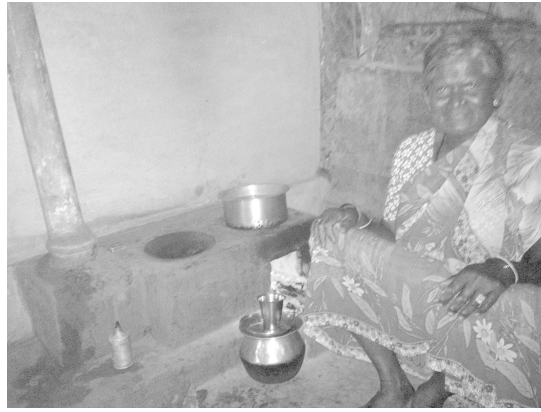


Figure 4.28: The Fumes can escape through the second Pothole, 2012, *made by author*

gets, waters fall down on the Chulha”⁴², explaining why the Chulha could not always be used and why thus some participants still kept their old stove. The interviewees did not indicate they could their work better as Junglescapes expected. The gained time was used to enhance various capabilities, as envisioned by Junglescapes. Only one participant expressed an actual increase of her safety. All other participants responded it was safe to get the fuel wood. Also not all participants indicated the promised decrease in fuel wood. This was partly due to the fact that Chulha was bigger than their original stoves. They wasted wood as they would just fill the compartment in the Chulha meant for fuel wood even if they only needed a little. Furthermore one participant used two stoves since the acquisition of the Chulha to cook quicker, which meant she used twice as much fuel wood now (see figure 4.29). The actual impact corresponds to the envisioned impact, but the percentage of villagers still using the Chulha is quite low.

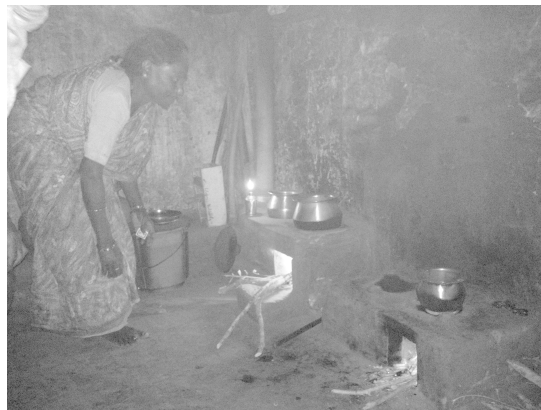


Figure 4.29: Usage of Two Stoves, 2012, *made by author*

In 29 out of 41 interviewed households the Chulha was actually being used. Even more households had also discarded the Chulha. All users however expressed the product fit their needs, customs and rituals. The habitus of the envisioned users was well-considered while developing the Chulha. Only the existence of choice was not properly met by Philips, but

⁴² From interview with Rajeshweri, hired farmer, interview, 14 April, 2012

this was solved by subsidies from Junglescapes. The implementation strategy may have been influential on the adoption of the Chulha. The implementation was forced either by the influential local builder, Ravi, or by implementing NGO Junglescapes. People did not choose themselves to acquire the product, which made them initially less in charge of their development, decreasing their agency. This may have been the reason many people felt less attached to the Chulha and had already discarded it at the time of the interview.

Some design recommendations can be formulated based on the interviews. The design of the Chulha could be made smaller. Minimizing the compartment for the fuel wood may discourage people to use too much fuel wood. Decreasing the size of the potholes would make it easier to fit vessels on the holes. In the current design many households could no longer use their old small vessels. These recommendations are specific to this region and may not be generalizable to other regions.

More important however, appeared to be the implementation strategy. Kleine's (2010) Choice Framework may be a useful guideline for implementation strategies in these markets. Junglescapes created the existence of choice. However the subsidized forced implementation removed the necessity of sense of choice, since people no longer had to understand the product beforehand. Therefore they never came to use of choice. This may have caused people to treat the product as alien. In an implementation strategy where sense of choice is necessary people have to be seduced by a product's features first. This can result in a desire, which generates an intrinsic motivation to acquire the product. People then consciously decide to acquire the product, making the initial attachment to the product stronger and the wish to make the product features come true bigger. Then the achievement of choice becomes more attainable. Acknowledging all dimensions of choice thus could help to more successfully turn good product innovations into actual achieved development.

CHAPTER 5

DISCUSSION & CONCLUSION

5.1 Discussion of Experiences with the Tool Box from the Case Study

The main research question was “How can the Capability Approach successfully be integrated into an evaluative framework for product designers to measure the impact of product innovations in emerging markets?”. After the development of the framework as described in chapter 3, the framework was tested in a case study (see chapter 4). This case study provided besides insightful information on the studied case also feedback on the framework itself. Since only one case study was performed, the experiences should not immediately be translated into conclusions. Rather the gathered information formulates hypotheses which allow for more future research.

5.1.1 How the Interpreter Influenced the Case Study Interviews

The influence of the interpreter, Rajanna, was very high during the case study. The fact that he was the only one who understood both the interviewer and the interviewee made him a key person in every interview. Five challenges were detected during the interviews, being too free translations, rushing of the interviews, familiarity with the environment, made up responses and poor level of English.

First the interpreter had the power to decide what to translate and how to interpret it. Properly instructing the interpreter was thus of vital importance and was done thoroughly before starting the interviews. The interpreter was explained the aims behind the research and all questions and materials were discussed, as well as the underlying reasons for using them. Furthermore he was asked to translate absolutely everything, both the interviewer’s as the interviewee’s words as close to the original wording as possible. Different nuances may be of high importance. Unfortunately, it appeared difficult to make the interpreter fully understand his role, similar to what happened in study III and IV at JFO (see chapter 3). A proper instruction sheet stating the tasks of the interpreter could help better communicate the role to the interpreter.

Second, despite the fact that the interpreter was instructed not to rush or interrupt the interviews, he often translated the answers immediately as soon as he got them when participants were not finished yet. For example, when asking Sathisha¹ what type of transportation she

¹ From Interview with Sathisha, hired farmer, interview, 4 April, 2012

used, she responded and while still talking Rajanna said “They go by bus”². Following question from the interviewer was “To what?”² to which Rajanna immediately could respond “They go by bus to their relative houses.”². This indicated that the participant did share more information even though she was interrupted. Furthermore he often rushed the interviewer by telling him “Then.”²³⁴ or “Next.”⁴⁵⁶, trying to speed up the interviews. Larsen (2011) argued participants tend to share fewer stories when rushed (see paragraph 3.5.3). The interpreter may have taken away participants’ time to think or concentrate, which means more insightful data could have been retrieved if no interruptions had occurred. Incorporating this in the instruction sheet could forestall this from happening.

The interpreter already was familiar with the research area because he had done his own impact study there from an environmental perspective which caused a third challenge. This initially was beneficial because it was easy to get in touch with the local builders and users. However, this also caused the interpreter to make assumptions rather than asking the questions. For instance, examples were deliberately not included in the formulation of the questions to avoid assumptions, as advised by IDEO (2011) (see paragraph 3.2.2). However, to make it easier for participants in the translations the interpreter added the options he already knew. Due to the abstract nature of the interview this was understandable, but the difficulty when interviewing through an interpreter was that it was unclear when examples were used and when they were not. Sometimes the examples could be identified, such as names of other villagers, names of nearby villages or typically used English words such as bus, TV and radio. Other times it was clear because the initial question was open-ended, whereas the interviewee answered with nodding, indicating that the interpreter changed it to a simple yes or no question. This caused the habitus of the interpreter to also be integrated in the answers provided. This also caused the interpreter to consider certain life aspects to be common knowledge, whereas they were new information for the interviewer, such as a local micro-credit system: “Interpreter: If they get more money from the association, [...] they will take any items or anything for their houses.; Interviewer: Is it like a bank? [...] They get interest.; Interpreter: Of course. Yes.; [...] Interviewer: That happens here in the village?; Interpreter: Of course.”⁷. The interpreter should thus fully understand the background knowledge of the interviewer and share all the information he has beforehand.

Fourth, the interpreter felt obligated to provide answers to all the questions even when participants were unable to. This was very clear when Sathisha⁸ was placing the capability cards on the importance sheet with help of the interpreter. “Interviewer: Did she want to move it there, or did you do it?; Interpreter: She is facing some difficulty.; Interviewer: If she is not doing it, then it is better if you don’t do it. Just tell me if she doesn’t.; Interpreter: They’re asking why you are asking all these questions.”⁸. It became clear that the participant no longer wanted to continue the interview, because she felt doubt concerning the intentions of the interviewer. Instead of translating these doubts, the interpreter had just been answering for her. The assumption is he did this in order to not let the interviewer down. This is a common phenomenon in interviewing, as participants often try to give pleasing answers to the interviewer. When working with an interpreter apparently this phenomenon can also occur. It should be

² From interview with Sathisha, hired farmer, interview, 4 April, 2012

³ From interview with Gopama, hired farmer, interview, 5 April, 2012

⁴ From interview with Malliga, hired farmer, interview, 5 April, 2012

⁵ From interview with Ratnamma, hired farmer, interview, 5 April, 2012

⁶ From interview with Belamma, hired farmer, interview, 14 April, 2012

⁷ From interview with Ragendra, builder, interview, 7 April, 2012

⁸ From Interview with Sathisha, hired farmer, interview, 4 April, 2012

made clear to the interpreter that no answer is better than a directed or fake response.

Fifth, the interpreter sometimes got confused because he did not understand the meaning of the questions. This resulted in either a discussion between the interpreter and the interviewer to clarify the meaning or in answers that did not correspond to the question at all. When asking Sathisha⁸ for example whether her old stove used to be installed on the same location as the new Chulha, “Where was it?”⁸, the response was “It was discarded”⁸. Or asking whether “[...] they have any products that they like to use?”⁸ often led to responses like “They want [...] TV”⁸. There was also confusion concerning tenses, such as “Would you like to have more free time to relax?”⁹ was answered by “Ye, they have more time [...] to relax.”⁹ or “Interpreter: She used to go.; Interviewer: She used to go? She goes?; Interpreter: She goes.”¹⁰. Furthermore he mixed ‘they’ with ‘she’ illustrated by the next example. “Interpreter: They get up, they’ll clean the field and they’ll drink some tea and they’ll prepare some food.; Interviewer: She does together with her mother?; Interpreter: No [...]; Interviewer: [...] Who do you mean by ‘they’? [...] Interpreter: She, she, she, she! [...] Are not supposed to use that word, they, they, better use she. [...] Because she is alone, no?”¹¹. As a recommendation for future interviews the interviewer needs to get to know the level of English through simple conversations in order to anticipate on this accordingly.

5.1.2 Interview Set-Up

Performing the interviews at the participants’ homes appeared to be successful in making them feel comfortable. The added advantage was that it gave direct insight into the way of living of the participants and the products they used in their houses.

The interviews were supposed to be conducted in private with the user of the Chulha only. However, family members and friends all joined in on the interview. It would have been impolite to ask them to leave. This may have influenced the participant in the answers.

The interviews started off with an introduction to state the purposes of the research. Participants understood the research was about the impact of the Chulha, which made them willing to participate. They were unable to distinguish between external researchers, the implementing organisation Junglescapes and the initial developer Philips, so all presumed the interview was conducted for Junglescapes, who they also believed to be the developer of the Philips Chulha. This may have influenced the interviews since these people felt dependent on this development agency. They may have answered what they believed Junglescapes would want to hear, hoping to receive more aid. Sometimes they explicitly demanded products, as the interpreter explained “they want some money and [...] solar, all these things they are demanding.”¹².

