

From Bottom of the Pyramid to Bottom Line

Translating user understanding into social,
environmental and business outcomes

by

William Schindhelm Georg

Submitted to OCAD University
in partial fulfillment of the requirements
for the degree of
Master of Design
in
STRATEGIC FORESIGHT AND INNOVATION

Toronto, Ontario, Canada, August, 2015

© William Schindhelm Georg, 2015

Author's Declaration

I hereby declare that I am the sole author of this MRP. This is a true copy of the MRP, including any required final revisions, as accepted by my examiners.

I authorize OCAD University to lend this MRP to other institutions or individuals for the purpose of non-commercial, scholarly research.

I understand that my MRP may be made electronically available to the public.

I further authorize OCAD University to reproduce this MRP by photocopying or by other means, in total or in part, at the request of other institutions or individuals for the purpose of non-commercial, scholarly research.

Abstract

This project investigates how a close understanding of human activity can inform the design of culturally and contextually sustainable innovations for subsistence markets. Building on existing literature related to poverty alleviation initiatives and using a mainly ethnographic research approach, this project attempted to understand the cultural and contextual challenges to the substitution of unhealthy and unsustainable biomass as cooking fuels by cleaner and competitive cooking alternatives in Kitintale, an urban slum in Kampala, Uganda. This project suggests that everyone's choice is shaped by a triad of forces – daily living circumstances, evolutionary aspirations and cultural references – and that the weight assigned to each of the forces varies according to the immediacy of needs, access to resources and capacity to plan for the future experienced by individuals in different contexts. Moreover, it concludes that, while the living circumstances faced by impoverished groups might be a valid arrangement to generally describe contextually vulnerable groups, cultural references and evolutionary aspirations might be entirely different depending on the geographic and historic background of the group for which a solution is being designed.

Acknowledgements

Firstly, I would like to express my sincere gratitude to my principal advisor Prof. Peter Hayward Jones and secondary advisor Helen Kerr for their continuous support of my studies and research project. Their patience, immense knowledge and guidance helped me in all the time of research and writing of this thesis.

Besides my advisors, I would like to thank the entire SFI team for their willingness to share knowledge and encouragement throughout the program.

My sincere thanks also goes to Greg Murray, Sagun Saxena, Richard Taylor, and the entire CleanStar Ventures crew in Kampala, who provided me an opportunity to temporarily join team as fellow, and who gave access to their resources and facilities in Kampala. Without their precious support, it would not be possible to conduct this research.

I also thank my fellow classmates for the stimulating discussions, for the sleepless nights we were working together in the SFI studio before deadlines and for all the fun we had in the last two years.

Last but not the least, I would like to thank my father Rodolpho Georg Filho and my mother Evelyn Schindhelm Georg for always supporting me emotionally and spiritually. I wouldn't have achieved this without you. You are the most precious people I have in my life. *Eu amo vocês acima de tudo.*

Table of Contents

List of Tables	vii
List of Figures	viii
Foreword	1
Chapter 1: Project Background and Motivation	3
The poor are not alone in the fight	5
Where foreign aid falls short.....	5
Catching mosquitos, fish and some soccer balls.....	8
Where NGOs and not-for-profit organizations fall short	10
Pumping expectations... away	11
The emerging role of the private sector.....	13
Where business organizations fall short	15
Signs of a chronic cultural-contextual sensitivity gap?	18
Chapter 2: The Problem and its Localized Face	22
Take a deep breath	23

A little context on Uganda	25
The birth of Kampala’s slums.....	27
Chapter 3: Research Setting and Methodology	33
Kitintale	34
Ethnographically-informed fieldwork methodology	35
Getting acquainted.....	38
Choosing participants	39
Designing research protocols	41
Approval, participant briefing and consent	42
Data reduction and analysis	44
Sensemaking and synthesis	45
Chapter 4: Research Findings and Discussion	47
Who’s getting their hands dirty?	47
Stories from Kitintale.....	54
There is no universal definition for poverty	62
Life in Kitintale.....	64
Surviving, adapting and evolving.....	69
Past, present and future.....	78

Chapter 5: Conclusions and Recommendations	84
Make it triable.....	88
Make it social.....	90
Leverage expected entry-points.....	91
Go through their leaders	92
Partner with informal market competitors	92
Help users manage their resources	94
Focus on benefits today.....	96
Make it children-friendly	96
Limitations and next steps	97
Bibliography	99
Appendices	107
Appendix A: Field Research Protocols	107
Appendix B: Sample POEMS Observation Sheet.....	113
Appendix C: Water Credit Token Project.....	114

List of Tables

Table 1. Research methods employed in the project.	36
Table 2. Research participants.	41
Table 3. Top-level themes that emerged from the analysis.	45