Unfortunately people were not willing to give a house tour. The interpreter explained this was due to the fact that they were embarrassed either because they had no belongings or because they did have them but did not want to brag. This statement was underlined by the fact that people did not share the products or resources they used while describing their daily rituals (see paragraph 3.2.2). The timeline usually does allow for these things to be shared (Larsen and Flensburg, 2011). It may be that showing personal belongings is quickly considered

⁹ From interview with Gopamma, hired farmer, interview, 5 April, 2012

¹⁰ From interview with Rajamma, land-owner, interview, 7 April, 2012

¹¹ From interview with Ratnamma, hired farmer, 5 April, 2012

¹² From interview with Chikamarashtty, land-owner, 13 April, 2012

bragging in this region. Another explanation is that both the interviewer and the interpreter male. The women may have felt uncomfortable about inviting two strange men into their homes. However from outside part of their products could often still be seen.

Therefore, all interviews started off by sitting in front of their houses on a plaid. As soon as the Tool Box was put in front of the participants, they showed great interest and curiosity. First pictures of the interviewer's homeland were shown, making the interview more casual as anticipated, based on Larsen (2011) (see paragraph 3.4.2). They also expressed amazement by the fact the interviewer came such a long way to talk to them.

The interview itself was conducted using a timeline, sensitizing cards and an importance sheet. These are discussed more in-depth in the following paragraphs.

After the interview, participants received a gift consisting of a cup, a spoon and a set of miniature ceramic clogs, native to the interviewer's hometown. Especially the clogs were received with great enthusiasm (see figure 5.1), "she's happy now, [...] [s]he likes that amongst those items"¹², and shown to other villagers. This increased the willingness of other villagers to participate, at some point even lining up for an interview so that they would also receive this gift.



Figure 5.1: Participant Happy with the Gifts, 2012, *made by author*

5.1.3 Timeline as a Way to get Familiar with the Habitus

The description of a normal day proved to be of good use to start off the interview (see figure 5.2). It was an easy start without in-depth questions where the interviewer showed he had interest in the participant's life. It worked especially well because people's daily rituals in this region were very similar every day. This was very different from the results of study I and II in the Netherlands, where daily rituals were too different from day by day. The sensitizing cards, discussed in the following paragraph, were supportive during this phase. Over-all the timeline really helped getting a feeling of the participant's life in an open, unstructured way before going to the predefined questions in the semi-structured part of the interview.

Having people describe what they perceive as a normal day gave indeed great insight. Their behaviour, reasoning and personal lives could be discussed because of the choice for an interview setting (Bowman, 2010) (see paragraph 3.1.3). Thereby daily rituals were uncovered,

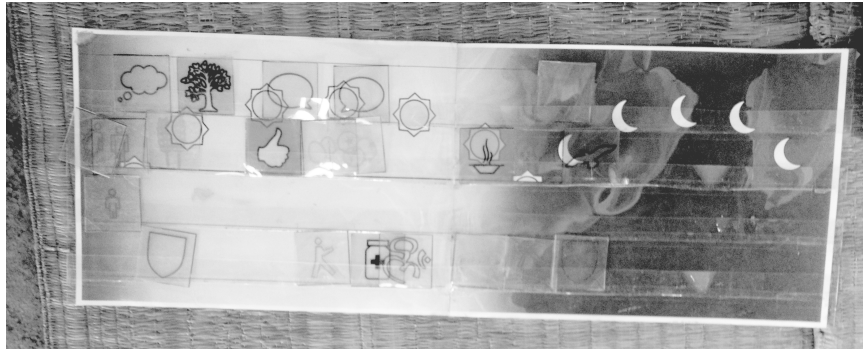


Figure 5.2: Timeline in Use, 2012, *made by author*

according to plan based on Larsen (2011) (see paragraph 3.2.2). As discussed in paragraph 2.2 this was used to encourage the feeling of intimacy and trust (Gawler, 2005). They shared their habits from the moment they got up until they went back to bed, indicating the different lives they led. For instance learning what time they get up, around “7 o’clock”¹³, combined with when they go to work, 10 o’clock, teaches how much time is spent on morning rituals. In the morning besides “wash[ing] the field in front of the house”¹⁴ they usually made “some coffee or tea”¹⁵ and “prepare[d] food [...] at 9 o’clock”¹⁶. In the “morning [...] [we prepared] lunch also”¹⁷. Then they “went for farming, [...] work all the day till 6 o’clock [...], make some tea and [...] cook again”¹⁷. Then they “sit sometime, and they sleep”¹⁸. The knowledge of these daily rituals was used to find out that the stove was usually used twice a day to make mainly traditional Indian dishes, as “chapatti, ragiball and rice”¹⁹ or “what is there in the house, we will [eat] that”²⁰. By sharing their daily rituals, participants seemed encouraged to reflect upon their lives, as Gawler (2005) indicated (see paragraph 2.2). Because participants could decide which details to share, it helped creating step-ups and determining which topics would be worth discussing more.

Besides learning what people did on a daily basis, the timeline also showed with whom they interacted on a daily basis. This helped to identify potential other stakeholders involved as was also found by Bowman (2010) (see paragraph 3.1.3). For instance, they indicated with whom they got up, explaining the way families were arranged in this region. For example, while working Sathisha explained the “kids [...] go into school”²¹ and in the evening Doddamma “spend[s] some time with her husband”²². As on a normal day participants usually went to work, and for instance they were “eating with colleagues”²³, “one day five members, one day two members”²⁴, sometimes “with ten”²⁵. This gave insights in the power structures and the

¹³ From interview with Doddamma, hired farmer, interview, 4 April, 2012

¹⁴ From interview with Malliga, hired farmer, interview, 5 April, 2012

¹⁵ From interview with Gopama, hired farmer, interview, 5 April, 2012

¹⁶ From interview with Sathisha, hired farmer, interview, 4 April, 2012

¹⁷ From interview with Rajeshweri, hired farmer, interview, 14 April, 2012

¹⁸ From interview with Doddamma, hired farmer, interview, 4 April, 2012

¹⁹ From interview with Sathisha, hired farmer, interview, 4 April, 2012

²⁰ From interview with Rajamma, land-owner, interview, 7 April, 2012

²¹ From interview with Sathisha, hired farmer, interview, 4 April, 2012

²² From interview with Doddamma, hired farmer, interview, 4 April, 2012

²³ From interview with Ratnamma, hired farmer, interview, 5 April, 2012

²⁴ From interview with Gopama, hired farmer, interview, 5 April, 2012

²⁵ From interview with Doddamma, hired farmer, interview, 4 April, 2012

way people interacted.

By learning about what they did, the existing power structures were also partly uncovered. For example Gopama explained “which work they’re told, that work they’ll do in the farmer field [...], removing of weeds, and all those things they will do.”²⁶. The hired farmers indicated to sometimes work for Ravi, and sometimes for somebody else, indicating the flexibility and uncertainty of their jobs including their dependence on the land-owners.

Finally the timeline was successful in identifying current challenges people faced on a daily basis as planned reconfirming Larsen’s (2011) view on timelines (see paragraph 3.2.2). For example Siddamma explained every morning she “brought some water, it’s far away to bring water. Cause there water tank, so they bring water.”²⁷ and “they provide some cooker, a cooker, but [I] can’t able to handle. [My] son can handle.”²⁷. Explaining their current habits they also indicated what they believed they lacked, for instance in the evening Chikamarashtty “just sleep[s], no TV entertainment”²⁸, because “[n]o power supply.”²⁸. These could be identified as future development opportunities.

The timeline formed a good start-up for the questions, because people had already started thinking about the way they lived their lives. Furthermore the interviewer already had a sociocultural frame of reference within which their answers could be placed. The questions could therefore target underlying reasons more specifically.

5.1.4 Enjoyable and Overwhelming Sensitizing Cards

The cards supported the questions regarding the description of the day. They were helpful in creating an open, more loose and playful way of interviewing.

The cards initially functioned as a way to break the ice and generate curiosity. While providing answers, they were used to visualize these, creating a way to check the answers in a more direct way. Gawler (2005) already indicated the sheets could work as a mnemonic for the interviewer (see paragraph 3.5.2), which proved to be very valuable. For example when talking about the family, the interviewer said “This is the son [puts down card]. These are the older people with the stick [points at the other cards].”²⁹. Sometimes people would inquire about the cards themselves, as happened in the interview with Malliga: “Malliga: If [we came] by bus, you would put the symbol of bus no?; Interviewer: Yes[...]. I would[...]; [Malliga and husband laughing]; [...] Interviewer: This is bus.”³⁰. Unfortunately not many people remained intrigued by the cards long after the initial introduction.

Interviewees were not able to put down the cards themselves as was planned to create a collaborative way of interviewing and make them feel more empowered. The reason this did not work was twofold. First of all there was an enormous amount of cards, which was very overwhelming to the participants. Providing overwhelming material was already anticipated to be a potential issue based on Londen and Hart (2004) and Von Hippel and Katz (2002) (see paragraph 2.2). They had no idea which cards existed so which ones they were supposed to select. Second the cards were developed to be used for universal purposes. As it turned out

²⁶ From interview with Gopama, hired farmer, interview, 5 April, 2012

²⁷ From interview with Siddamma, hired farmer, interview, 14 April, 2012

²⁸ From interview with Chikamarashtty, land-owner, 13 April, 2012

²⁹ From interview with Gopama, hired farmer, interview, 5 April, 2012.

³⁰ From interview with Malliga, hired farmer, 5 April, 2012

the abstract depictions were not always understood. The fact that it was printed on transparent sheets made it even more difficult to distinguish the shapes. In order to get participants more involved with the cards local pictures should be developed.

5.1.5 Complexity of Questions and Scales

The questions were divided into sensitizing questions and capability questions. For the capability questions initially scales were used to determine to what extent the participant felt a certain life aspect had increased or decreased since the implementation of the Chulha. All the capability categories were addressed in a semi-structured way making use of the already acquired knowledge from the timeline. It worked well, however, some categories contained questions that were not properly understood as is described in following section.

5.1.5.1 Preparation

Sensitive Questions As already discussed in chapter 4, some questions were removed beforehand in consultation with the interpreter and the local contact. The experienced affection or possibility of leaving a husband were removed because participants were expected to be offended by them. Fowler (2009) suggested for sensitive questions in interviews to be asked in a third person perspective (see paragraph 3.2.3). Local contacts nonetheless advised against this and preferred complete elimination of the questions. Questions regarding the accommodation could not be asked because participants were afraid of losing their homes due to current political developments. For the same reason, no questions were asked regarding their political views or freedoms. However during the interview sometimes their accommodation did come up concerning facilities, such as “she don’t have even no power in her house”³¹. Or when talking about their dreams, many people expressed the wish to “extend the houses”³². So even without directly asking questions regarding their houses, knowledge could still be gained regarding the perception of their houses through other indirectly related questions.

Even though the questions were discussed thoroughly beforehand, during the interviews some topics appeared to be sensitive as well. For instance, Ratnamma could not be asked questions regarding family because she was unmarried and her brother died recently, which also caused her relationship with her mother to be worsened. Because the interpreter, being familiar with the local people, had this knowledge, these questions were skipped in the moment. However the interpreter could not foresee everything. For example, one time when asking about happiness concerning partnerships, he during the interview realised “they feel doubt, they can’t able to talk more.”³³. In the same family category another participant actually started crying due to recent family losses: “Again they’re refreshing and crying. Refreshing, crying. Their husband also died. Kids also dead. Suffering lot of things.”³⁴. Chikamarashtty became emotional again when her friendships were discussed, “Ok, don’t ask more, little bit important it has. They’re crying.”³⁴. Another villager also became very emotional when she was asked about her friendships, and said “[I] never interact with the people. They are not good [...],

³¹ From interview with Nagamma, hired farmer, interview, 13 April, 2012

³² From interview with Rajeshweri, hired farmer, interview, 14 April, 2012

³³ From interview with Sathisha, hired farmer, interview, 4 April, 2012

³⁴ From interview with Chikamarashtty, land-owner, interview, 13 April, 2012

[I am] lonely. [I] don't interact with anybody.”³⁵. Finally it turned out “they [got] hesitation to talk regarding money”³⁶. It is important to always stay alert during the interviews how participants respond emotionally in order to determine whether it is ethical to continue.

Anticipated was that inquiring about health or family fights would also be considered very personal, yet people were very open in sharing “some itching that's all [...] [d]ue to some infection.”³⁷ and “sometimes in the family [we] maybe take some conflicts. In the family, that's quite common.”³⁸. That some topics were less and other more sensitive to these people could not have been predicted beforehand. This confirms Bowman and Crew's (2010) and Crul and Diehl's (2008) statement that an evaluation framework or research questions can only be well-prepared when the researcher has already grown partly familiar to the area as was already anticipated in paragraph 2.2. A local contact could help in creating a short description of all villagers beforehand to assure that people do not feel embarrassed or bothered with the interview.

Background Knowledge The local contact could be of more help in giving background information. However, no assumptions should be created based on subjective knowledge of one individual. Objective information can help though to better understand the local context, as was also argued by Philips (2010). When Gopama expressed she went “by bus to Gundlupet or Bachahalli”³⁹, it was good to already be aware of these other local villages. That saved time in which the interpreter would otherwise have to give explanations to clarify answers, such as “They used to go this way, there is no bus. So they go by walk. If they wanted to go by this way, this way there is bus, they will go by bus.”⁴⁰. Furthermore a long discussion between the interpreter and the interviewer of why a participant was not able to go to the temple more often, was finally solved by the interpreter explaining “You have to give something, some banana, or some priest items, coconut, banana.”⁴¹, which made it clear money was the issue. Learning about the local ways of practicing Hinduism would have helped understanding quicker that “when she has to do, she have to do. [...] So she would like to do more religion. [...] She can't do all the time. Only during the festivals.”⁴². Knowledge and education also turned in out in the interviews to have little to do with school. Most participants felt the best way the gain knowledge was by talking to their husbands, other farmers or to researchers who came to the area. Background information regarding all the other topics could have speeded up the interviews asking better directed questions.

Misunderstanding that now occurred during the interviews could have been forestalled by discussing the background beforehand. Asking about ‘attachment’ for example “Do [...] [you] feel attached to products?”⁴³ often gave answers like “[We] want some TV and all”⁴³ and “Do [...] [you] feel attached to plants?”⁴⁴ gave answers like “They have only one tree.”⁴⁴. This did give insight in their factual surroundings, however they were often unable to express their personal attachment to plants, animals or products. This may have because they did not

³⁵ From interview with Siddamma, hired farmer, interview, 14 April, 2012

³⁶ From interview with Sathisha, hired farmer, interview, 4 April, 2012

³⁷ From interview with Malliga, hired farmer, interview, 5 April, 2012

³⁸ From interview with Sathisha, hired farmer, interview, 4 April, 2012

³⁹ From interview with Gopama, hired farmer, 5 April, 2012

⁴⁰ From interview with Malliga, hired farmer, 5 April, 2012

⁴¹ From interview with Ratnamma, hired farmer, 5 April, 2012

⁴² From interview with Sathisha, hired farmer, interview, 4 April, 2012

⁴³ From interview with Sathisha, hired farmer, interview, 4 April, 2012

⁴⁴ From interview with Gopama, hired farmer, 5 April, 2012

understand the question or because they did not want to share their feelings. It turned out during the interviews that “community, friends, almost are same”⁴⁵, and dreams and planning also “both are same”⁴⁶. Another confusion when Rajamma was asked whether she ever felt lonely, and he answered: “Whenever [I] get sick, during that time, [I] get lonely. For getting rest.”⁴⁷. Clearly the difference between alone and lonely was not understood or experienced as such. The interview questions considered all these terms to have different meanings, which by straightening out beforehand could lead to less confusion and better results during the interviews.

5.1.5.2 Execution

Sufficiency Scales The sufficiency scales, used with the questions on which participants were required to indicate to which extent they felt they could enjoy a certain life aspect sufficiently. The scales were added to make this research more structured and repeatable. As explained in paragraph 2.5 previous studies were too open and unstructured for repetition (Robeyns, 2006). However the scales were not properly understood. Explaining the scale before a question caused participants to understand it just that time, but after having asked some open-ended questions they were unable to recall how the scale worked. The scales were therefore removed after the first interviews and not used in the analysis of the data. This caused the enhanced capability data to be less quantitative.

Underlying Reasons The questions that were understood usually provided proper understanding of underlying reasons. As discussed the timeline allowed for the follow-up questions to be more directed in order to probe deeper. For example, in questions about the family it was already clear with whom she lived. Underlying reasons were found by asking follow-up questions in a deep dialogue as was suggested by Gaver et al (1999) (paragraph 2.2). For example, the underlying reason for not going to the doctor was expressed by Siddamma as “oftenly [I am] not able to go, because [I] don’t have money”⁴⁸. People were usually capable of explaining their behaviour and providing underlying reasons. The main rule in order to get to these underlying questions, is by keep asking ‘Why?’.

Interrelated Capability Categories Often while asking questions regarding one category, other categories were also discussed. Deep discussion uncovered interrelations between different life aspects (IDEO, 2011). Questions about health for example also cover which places they visit for medical facilities or how they get there, as explained by Siddamma: “[I] go by jeep or by bus. [I] go to Bachahalli and Mangala. Depends on facility for transportation.”⁴⁹. Or when inquiring about their dreams, answers like “[we] discuss regarding improvement of the houses”⁵⁰ or “with children [I] talk”⁵¹ provide insight in respectively their satisfaction with their accommodation and key persons in their lives. The interviewer inquired more

⁴⁵ From interview with Nagamma, land-owner, 13 April, 2012

⁴⁶ From interview with Malliga, hired farmer, 5 April, 2012

⁴⁷ From interview with Rajamma, land-owner, interview, 7 April, 2012

⁴⁸ From interview with Siddamma, hired farmer, interview, 14 April, 2012

⁴⁹ From interview with Siddamma, hired farmer, interview, 14 April, 2012

⁵⁰ From interview with Gopama, hired farmer, 5 April, 2012

⁵¹ From interview with Nagamma, hired farmer, interview, 13 April, 2012

about a just mentioned topic rather than sticking to the originally planned order of the questions, contradicting IDEO's (2011) definition of a smooth dialogue, yet more in line with Hart and Simanis (2008) (see paragraph 3.4.2). Hart and Simanis' (2008) approach worked, yet in order to manage this more unstructured way of interviewing it is essential for the interviewer to know the questions of all categories by heart.

5.1.5.3 Outcomes

Development Opportunities Opportunities for improvement of the participants' lives were also identified during the interviews, either because participants explicitly asked for aid or because they described troubling issues. Gopama said "[I] have a feel, dream. But [I] don't have opportunity to. [...] Because [I] didn't get [...] farm lands to cultivate something."⁵². Others had more simple requests, such as "if [...] power came, [we] used to plan to bring some radio, TV."⁵³ or "instead of free stuff, [we] have to add another rooftop, another type of rooftop"⁵⁴. These expressed opportunities could be further investigated.

Product Impact By gathering all this information concerning their capabilities, a link could be established between changed capabilities and the product in order to determine the actual product impact. First users gave the impact from a functional perspective, since "before it [took] more time. Just half an hour extra"⁵⁵. Asking participants what had changed since the implementation of the Chulha almost always gave the answer 'nothing', however, by checking the capabilities individually more and more changes emerged. Development was earlier defined as "freedoms people enjoy" (Sen, 1999, p. 3) (see paragraph 2.3), but in the interviews only enjoyed functionings were found. This was due to the fact that people had more trouble expressing their feelings than expected. Behavioural changes and underlying reasons were easier to identify.

The final connection between capabilities and the Chulha was made in the end. Unfortunately participants had sometimes lost their concentration and were less eager to answer. Asking some additional questions about using the Chulha gave some new functional insights that also affected their enjoyed capabilities, because "when rain gets, waters fall down on the Chulha"⁵⁶, explaining why the Chulha cannot always be used and why thus some participants still kept their old stove. These functional aspects helped link the achieved functionings to the product innovation and design process.

5.1.6 Importance Sheet Gives Insight in Values and Differences

Participants were asked to put a capability card, each depicting one of the capability categories, on the importance sheet indicating their importance (see figure 5.3). The importance sheet gave very clear quantitative data. Participants were asked afterwards if they wanted to shift in retrospect.

⁵² From interview with Gopama, hired farmer, 5 April, 2012

⁵³ From interview with Malliga, hired farmer, 5 April, 2012

⁵⁴ From interview with Rajeshweri, hired farmer, interview, 14 April, 2012

⁵⁵ From interview with Chikamarashetty, land-owner, interview, 13 April, 2012

⁵⁶ From interview with Rajeshweri, hired farmer, interview, 14 April, 2012



Figure 5.3: Importance Sheet in Use, 2012, *made by author*

The importance sheet was understood very well. Only during the first interview confusion occurred because the interpreter did not understand the questions, which became clear when he intended to clarify an answer with “Is more than sufficient”⁵⁷, which should be of no relevance in indicating the importance. After explaining still extra information was needed to clarify the categories, for example: “Family means how important she is in family?”⁵⁷. Ambiguity existed as it was not made clear whether participants were supposed to indicate whether a certain category was important in their current life or whether they valued it for the future. Participants were told to indicate what they found important including their aspirations. The data from the importance sheets helped in defining stakeholder groups and understanding what the different individuals and stakeholder groups valued.

Why participants valued one aspect more than another was not asked. Sen (1999) argued people are responsible for formulating their own goals (see paragraph 2.3), so people were asked about what they valued based on a predefined list. Their functionings were then measured to see if they had been able to expand those capabilities that were important to them. However, what the framework did not take into account was inquiring why they did not choose to enhance their highest valued capabilities. Various reasons may have played a role, be it external or internal, which should be clarified by the participant.

5.2 Limitations of the Research Project

The first limitation of this research is that the author was initially unfamiliar with the CA and had no prior experience with designing with emerging markets. This caused many decisions that were made during the development of the framework to be based on assumptions or a selection of the literature. Somebody more familiar with the CA might be more successful in translating the actual values of the CA into an evaluation framework. Somebody experienced

⁵⁷ From interview with Sathisha, hired farmer, interview, 4 April, 2012

with designing with emerging markets may be better in anticipating differences in cultural values.

The second limitation of this research is that the tool was tested and evaluated based on the results from a single case study. This case study was executed one location with one product, making the information highly contextual, yet this is not a real hindrance, since the aim was to develop a methodological approach and a theoretical framework. Only one researcher and one interpreter have been involved in the research which means their influence is omnipresent throughout the results. The conclusions are only based upon this single case study, whereas actually more case studies are needed before definite statements regarding the use of the tool can be given. One case study does not provide enough data to state the value of the framework with full certainty, but based on the first experiences the potential can be identified.

Third, the case study was executed in a limited amount of time. The interpreter had to be accepted because there was no time to look for another one. Also localized sensitizing cards could not be developed. The limited time also meant the selection of participants was solely based on their availability. There was not enough time to properly define different groups and interview equal parts of every group for comparison. Also there was no time to do focus groups which could be helpful in verifying the results.

Fourth, results from a case study hardly ever lead to firm conclusions due to the limitations case studies have (see paragraph 4.2.2). The contextual information, the pleasing answers and the language differences all make the responses not generalizable. Generalizable conclusions are not essential though since they are often not useful to understand the specificities which are sought for in the first place.

5.3 Conclusions: The Tool Box as a Way to Identify Impact

5.3.1 Creating Rich Data from Qualitative Interviews

Interviews were conducted with the initiators, developers, implementers, subsidizers, builders, users, and other affected villagers. Based on the interviews with the initiators, developers, implementers and subsidizers, the envisioned capabilities could be determined as well as their consideration of the habitus and the dimensions of choice in the development process (see section 4.2). These have been correlated with the actual enjoyed capabilities as identified in the interviews with the users. This was done in order to find out if the actual impact corresponded with the anticipated impact.