List of Figures

Figure 1. The Salgueiro slum as seen from my window	2
Figure 2. Estimated BoP market size, by sector. Source: World Resources Institute.	14
Figure 3. Map of Uganda.....	25
Figure 4. Ernst May's plan of Kampala as a multi-centered satellite city.....	29
Figure 5. A hair salon, a hair product shop and a small vendor in Kitintale	32
Figure 6. Kitintale's geographical context	33
Figure 7. Research process schematic.....	35
Figure 8. First few minutes in Kitintale	39
Figure 9. Research participant map.....	40
Figure 10. Synthesis process using sticky notes.....	45
Figure 11. Charcoal cycle with main touch points, average price and gender roles.....	48
Figure 12. Charcoal bags at a roadside selling point	50
Figure 13. Charcoal transportation by trucks (left) and motorcycles (right).	51
Figure 14. Charcoal wholesaler (left) and retailer (right) in Kitintale	52
Figure 15. Sarah and her neighbor preparing lunch.....	56

Figure 16. Joana’s niece washing clothes while waiting for kerosene stove to cool down.	57
Figure 17. Brenda's closed business next to her house	59
Figure 18. Michael’s front yard with water standpipe and light pole	60
Figure 19. Hannah’s charcoal stove and charcoal bucket serving as a kitchen table	62
Figure 20. Quiet day in the water well	67
Figure 21. Four key vulnerability factors identified in Kitintale.....	69
Figure 22. The four types of coping mechanisms.....	70
Figure 23. TivaWater filter: never used	71
Figure 24. Mobile phone and water credit token (blue device hanging on the right)	73
Figure 25. Expanding timeframe for return on resource investment.....	75
Figure 26. Triad of decision-shaping forces and Inayatullah’s futures triangle	80
Figure 27. Prepaid water standpipes in use	115

Foreword

I was born and raised in Rio de Janeiro, Brazil, a city that developed amid mountains and hills, squeezed between the rainforest and the sea. The juxtaposition of an effervescent urban scene and its peaceful natural heritage is remarkable to the eyes of visitors and its own citizens alike, having served as inspiration to people all over the world. Yet, another notable aspect of the city, equally important to its identity and social arrangement is the proximity of its most valuable real estate to informal, low-income settlements, also known as *favelas*.

While growing up, I got used to seeing the *favela do Salgueiro* (Salgueiro slum) through my window. The distance was large enough to blur the details of a reality that didn't have anything to do with my individual life, but close enough to remind me of its existence every day. The unsettling truth is that this is the reality of about 1,4 million people, or 22% of the city's population. But that never really bothered me until Christmas of 2013.



Figure 1 The Salgueiro slum as seen from my window

Having moved to Toronto in September 2013 to pursue my master's degree, I was flying back home to spend a few days in my hometown for the first time.

However excited I was to tell my family and friends how much my lifestyle had changed in those three months, looking through my window shortly after my arrival made me realize that, while my life went through a complete transformation in three months, for those living in substandard households in Salgueiro, it hadn't changed that much for decades. But what would it take to change these people's lives?

Chapter 1

Project Background and Motivation

Solving global poverty is not that easy

The favela do Salgueiro is just one example of how income inequality impacts everyday life for billions of people in urban and rural areas around the world. Despite immense work to reduce the despair of those directly affected, the problem persists. And it is complex.

More than 1 billion people still live on less than one dollar per day and about 2.7 billions survive on less than two dollars a day (United Nations, 2006). To help put that into perspective, the total population of the world in 1960 was about 2.6 billion people. This means that the world has today 100 million more people below the poverty line than its entire population 50 years ago.

It is important to highlight that the measurement and definition of poverty can be highly controversial. At the core of the debate is the fact that poverty goes far beyond income and takes a serious toll on an individual's physical and mental health, as well as on the regional environment and the global economy, to mention a few. Thus, measuring poverty only in economic terms is not enough.

About 800 million humans will go to bed hungry tonight, 300 million of them are children. In a disconcerting comparison, nonetheless, these people can be considered fortunate to have the chance to wake up tomorrow, as one person dies from starvation about every four seconds. For those, unfortunately, there will be no second chance.

Of course the poor frequently – but not always – try to escape poverty by engaging in subsistence activities and even running their own businesses. But these ventures tend to be chronically underfunded and therefore inefficient (Banerjee & Duflo, 2007). Overfarming of already poor soil, combined with the spread of AIDS, have led to a 23% decrease in food production in the last 25 years. Moreover, for African farmers, conventional fertilizers cost 2 to 6 times more than it would cost in the international market (United Nations, 2006). On the demand side, the international price for agricultural commodities has been in a long-term trend decline, making it even harder for poor farmers to make a profit by selling their products.

When trying to increase their incomes, they can engage in complementary, nonagricultural activities, but tend to do so in short bursts. By trading off opportunities to seek higher incomes, the poor have little chance to learn their jobs better (Banerjee & Duflo, 2007), thus impacting their capacity to increase their output and as a consequence, their income.

The poor are not alone in the fight

Collective efforts to combat poverty in the last 70 years sum up to about \$2.3 trillion (Polak & Warwick, 2013). If we assume, inaccurately of course, that this amount of financial resources has been equally invested by the 100 richest countries in the world for the last 70 years, we realize that each of these nations would have allocated more than \$328 million every year in the fight against global poverty. The United Nations, foreign aid agencies, regional and intergovernmental organizations, countless NGOs, charitable trusts and foundations, religious groups, billionaires and celebrities have openly affirmed their intentions to contribute to the cause. Yet, as former World Bank secretary William Easterly noted, “We have invested a staggering \$568 billion in development aid in Africa over the past forty-two years, and have very little to show for it” (Polak, 2009).