The results suggested the impact could not be generalized for all users altogether. Based on what they indicated to be valuable, the interviewees were split into different groups. This resulted in a classification per occupation. The impact on their lives was therefore also evaluated per occupation. The quantitative data from the importance sheets showed what people valued. For every stakeholder group the qualitative data was used to describe the habitus, underlying reasons for their values and the product impact.

The reasons they provided for acquiring or not acquiring the Chulha was combined with the data from the builders and the implementers. This gave insights in the existing dimensions of choice, which have been described by Kleine (2010).

5.3.2 Success of Incorporation of the Habitus and the CA in an Evaluation Framework

The main aim of the research was to create a product innovation evaluation framework. The framework combined Sen's (1999) CA, while considering Kleine's (2010) Choice Framework, with Bourdieu's (1993) concept of habitus, in order to evaluate development through product innovation in emerging markets. The value of the CA was that it helped to create categories and guiding questions. The habitus and choice framework were both mainly supportive to this cause. Each theory developed in the social sciences had its own added value to the evaluation.

The questions derived from the CA diminished the interviewer's assumptions. Setting aside own ideas and viewpoints allowed for a deep dialogue where the participant could just share, corresponding to findings of Gawler (2005) and Hart and Simanis (2008). By touching upon many different life aspects the questions helped to identify the full impact. The framework was successful in identifying achieved functionings, yet less successful in identifying capabilities. The CA proved to be very valuable as it distracted the interview from the direct functional benefits, which were abstract and only means to open up other possibilities (e.g. time and money). Instead it provided a framework capable of deriving truly valuable changes which had occurred for the individuals themselves.

Considering the habitus helped in understanding why people behaved the way they did. Asking them about their daily rituals and insisting on explaining underlying reasons led to a quick understanding of the social structures and individual interests. Knowing and understanding why a participant chooses to lead his life a certain way gave insight into why the use of the Chulha had led to different impacts on different stakeholder groups and individuals.

However, part of people's habitus was influenced by the developmental organisations who had been providing them with material aid for decades. This caused them to have a distorted view of what they believed to be their due. It was earlier argued by Jones (1999) that an equal world consists of people having what they sense they have right to have, yet based on the results it can be hypothesized that people are not able to properly evaluate their inner needs after interference of alien parties with their habitus. Using Bourdieu's (1993) metaphor of field this interference can be explained. Bourdieu linked the field and rules to the social structures and the players to the habitants. The external, alien parties can be seen as the viewers of the game who throw objects into the game. One player is bound to come across this object, pick it up and potentially changing the rules and the structures of the game, yet without a sense of history explaining where the change came from. Since the acquisition of the object appeared without a clear reason or explanation, it is obvious the other players begin to expect to also suddenly receive new objects.

Another way of understanding this is through Kleine's (2010) Choice Framework, as it was clear that by the forced implementation the sense of choice was surpassed (see paragraph 4.3. Linking the dimensions of choice to the development and implementation strategy showed which dimensions were considered and met. It helped understanding how the Chulha in some cases became a failure and in some a success. The habitus was well-considered in Philips' design process by involving existing users and redesigning an existing design which came from the habitus of the envisioned target group. It was argued this would result in high acceptance and proper use (see paragraph 2.3.1). Initially the stove was no success, because financial availability was not met, which Kleine (2010) ranks under existence of choice (see paragraph 2.3.1). The implementing NGO helped in financial availability, yet then forced the

implementation. People did not all use the stove even after implementation, which Kleine's (2010) explained using the sense of choice (see paragraph 2.3.1). Because the envisioned users did not themselves opt to acquire the product it remained alien to some. The Choice Framework (Kleine, 2010) helped in understanding how the product innovation resulted in the actual impact.

The tool helped gather rich data in a short period of time. This was less time-consuming than techniques such as observation and shadowing (see paragraph 2.2). The value of the combination of the three theories was that it helped in understanding *what* the impact was, *how* it was achieved and *why* it turned out to be this way.

5.3.3 Identified Gaps within the Tool

The tool has proven successful in answering all the research questions including understanding the underlying reasons and feelings people had. By combining this data the achieved development could be evaluated and compared to the envisioned development. From a capability perspective the tool was able to assess the impact of the Chulha. Some relevant aspects that determined whether the development was successful, but were not incorporated in the tool, were identified. These gaps are described below.

First, the environmental impact of the Chulha was not incorporated in the tool. Since the Chulha saved a lot of fuelwood, the forest was more preserved resulting in more secure living conditions for the villagers (Venkataraman, 2011). Enjoying more secure or stable living conditions potentially also opened up new capabilities on the long run.

Second, connected to the same issue, political and social power structures were not incorporated in the tool. In this area the Forest Department was trying to get the people to move away from this area. If they were to succeed, the villagers would have to move, regardless of how they felt about it. Considering existing political struggles and opportunities that are affected by the political circumstances should be part of the evaluation.

The tool did not incorporate to what extent people were certain of the future or in control regarding the defined categories. The interviewed villagers received their houses from the government, as well as power, land, drainage and some received plants or animals from developmental organisations. This explains their habitus and thus through the dimensions of choice why certain capabilities would or would not be enhanced. It is important to uncover not only whether a person currently feels he can enjoy a certain life aspect sufficiently, but also where exactly the limitations lie.

Naturally the tool can never close all the gaps. The tool aims to identify capabilities, and a designer also needs to look beyond those. However the designer should perceive the capabilities in the right context. Therefore the framework should cover as many relevant aspects as possible.

5.4 Recommendations for the Tool Box

The results of the case study suggest the tool box was successful in determining the product impact from a capability perspective. The questions were seldom experienced as offensive and

uneducated participants were also well able to provide answers. However, five adjustments are proposed to create a smoother interview experience.

Preparing an in-depth training with the interpreter is the first recommendation. This training is meant to make sure he understands his role better so that the aforementioned issues (see paragraph 5.1.1) can be avoided. Through a role-playing game, where the interpreter acts as the interviewee, ambiguities can be anticipated and forestalled. Furthermore, by making use of more visual material, the influence of the interpreter can also be decreased allowing for a more direct, be it abstract, way of communicating between the interviewer and the interviewee. The interpreter would then get a more supportive role rather than a leading role.

Second, creating contextual frameworks through visual aids could be supportive in more question categories. For instance, the mobility questions could be aided by a small map of the region on which they could indicate their different routes, the people they visit, the facilities they use, etc. People expressed a lot of difficulty in describing rituals, such as cooking, where visual cards depicting different actions could also be helpful. The visual aids should not constrain the participant and always allow for personalization in the interview setting. Considering how well the timeline and importance sheet worked, the results suggest it can be beneficial to use cards and sheets for all topics discussed.

Third, creating localized pictures on-site in close collaboration with a local contact might increase the participation of the interviewee in creating the mappings. The pictures can be created by taking photographs or by drawing together with the people. This would require more time from the researcher but potentially increases the collaboration. The understanding of the cards should be verified before starting the interviews. The number and variety of cards should still be fairly high in order to give the participant enough freedom, yet not too high as this might overwhelm the participant. The amount of freedom that can be given to the participants highly depends on their knowledge and abilities and can thus only be determined in the local context. Also which pictures are useful depends on the local habitus. However the type of pictures that need to be created can be generally derived from the pictures now used on the cards as they mainly reflect the questions.

As a fourth recommendation, the sufficiency scales should be used to make it simpler for the participants. Sufficiency scales allow for the enjoyed capabilities to be evaluated quantitatively. Quantitative data is an advantage over just qualitative data, because it allows for easy repetition, comparison of data and impact studies including a before and after measurement of enjoyed capabilities. It makes communicating results faster and easier. Qualitative data is still necessary to support the quantitative data with meaning. Participants now were sometimes able to answer questions with the scale but had to think again every time they had to use it. This can be solved by saving all scale-questions until the end. Then the concept only needs to be explained once. In this way participants get used to working with the scale without switching from open to closed questions. This would however mean that all categories are repeated in the end and the interview structure would become more strict.

Fifth, questions regarding environmental, social and political power structures should be added to create a better mapping of the habitus. Asking participants about these topics shows what they experience as boundaries, which is of value to understand their dimensions of choice when design opportunities need to be formulated.

5.5 Implications for Designing with Emerging Markets

This research aimed to create an evaluation framework that was able to evaluate the impact of a product innovation in emerging markets. This framework was tested in a case study where the socio-cultural context was mapped out and the enjoyed human capabilities evaluated involving developers, implementers, builders, users and other villagers. Based on this case study the framework was evaluated. After performing more case studies to further improve the framework, this research can possibly provide product designers in emerging markets with deeper insight in development.

The Tool Box was used to perform interviews of about half an hour. Within this half hour an enormous amount of information was shared by the participant giving insight in daily rituals, choices, possibilities, struggles and values. The framework also was able to evaluate the full impact of an existing product innovation. Whereas this information can be gathered through long-term shadowing and observations, the value of this tool lies in the fact that in a relatively short time a lot of personal data can be gathered.

The framework worked well in facilitating in-depth conversations with participants. Incorporation of the choice framework created insight in the influence of the development and implementation upon the adoption of the studied product innovation. The framework appeared to be a quick way of getting to know habits, rituals and values of a target group unfamiliar to the researcher. These data were used to build a sociocultural framework which helped understanding the habitus. Knowledge of the habitus proved valuable in understanding enjoyed capabilities. Integration of the CA in the evaluation framework resulted in a quick way of identifying impact that participants were unable to express beforehand. Due to the large range of topics, assumptions of the interviewer were minimized. In order to verify these experiences to be universal, more case studies need to be executed.

This framework is valuable to product designers because it provides them with guiding questions. These questions can help them to get to know their target group from a very broad perspective. The questions covered many different aspects that ostensibly have no relation with product design whatsoever, but will help the designer to build a sociocultural framework with design criteria within which the product innovation has to be accepted. New information gives new insights which can be implemented in the tool. Therefore the framework will always need updates.

The framework can also be made prospective. Already in the interviews design opportunities were identified, which, with the help of the created understanding of the habitus, could be further developed. These expressed opportunities could be grouped and then discussed in smaller focus groups with the villagers. Through the focus groups the highest priorities can be identified. Using all gathered sociocultural information the priorities can be transformed into design opportunities. By forcing the participants to provide more quantitative data comparisons can easier be made between the situation before and after a product innovation. How to make the framework fully prospective requires further research.

This thesis work has shown the richness and value of using the CA to evaluate product innovation. It has developed and evaluated interview techniques and materials. These findings have paved the way for the development of a prospective framework, so that designers can develop products with emerging markets that have a truly beneficial impact on the users.

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APPENDIX A

Contact Sheet

This appendix contains the contact information of some key people I have been in touch with during my research.

Me

- Floris van der Marel, fmarel@gmail.com

Philips Design Eindhoven

- Paul van der Sluijs, designer Philips wood stove, Paul.van.der.Sluis@philips.com
- Simona Rocchi, program owner Philips Chulha, Simona.rocchi@philips.com

Philips Design Delhi

- Abhimanyu Kulkarni, office director, abhimanyu.kulkarni@philips.com
- Praveen Mareguddi, lead designer Philip Chulha, praveen.mareguddi@philips.com

Dutch Embassy Delhi

- Vikas Kohli, sr policy officer, vk@nostindia.org
- Theo Groothuizen, tg@nostindia.org
- Freek Jan Frerichs, fjf@nostindia.org

DYPDC, Design School Pune

- Hrridaysh Deshpande, director, hrridaysh.deshpande@gmail.com

Jaipur Foot Organisation

- Dr Pooja Mukul, technical consultant, poojamukul.jaipurfoot@gmail.com
- Bhupendra Raj Mehta, jt secretary, rangolibrm@gmail.com

NGO BetterFuture

- Michel Barth, info@betterfuture.nl

NGO ARTI

- R.D. Deshmukh, office director, arti_pune@vsnl.net
- N.J. Zendre, research director, njzendre@yahoo.com

NGO Junglescapes

- Venkataraman Ramesh, director, rameshvenkataraman@curalea.in
- K.S. Ramesh, field worker, ksramesh05@gmail.com

Mysore University - Department of Studies in Environmental Science

- Prof S.L. Belagali, professor and chairman, slb_envsci@yahoo.com
- Rajanna, PhD student, ahrajanna@gmail.com

APPENDIX B

Struggles and Advices

The following struggles and advices are drawn from my own experiences. I do not imply they are true in every region or for every research. However, reading them might prepare you a little better on doing research in India.

Preparations Before going to India, I had had contact with an NGO who via e-mail responded enthusiastically on my graduation proposal and said they would be willing to help. However, it turned out when I got there, that they were not able to help me. They were very happy I had come to them and was willing to help them. It is therefore important to make sure the NGO knows *exactly* what you want to do. Try to get them to reply by stating exactly how they are going to help you, so that you can be sure they understood.

A lot of things can be arranged when you are in India. People are quickly willing to take time out of their lives to be of assistance. You could therefore also decide to go to India with a more open mind to find out what you can do in the area you are about to visit. Such an open plan however, is difficult to defend as you may not know the outcomes beforehand.

Getting around Be careful when asking for help in India. People are very helpful and would consider it rude to turn you down. This in fact often results in people giving you answers that are not true. Giving an answer they are not sure about is considered to be more polite than giving no answer at all. Be always sure to check with a few other people, or you may end up waiting for a bus that will never show up, walk for hours in the wrong direction, or put credit on your phone that only gives you Internet access instead of balance for making calls.

Be prepared before entering a taxi or tuktuk. The driver may not know the address you want to go to, yet still take you in even though you specifically ask if he knows. Make sure you have a phone number of somebody who can direct the driver to the address, so you can call him while driving. Also, since most times you will have to give your phone to the driver, use a phone that you are not afraid to lose or damage.

India has good 3G coverage. This may be helpful if you want to use your phone/laptop a lot. Get a simcard from a local provider. Bear in mind that different states are a bit like different countries. If you buy a simcard in Delhi, you own a Delhisim and international rates apply if you travel to a different state. Costs however are very low, so there is no reason to worry. 3G can usually easily be activated on your simcard. Internetcafes can also be found almost

anywhere.

Making appointments Appointments are less strict in India than they are in the Netherlands. Be aware that people might not call you back when they say they will. People may also not show up on the correct time or even date. I had an appointment with an interpreter, who was postponed multiple times to a total of three weeks and then he got cancelled. This is a very extreme example, but my experience was that people don't mind postponing appointments several days which can be very frustrating if you work on a tight schedule. Try to make urgent matters clear but also be prepared to do some other work if you unexpectedly have to wait longer. An appointment is only fully fixed when it is over.

Also India knows a lot of national and local holidays. People may not inform you beforehand a holiday is coming up, but do assume nobody is working that day. So even if you make an appointment on those days, they might cancel it at the last minute. The Indians are not as rushed and take life a little easier. Knowing the upcoming holidays can make it easier to create a proper planning.

Communication People are not very direct in India. This has to do with the earlier mentioned cultural phenomenon that Indians do not like to let people down. There are two results from this. One is that they always respond positively, even if they in fact already know they are not able to fulfill your demands. Try to read and listen between the lines to get the true response. The other result is that you have to be careful in how you communicate to them. A direct approach may be seen as offensive or rude. Open communication is not always appreciated, sometimes it is better to disguise your actual aims. I for example sent all the questions to the organisation who had agreed to help me with the research, but found a few questions quite offensive. As I already anticipated this, I clearly stated we had to discuss the questions first to identify the questions that were too sensitive. However, due to the sensitivity of the questions, the organisation labeled my research as too provocative and was no longer willing to help me or listen to my explanations. My direct and open communication thus led to a loss of help and caused me to set out the research without their help. Be therefore careful what you say and how you say it.

Not everybody speaks English in India. Even though it is a national language, you will find many people in the big cities that do not speak English properly. Make sure you always have a contact that does, so you can call him when you need somebody to interpret for you.

India has many dialects. Learning Hindi may be useful for some parts of India, but definitely not for all. Many people only speak their local language and are unfamiliar with speaking Hindi. Bear in mind that India is a very big country and that depending on the region you visit, you may need to learn the basics of a different dialect.

Money In India paying cash is still the safest way. When I was in India both my bankcard and creditcard got blocked because an attempt to copy my card was detected. You should never use your bankcards in shops. However, my cards got blocked in a government shop and a state bank, so no guarantees can be given even if you are careful. Western Union provides an easy way for your family to transfer money to you, although it comes at a 10% interest. Make sure you always have enough cash, because in many places bankcards are not even accepted.

APPENDIX C

Time

Because the duration of this graduation project had to be determined beforehand as for the final jury all jury members should be available, a concise planning was necessary. Displayed here is the followed planning. Certain adjustments had to be made during the project due to external factors, which are mentioned for future researchers to take into account.

June 2011:	Forming graduation jury panel, first draft graduation proposal
July 2011:	<i>Holiday</i>
August 2011:	<i>Holiday</i>
September 2011:	Start literature review
October 2011:	Literature review
November 2011:	Literature review
December 2011:	Literature review & Concept development
January 2012:	Literature review & Concept development
February 2012:	<i>In India</i> Piloting & Concept iterations
March 2012:	<i>In India</i> Getting acquainted with Indian parties and preparation research. This was actually supposed to take two weeks, but because of a delayed arrival of the interpreter it took a full month.
April 2012:	<i>In India</i> Executing research
May 2012:	Analysis & Thesis writing
June 2012:	Thesis writing & Green light meeting
July 2012:	Thesis writing
August 2012:	Graduation

APPENDIX D

Budget

Before starting the graduation a clear budget needed to be determined, since the trip to India would involve extra costs. Underneath is the final exploitation. Normal costs made in The Netherlands such as rent are left out of the equation, as they depend on personal circumstances. Only the costs for the graduation project are displayed (see table D.1). This covers two and a half months. Also some foundations were kind enough to reimburse me for some costs. These are also mentioned here (see table D.2).

Table D.1: Expenses

Accommodation	€350,-	
Food	€300,-	
Study material*	€400,-	
Local transportation	€350,-	*This includes costs for an interpreter: fee, food, travel expenses and accommodation
Flight ticket	€510,-	
Visum	€65,-	
Malaria pills	€40,-	

Table D.2: Reimbursements

CICAT*	€300,-	
Universiteitsfonds Delft	€250,-	*Also named TUD-StuD Fonds
Faculty Research Group	€250,-	

APPENDIX E

Capability Categories

The list of capabilities has been derived from Nussbaum's list (2001) and supplemented by lists gathered by Alkire (2007). For all lists, see Alkire (2007).

Life (right and expectancy)

Being able to be born and, once born, live a life of normal length Nussbaum (2001); Robeyns (2003).
Design example: incubator

Bodily health

Being able to be physically healthy, to be adequately nourished, to have good reproductive health, to be able to visit a doctor and hospital Nussbaum (2001); Robeyns (2003).
Design example: smokeless stove, plough, water purifier, surgical instruments (e.g., ultrasound device)

(Bodily) safety and security

Being able to be protected from violence of any sort and have adequate shelter and to live in a safe and pleasant environment Nussbaum (2001); Robeyns (2003).
Design example: house, door lock, burka, uniform

Self-determination

Having one's bodily boundaries treated as sovereign, having opportunities for sexual satisfaction and for choice in matters of reproduction Nussbaum (2001); Robeyns (2003).
Design example: chatbox, games, pepper spray, access to worldwide web

Mental health

Being able to be mentally healthy, relates mainly to the absence of any negative mental states of being and doings, such as not being able to sleep, worrying, feeling depressed, lonely or restless Robeyns (2003).
Design example: mattress, on-line counseling, games

Education and knowledge

Being able to sense, imagine, think and reason in a way informed and cultivated by an

adequate education, including, but by no means limited to, literacy and basic mathematical and scientific training Nussbaum (2001).

Design example: light (for reading books in the evening), books, pen, chalk, access to information (books, ICT)

Self-awareness (and transcendence, practical reason and mental integrity)

Being able to form a conception of the good and to engage in critical reflection about the planning of one's life (this entails protection for the liberty of conscience and religious observance) Nussbaum (2001).

Design example: personality test, educative game, access to information (books, ICT)

Identity (for social context)

Who you are and what you stand for (religion, politics, cultural values and norms) Nussbaum (2001); Robeyns (2003).

Design example: books (reading and writing of stories), church

Political

Being able to use one's mind in ways protected by guarantees of freedom of expression with respect to both political and artistic speech, and freedom of religious exercise. being able to participate effectively in political choices that govern one's life; having the right of political participation, protection of free speech and association Nussbaum (2001).

Design example: radio, microphone and speakers/megaphone

Meaningful work and conditions

Having the right to seek employment on an equal basis with others. In work, being able to work as a human being, exercising practical reason Nussbaum (2001).

Design example: silk reeling machine, agricultural equipment

Mobility

Being able to move freely from place to place Nussbaum (2001); Robeyns (2003).

Design example: bicycle, car, foot prosthesis

Leisure

Being able to have pleasurable experiences and to avoid non-beneficial pain. to engage in various forms of social interaction. Being able to laugh, to play, to enjoy recreational activities Nussbaum (2001).

Design example: incubator

Acceptance (based on identity)

Being able to be accepted by others, to have friendship.

Design example: community centre

Integration (participation) and recognition (dignity and respect)

Having the social bases of self-respect and non-humiliation; being able to be treated as

a dignified being whose worth is equal to that of others. This entails provisions of non-discrimination on the basis of race, sex, sexual orientation, ethnicity, caste, religion, and national origin. having the freedom from unwarranted search and seizure Nussbaum (2001).

Design example: games

Social support

To be nurtured and cared for, to form and enjoy social relations (sharing emotions and feelings) and not having one's emotional development blighted by fear and anxiety. Also the type and amount of support that one receives: networks in political, economic and legal arenas that can be used to perpetuate advantages in economic and public life. entering into meaningful relationships Nussbaum (2001).

Design example: games, play apparatus, telephone

To care for others (not harm others)

Being able to live with and toward others, to recognize and show concern for other human beings, to love those who love and care for us. To be able to imagine the situation of another. Being able to live with concern for and in relation to animals, plants, and the world of nature. Nussbaum (2001); Robeyns (2003).

Design example: mobile phone, transportation, games (for animals)

Life (right and expectancy)

Being able to be born and, once born, live a life of normal length Nussbaum (2001); Robeyns (2003).

Design example: incubator

APPENDIX F

Toolbox

F.1 Instructions Interpreter

Goal In my research I aim to find out what the sociological impact has been of the Philips chulha. I try to go beyond just time savings, since I am interested in what these time savings have given the users. Topics covered in the tool are accommodation, material context, family, nutrition, friends, mobility, education, meaningful work, self-determination, beliefs (religion/politics), leisure/free time, safety and health. I realise many of these topics may not directly be influenced by the stove, but as I aim to do a complete impact study and assumptions can result in poorer data, I did not exclude anything.

Interview Tool The tool itself in its current state is a set of cards that makes users collaborate with the designer to create a mapping of their life. This is used to sensitize the participant in order to be able to ask deeper questions. Some of the questions are very personal, which is why introductory questions are also used. Because there are so many topics, this could take over an hour in total. In the planning I use 1,5 hour since we also need to go from one place to the next. The interviews will take place at their own homes.

Translations What is important, is that I get a full overview of all aspects that may or may not have changed. Therefore it is essential that you translate absolutely everything as close to the original wording as possible as different nuances may be of high importance. Also confusions need to be translated. Also, because I include whether they mention changes that have occurred, you should never give examples, because it may direct the participant. Of course, since we want the participant to feel comfortable, the conversation can have more topics than those on the cards. Those conversations can be more open and free.

Some questions may seem absurd to you whereas others may seem trivial. Be aware that this differs per culture, so please just ask the participant. If you feel uncomfortable asking a question because you feel it is too personal, please indicate so, so I can exclude it from the analysis. Attached are the questions. For the bold questions (Do you feel...), I want to know to which extent they feel this, ranging from not at all, hardly, neutral, mostly to completely. It is best to first ask this question open and then ask them to indicate it on the answer scale.

F.2 Interview Set-Up

Why The main objective is to develop a prospective tool or framework for designers to be better able to develop products for emerging markets taking capabilities and sociological implications into consideration.

The end results of this project will be an improved tool to extract capabilities both on a personal and sociological level as well as a conceptual tool for designers to encourage them to consider capabilities and sociological impact. Following results will be a thesis in which the results found are related to existing literature, a presentation poster and a presentation which will be given at the faculty of Industrial Design Engineering.

The following are the research questions:

- What was the previous situation?
- What were the expectations when acquiring this product?
- What were the actual effects (both expected and unexpected, both good and bad)?

Who Present at the interview are the interviewer (me), a local interpreter and two participants.

The interpreter is to be someone the interviewer can relate to but also someone the participants can relate to. The interpreter preferably is a local woman, since this would make it easier for the users of the stove, also local women, to be open and honest in their answers. It is very important the interpreter understands the reasons behind the questions. She will therefore also first be trained and informed by the interviewer before the first interview starts. The interpreter can also help get acquainted with local customs. It is better if the interpreter is not related to ARTI or Philips as to maintain the impartiality. The participant is either a user of the product or a distributor, local developer, or any other stakeholder that is uncovered during the research. Participants are to appear alone so they are not influenced by other people. If a husband has to be present, sensitive questions will be skipped.

Where The participants need to feel comfortable and at home. The location is up to the participants, can be inside or outside but is near one or both of their homes.

When At a convenient time for the participant, can be morning, afternoon or evening. Flexible scheduling, time of the day is not considered relevant for the interview.

What An interview session consisting of six parts:

1. Introduction
2. Getting acquainted
3. Acquiring capabilities data
4. Relating to product data (only if the participant is a user of the stove)
5. Closing

How 1. Introduction - The introduction is partly functional to start off and ask permissions. Also during the introduction the interviewer gives a personal introduction showing pictures of himself, his hometown/country and his family. Furthermore the interviewer creates a trustful and comfortable environment by clearly stating his roles, purposes and the benefits for the participants. “My name is Floris. I am a researcher from a university in The Netherlands/Europe. I am very interested in the changes in your life, because we can use that to develop more useful or more fitting products for you. Because my life is so different, I don’t know everything about what you do. For example, look at these pictures, this is my family, my house, etc. In order to do so I would like to get a complete overview of your current life and how this has changed over the past years. Can I record this interview? During the interview I will also be taking some notes, this is just so I can more easily find things in the recording, is that okay?”

2. Getting acquainted - Getting acquainted is done by a house tour and finding connections between the interviewer and the participants. During this time all parties also get familiar with the way of conversation through the interpreter. It serves as the starting point of the sensitizing session.

3. Acquiring capabilities data - We use the Capability Cards. The sensitizing happens through creation of mappings and timelines of the environments and rituals of the participant in his current situation and of three years ago. Participants get many premade drawings and also empty cards and pencils with different colours to create it. Participants describe the current situations both as it is now and how it was three years ago. Participants are asked to select a specific event of three years ago in order to link all the situations to that event. The current situation is more or less that of the last month. We put down the sensitizers, so they are clearly visible to both the participant and the interviewer. The interviewer can point at all aspects. The participant uses the sensitizers to be able to travel back and remember the situation of three years ago so s/he can answer the questions. Acquiring capabilities data is done by asking questions connected to the created mappings and timelines also of the present and the past. The first questions can be asked to get in-depth understanding of the mind set and get a feeling of their capabilities. The response on every last question per number, whether it is explicitly asked or not, is filled in by the interviewer after the interview and used for the capability score. Now please rank all the capability categories in the mapping on their importance. If certain categories are equally important, please indicate so.

4. Relating to product data - You just mentioned you got the Chulha stove from Philips, can I also ask some questions about that? Before acquiring product data the participant is asked to use the stove (or pretend-use) as to sensitize the participant about this product specifically. “Also, if I can, I would like to take a picture of you and the product as you operate it, could we maybe start with that?” (Getting her to operate it and taking the picture will help to set the mood and give some visual insights.) We also ask if certain before-mentioned changes were influenced by the implementation of the stove.

5. Closing - During the closing the participant is thanked and asked whether he/she wishes to share more information and given a set of wooden clogs to thank her for her participation. “Thank you very much for participating, do you have any further remarks you wish to share? Do you have any comments on the interview?”

F.3 Timeline

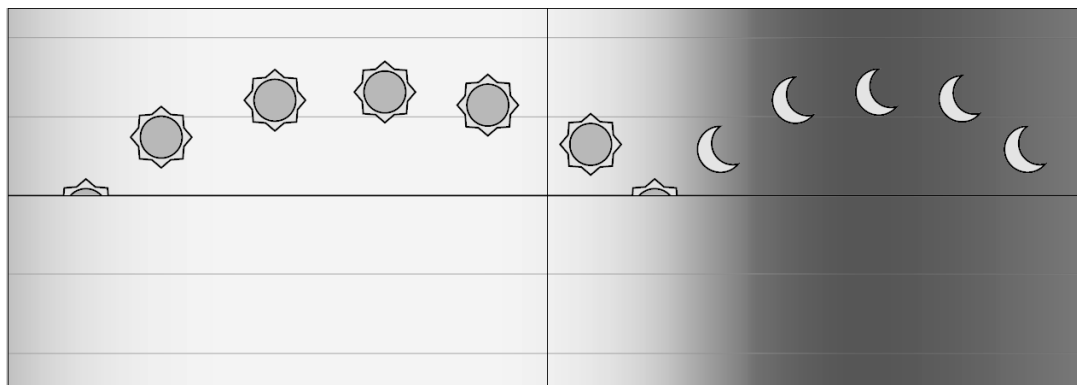


Figure F.1: Timeline, 2012

F.4 Sensitizing Cards

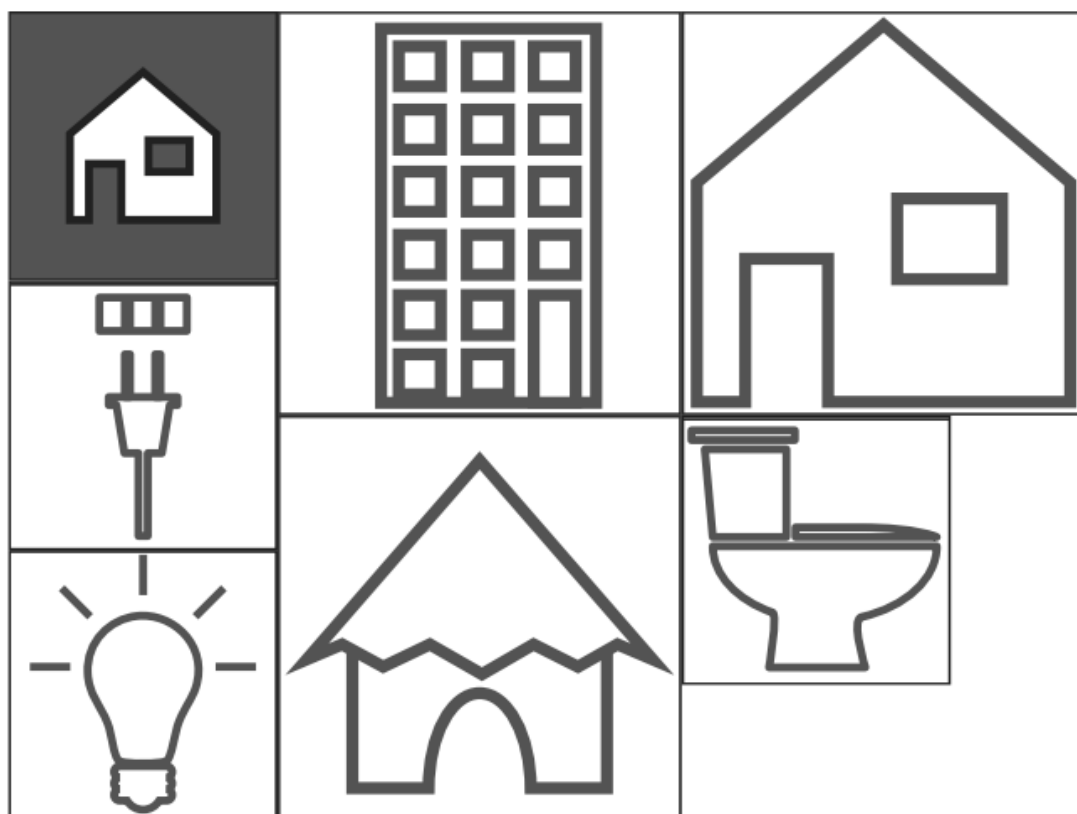


Figure F.2: Sensitizing Cards Accommodation, 2012

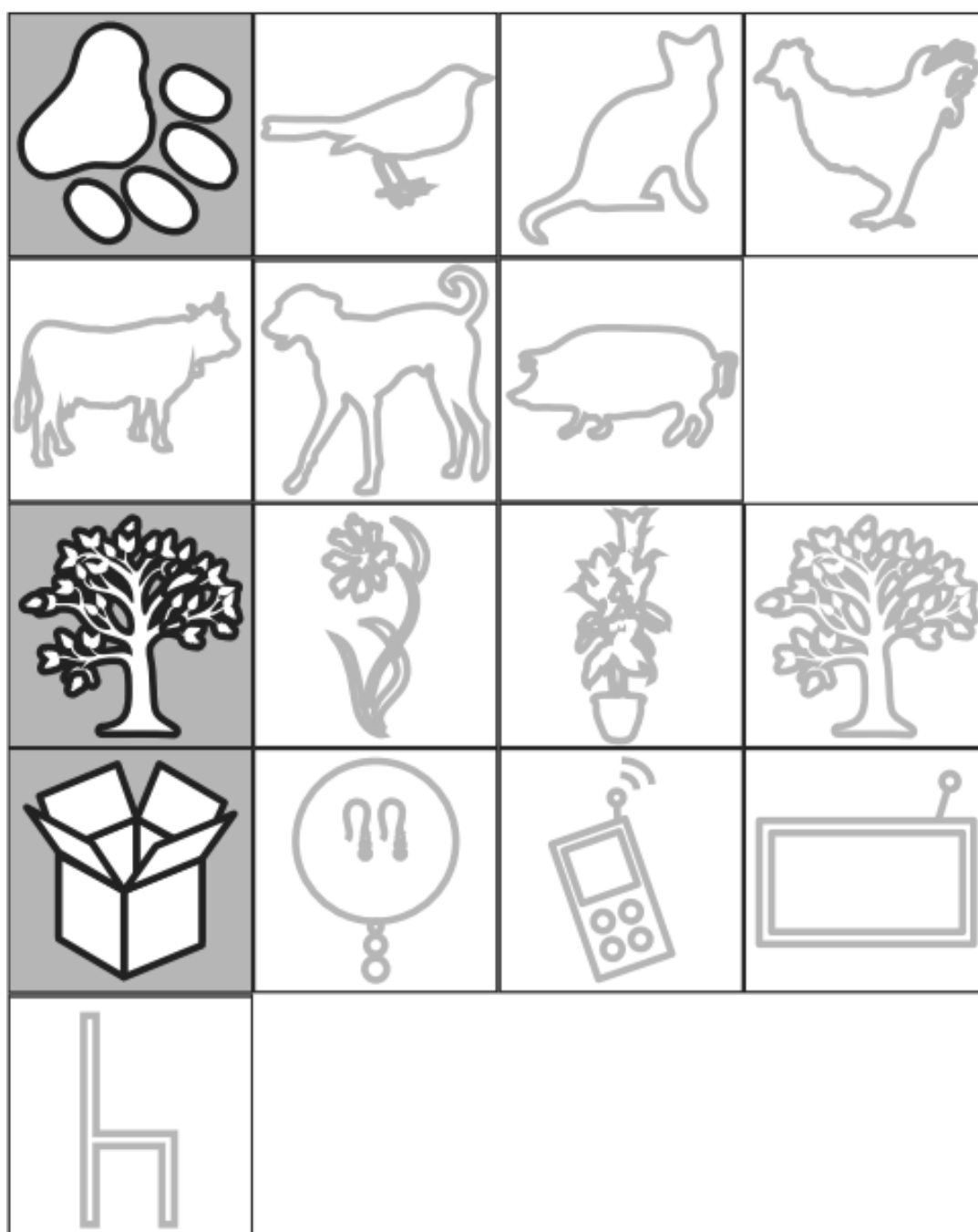


Figure F.3: Sensitizing Cards Attachment to plants, animals and products, 2012



Figure F.4: Sensitizing Cards Education, 2012

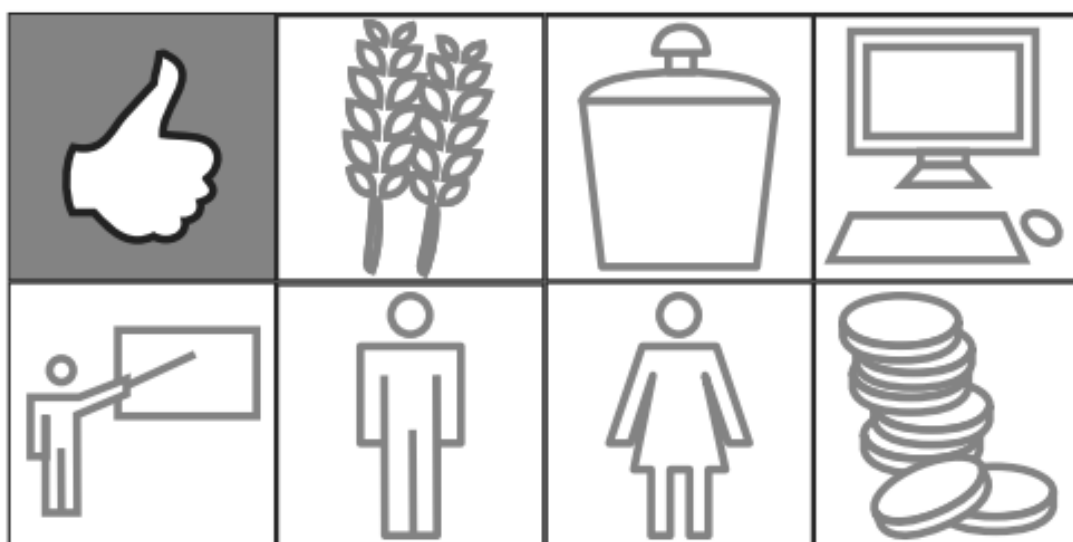


Figure F.5: Sensitizing Cards Meaningful work, 2012



Figure F.6: Sensitizing Cards Health, 2012



Figure F.7: Sensitizing Cards Family, 2012

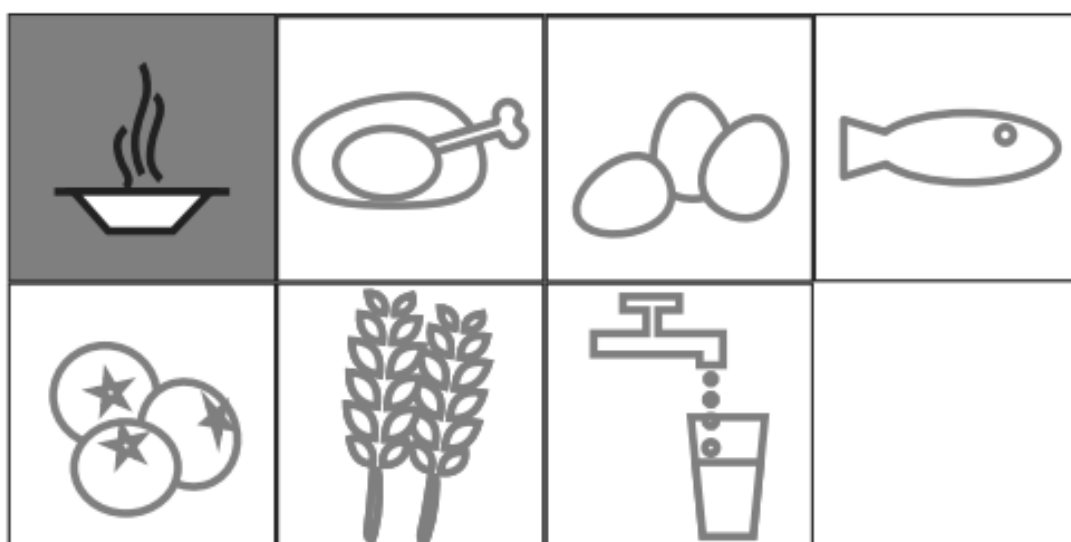


Figure F.8: Sensitizing Cards Nutrition, 2012



Figure F.9: Sensitizing Cards Self-determination, 2012

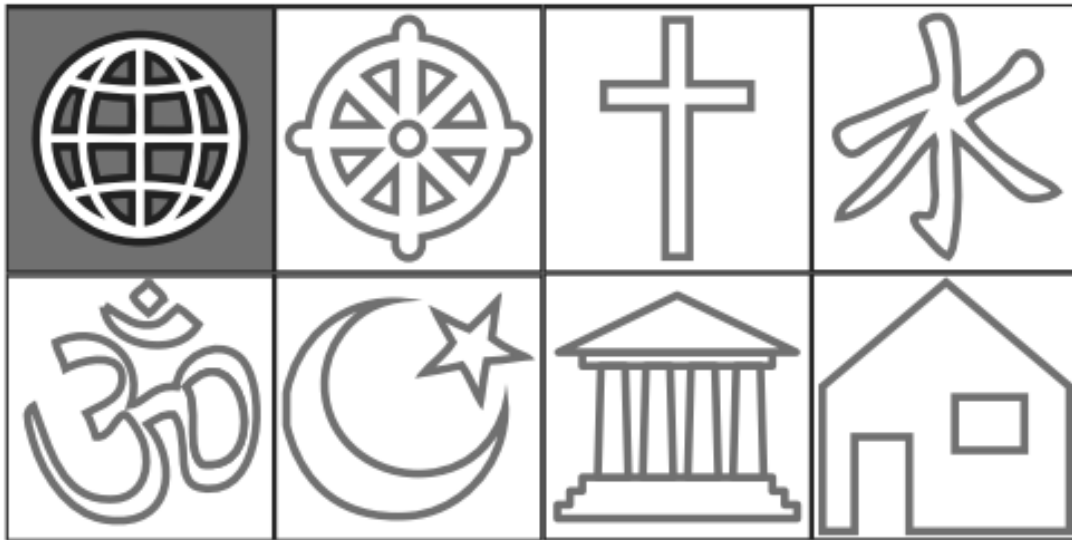


Figure F.10: Sensitizing Cards Cultural values, 2012

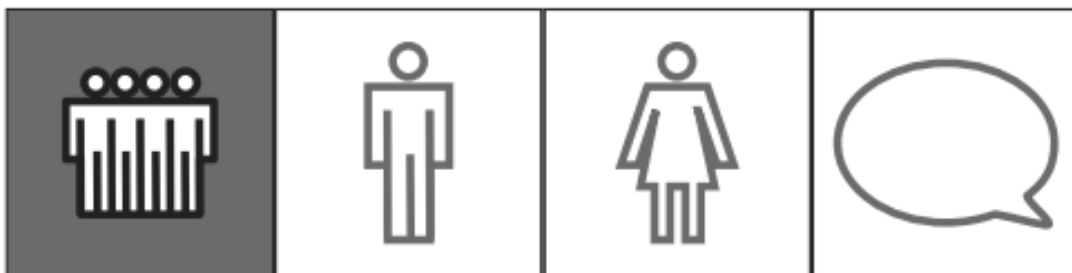


Figure F.11: Sensitizing Cards Friends, 2012



Figure F.12: Sensitizing Cards Mobility, 2012



Figure F.13: Sensitizing Cards Leisure, 2012

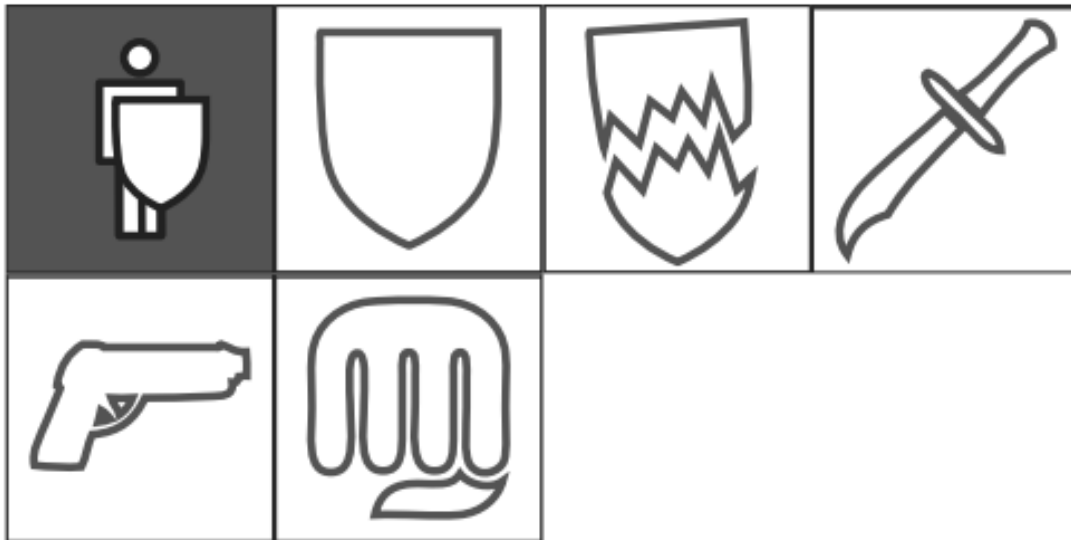


Figure F.14: Sensitizing Cards Safety, 2012

F.5 Question Cards

Do you feel you were involved enough in choosing your home?
 Do you feel your home is your own property?
 Do you feel prevented from moving to another home for any reason?
 Do you feel your current accommodation is adequate for your current needs?

What type of house do you have?
 With whom? Rooms? Roof? Light, electricity, gas?
 When did you move here?
 Did you build this house yourself or make any changes to this home?
 How did you pay for this home?
 Are there other houses/places that you would really like to live?
 Do you think you will live here the rest of your life?
 Do you want to change something in your house?



Figure F.15: Question Card Accommodation, 2012

Do you feel sufficiently attached to plants?
 Are there any plants/trees in or near your house?
 Do you like them? Do you care for them?
 Do you need more plants?
 Do you grow plants yourself or do you want to?

Do you feel sufficiently attached to animals?
 Do you own domestic animals?
 What is your favourite animal?
 Do you want (more) animals?
 Do you like animals? Do you respect animals?

Do you feel sufficiently attached to products?
 Which objects do you love to use?
 Are there certain objects you need to have?
 Are there certain objects you want to have?
 Do you like plants? Do you respect plants?



Figure F.16: Question Card Attachment to Plants, Animals and Products, 2012

Do you feel you are properly educated?
Do you feel you have sufficient knowledge?
Do you feel you have sufficient access to information?

Have you ever been to school, how many years?
 Would you have wanted to go longer back then? Do you still want this?
 Where did you learn to do your work?
 Did you follow any courses?
 Do you have any other diplomas?
 Can you read and write? Can you count? Do you have a signature?
 Do you want or need any of these?
 In your day-to-day life, do you often face problems you cannot solve by yourself?
 What kind of problems? Then what do you do?
 Do you always find an answer?



Figure F.17: Question Card Education, 2012

Do you feel you can enjoy your normal day-to-day activities?
 Do you feel you can use your imagination and or reasoning in your day-to-day activities?
 Do you feel you are playing a useful part in your normal day-to-day activities?
 Do you feel you make enough use of your skills and talents in your day-to-day activities?
 Do you feel you are appreciated in your normal day-to-day activities?
 What kind of work do you do during the day?
 When do you work (time/day)?
 Do you work together with other people?
 What kind of activities do you have to do?
 What are the things you are good at in your work?
 Why do you do this?
 Do you like what you do?



Figure F.18: Question Card Meaningful Work, 2012

Do you feel your life expectation is sufficiently long?
 Are you or other family members able to visit the doctor whenever necessary?
 Do you feel your health limitations obstruct you in your day to day activities?
 Do you feel you are able to fulfil your wish for children?
 Do you worry much or feel under strain?
 Do you feel lonely?
 Do you have a toilet? Where do you go when nature calls?
 Are all your brothers and sisters still alive?
 How old are your parents and are they still alive?
 How old do you think you will become? Do you want to live longer?
 Are you ever sick?
 Can you and your family visit the doctor when you are ill?
 Is your doctor far away?
 Do you have any health limitations?
 Do you want more children?
 Do you worry much or feel stressed? Do you sleep well?
 Do you feel lonely?



Figure F.19: Question Card Health, 2012

Do you experience sufficient affection from your partner?
Do you feel happy with your partner?
Do you feel you are sufficiently involved in the family decision making?
Do you feel prohibited from leaving your partner if you would want to?
Do you feel appreciated by your family?

Do you have a partner/children?
 How did you and your partner get together?
 When do you and your partner/children spend time together?
 What do you like most about your partner?
 Do you feel happy with your partner?
 When do you see your parents?
 When do you see your brothers and sisters?
 And other family?
 Who can you count on most?
 From whom do you receive love/care/support?
 Who do you go to first if you feel lonely/sad?



Figure F.20: Question Card Family, 2012

Do you feel you have sufficient food to feed yourself?
Do you feel you have sufficient food to feed your family?
Do you feel you can enjoy a meal whenever you need one?
Do you feel you can eat sufficient meat, chicken or fish?
Do you feel you can eat sufficient vegetables?

What is your diet? When do you eat?
 What do you drink? Where do you get pottable water?
 Do you have a stock of food in your house?
 Do you feel you have sufficient food to feed yourself?
 Do you feel you have sufficient food to feed your family?
 Do you feel you can enjoy a meal whenever you need one?
 Are you a vegetarian?
 Do you like to eat fresh meat, chicken or fish?
 Do you feel you can eat sufficient meat, chicken or fish?
 Do you like to eat fresh vegetables?
 Do you feel you can eat sufficient vegetables?



Figure F.21: Question Card Nutrition, 2012

Do you feel you can evaluate how you lead your life and where you are going in life?
Do you feel you live your life satisfactorily?
Do you feel prohibited from using contraception, abortion or infertility treatment?

Are you happy?
 Do you have a dream of a different life?
 If you could change anything in your life, what would you want to change?
 Do you have a plan of what you want to do or be in life?
 What do you want to achieve in your life?
 Do you make your own decisions?
 Do you ever consider using contraception?/Do you think people here want to use contraception?
 Do you ever consider abortion?/Do you think people here want an abortion?



Figure F.22: Question Card Self-determination, 2012

Do you feel free to practice your religion as you want to?
Do you feel free to express your political views and participate in political activities?
Do you feel prohibited from performing your cultural habits?

What is your religion?
 Has this always been your religion?
 What about your parents?
 How do you practice it?
 Do you vote in government elections?
 Which party do you support?
 Do you fit in your community?
 What are your daily rituals? Product specific,
 - f.i. what is your eating ritual (where, when, how, with what)?
 - f.i. what is your cooking ritual (where, when, how, with what)?
 - f.i. what is your sleeping ritual (where, when, how, with what)?



Figure F.23: Question Card Cultural Values, 2012

Do you feel accepted within your community?
 Do you feel appreciated within your community?
 Do you find it difficult to make friendships?
 Do you find it difficult to express feelings of love, grief, longing, gratitude, and anger?

 Do you know a lot of people in your community?
 When do you see the people in your community?
 Do you have friends?
 When do you see your friends?
 What kind of things do you talk about with your friends?
 Do you feel like you can tell your friends everything?
 >> Social status <<



Figure F.24: Question Card Friends, 2012

Do you feel you can go out of the house whenever you want to?
 Do you feel you can go wherever you want to go?
 Do you feel prohibited from using any kinds of transportation (which you would like to use)?
 Do you feel prohibited from personally operating any kinds of transportation (which you would like to operate)?

 Which places do you visit in your village?
 Do you ever go out of the village?
 Which types of transportation do you use?
 What is your favourite type of transportation?
 Do you have a bike/motor/car?
 Which other places do you want to visit?
 Do you want to have a bike/motor/car?



Figure F.25: Question Card Mobility, 2012

Do you feel you have sufficient spare time, in which you can decide what to do?

Do you feel you can enjoy your recreational activities?

Do you have free time, when you don't have to do anything?

What do you do in your free time?

What do you do when you don't work?

Do you enjoy this?

Do you need more free time?

Are there other activities you would like to do?

then
why
more

more



Figure F.26: Question Card Leisure, 2012

Do you feel safe inside your home?

Do you feel safe walking alone in the area near your home?

Do you feel discriminated or bullied?

Are there quarrels/arguments/fights/shouting either inside your home or outside on the street?

Do you feel secure in the area you live in?

Do you dare to go out during the day?

Do you dare to go out at night?

Do you think people are discriminated in the area you live in?

then
why
more

more



Figure F.27: Question Card Safety, 2012

<p>When did you acquire the product?</p> <p>How did you find out about the product?</p> <p>How did you acquire the product?</p> <p>Why did you acquire the product?</p> <p>Did you make any changes to the product to your own preferences?</p> <p>Do you consider the product to be your own property?</p> <p>Do you like to use the product?</p> <p>Can you describe how you use the product?</p> <p>Are there any functions you don't use?</p> <p>What do you like about the product?</p> <p>What do you dislike about the product?</p> <p>What would you like to change or add to the product?</p> <p>How did you perform the function of the product before?</p> <p>Repeat all questions from before.</p>	<p>then why more</p>
	<p>2</p> 

Figure F.28: Question Card Product I of II, 2012

<p>Comparing the two situations, what has changed for you personally?</p> <p>Do you feel like you have more or less possibilities?</p> <p>How do you feel about your life?</p> <p>Does the product contribute to your happiness?</p> <p>Were there any changes due to the product that we did not mention yet?</p> <p>Who else besides you uses the product?</p> <p>Which additional products do you need when using this product?</p> <p>Where do you get these?</p> <p>Repeat all questions for previous situation.</p>	<p>then why more</p>
	<p>2</p> 

Figure F.29: Question Card Product II of II, 2012

F.6 Importance Sheet

Figure F.30: Importance Sheet, 2012

APPENDIX G

Interviewees

Interview	Name	Village	Occupation	Date	Outcomes	Comments
1	Kamakshamma	Chik Yel Chetti	Hired farmer	29-3-2012	Recording, photos	Study 5
2	Javanamma	Chik Yel Chetti	Hired farmer	30-3-2012	Recording, photos	Study 5
3	Bantama	Chik Yel Chetti	Hired farmer	30-3-2012	Recording, photos	Study 5
4	Chamamma	Chik Yel Chetti	Hired farmer	30-3-2012	Recording, photos	Study 5
5	Sarojama	Chik Yel Chetti	Hired farmer	30-3-2012	Recording, photos	Study 5
6	Sathisha	Chik Yel Chetti	Hired farmer	4-4-2012	Transcript, recording, photos	
7	Doddamma	Chik Yel Chetti	Hired farmer	4-4-2012	Transcript, recording, photos	
8	Gopama	Chik Yel Chetti	Hired farmer	5-4-2012	Transcript, recording, photos	
9	Malliga	Chik Yel Chetti	Hired farmer	5-4-2012	Transcript, recording, photos	
10	Ratnamma	Chik Yel Chetti	Hired farmer	5-4-2012	Transcript, recording, photos	
11	Gowamma	Lokkere	Builder	6-4-2012	Recording, photos	Mother Nagendra
12	Najamma	Lokkere	Hired farmer	6-4-2012	Recording, photos	
13	Pinnithayama	Lokkere	Livestock caretaker	6-4-2012	Recording, photos	
14	Nagendra	Lokkere	Builder	6-4-2012	Recording, photos	
15	Nagamma	Chik Yel Chetti	Housewife	6-4-2012	Recording, photos	Mother Ravi
16	Ragendra	Chik Yel Chetti	Builder	7-4-2012	Recording, photos	
17	Rajamma	Chik Yel Chetti	Land-owner	7-4-2012	Transcript, recording, photos	
18	Mangali	Chik Yel Chetti	Hired farmer	8-4-2012	Recording, photos	
19	Goramma	Lokkere	Land-owner	8-4-2012	Recording, photos	
20	Belamma	Chik Yel Chetti	Housewife	8-4-2012	Recording, photos	
21	Kalamma	Burdurundy	Land-owner	12-4-2012	Recording, photos	
22	Badra	Burdurundy	Hired farmer	12-4-2012	Recording, photos	
23	Irappa	Burdurundy	Land-owner	12-4-2012	Recording, photos	
24	Kunaramma	Burdurundy	Hired farmer	12-4-2012	Recording, photos	
25	Sheetha	Burdurundy	Housewife	12-4-2012	Recording, photos	
26	Vanitha	Burdurundy	Housewife	12-4-2012	Recording, photos	
27	Gangamma	Burdurundy	Housewife	12-4-2012	Recording, photos	
28	Nagamma	Chik Yel Chetti	Land-owner	13-4-2012	Transcript, recording, photos	
29	Nagamma	Chik Yel Chetti	Hired farmer	13-4-2012	Transcript, recording, photos	
30	Chikamarashtty	Chik Yel Chetti	Land-owner	13-4-2012	Transcript, recording, photos	
31	Nashamma	Burdurundy	Hired farmer	13-4-2012	Recording, photos	
32	Maramma	Burdurundy	Housewife	13-4-2012	Recording, photos	
33	Mashamma	Burdurundy	Housewife	13-4-2012	Recording, photos	
34	Mahadevamma	Burdurundy	Hired farmer	13-4-2012	Recording, photos	
35	Kantamma	Burdurundy	Land-owner	13-4-2012	Recording, photos	
36	Ashok	Burdurundy	Student	13-4-2012	Recording, photos	
37	Belamma	Burdurundy	Hired farmer	13-4-2012	Recording, photos	
38	Honnamma	Burdurundy	Hired farmer	13-4-2012	Recording, photos	
39	Bhagya	Upkara	Land-owner	13-4-2012	Recording, photos	
40	Ragendra	Chik Yel Chetti	Builder	14-4-2012	Recording, photos	
41	Rajeshweri	Chik Yel Chetti	Hired farmer	14-4-2012	Transcript, recording, photos	
42	Belamma	Chik Yel Chetti	Livestock caretaker	14-4-2012	Transcript, recording, photos	
43	Ratnamma	Chik Yel Chetti	Hired farmer	14-4-2012	Transcript, recording, photos	
44	Siddamma	Chik Yel Chetti	Hired farmer	14-4-2012	Transcript, recording, photos	
45	Rajamma	Upkara	Land-owner	14-4-2012	Recording, photos	
46	Gangamma	Upkara	Hired farmer	14-4-2012	Recording, photos	
47	Manikanta	Upkara	Hired farmer	14-4-2012	Recording, photos	
48	Ravi	Chik Yel Chetti	Builder	14-4-2012	Recording, photos	

Figure G.1: Interviewees, 2012