This affirmation backs up the idea that simple distribution of financial resources alone is not enough move communities out of poverty and ultimately change people’s lives. But why?

Where foreign aid falls short

Foreign aid can be defined as a voluntary transfer of funds from one country to another. In 2014, the 34 countries that make up the OECD contributed a total of

\$134.4 billion in overseas development. If equally distributed, this would mean over one billion dollars of aid incomes per country in the global south¹. Sub-Saharan Africa has traditionally been the most aided region in the developing world, having received on an average the equivalent of 5% of the region's GDP in development aid (Lancaster, 1999). If we consider the top quarter of aid recipients from 1965 to 2007, this proportion rises to about 17% of these countries' combined GDP, and yet the same countries experienced near zero per capita growth in the same period (Easterly, 2007).

The realities revealed above help stress the fact that foreign aid is not immune to polemic and skepticism in the development and poverty alleviation discussions. An important component of this dispute that seems to be missing is the variety of purposes for which aid is provided... and development is only one of them (Lancaster, 2006). Let's take the United States as an example, which committed \$31.1 billion to international assistance in 2012, or 24% of the total amount provided by OECD countries in that year. A careful look into the country's allocation of transferred funds reveals that large sums of resources flow into military assistance and related programs in conflict areas, infrastructure developments provided by American companies, support in local tax systems and trade promotion, none of which with a direct impact in the lives of the poor. In

¹ The global south usually refers to the countries with a human development index (HDI) below 0.8, the majority of which – but not all – are located in the southern hemisphere.

fact, bilateral net official development assistance to the group of least developed countries totaled to about \$26 billion, or about 21% of the aid resources provided by the OECD members in that same year (OECD, 2013). And even when these resources underpin the development of life improving infrastructure, the common mistake of emphasizing on donations and loans made (i.e. outputs) rather than the results of these loans (i.e. outcomes) has left innumerable health clinics without doctors, schools without textbooks, infrastructure badly maintained and governments in power despite economic mismanagement (Easterly, 2007).

Further components of this debate go beyond numbers, and relate to more structural issues. While some may argue that foreign aid fuels economic growth and thus, lays the foundations that help lift people out of poverty, lump-sum transfers of funds doesn't change the incentives at the margins to invest in an economy, an aspect which is even more critical in today's globalized financial market (Easterly, 2007). Even when aid resources flow to large infrastructure projects and ultimately supports GDP growth, the impact of indirect methods in poverty reduction can be considered negligible, as – sometimes corrupt – ruling elites take advantage of their position to award contracts to family, friends and supporters, or to invest in structures that help them preserve their power (Polak & Warwick, 2013). Yet, if governing elites are able to keep donors happy and willing to provide alternative sources of funding, the need to build or improve domestic revenue collection systems reduces, alongside with governmental accountability, as

they no longer need to sustain public support (Moss, Pettersson, & van de Walle, 2006). Moreover, as William Easterly pointed out:

“Unlike most market transactions, the recipient of the aid goods has no ability to signal their dissatisfaction by discontinuing the trade of money for goods. Unlike the provision of domestic public goods in democracies, the recipient of aid-financed public services has no ability to register dissatisfaction through voting. With little or no feedback from the poor, there is little information as to which aid programs are working.” (Easterly, 2007)

Catching mosquitos, fish and some soccer balls

According to the World Health Organization (WHO), about 1.2 billion people in the world are at high risk of malaria, a disease that killed about 627,000 people in 2012 (World Health Organization, 2013). Most of the deaths due to malaria infection occur among African children, where the virus takes the life of a child every minute. Despite its high incidence, malaria can be cured with the use of rapid diagnostic tests and artemisinin-based combination therapies. It can also be prevented with residual indoor spraying and with a very simple and popular item: treated mosquito nets.

Treated bed nets have been shown to be a relatively inexpensive and effective way of combating malaria, decreasing the death of kids under five by about 20% (Center for Disease Control and Prevention, 2014). For this reason, efforts to supply mosquito nets to Sub-Saharan Africa have ramped up steadily in the last few years: about 294 million bed nets have been distributed in the continent

between 2008 and 2010 and in 2014, the Global Fund has supported the delivery of 320 million of them (The Global Fund, 2014).

However, a recurrent phenomenon has been observed in several African villages, especially the one along lake Tanganyika, the longest and second largest freshwater lake in the world: the nets were going straight out of the bag into the sea. About 87% of households in that area reported to have used mosquito nets to fish in the lake (Gettleman, 2015). The problem goes beyond the fact that the nets are not being used for the prevention of a highly infectious disease. Treated bed nets have holes smaller than mosquitoes and, when used for fishing, sweep up the fish, but also fingerlings and eggs, putting the entire fish population at risk. Moreover, permethrin, one of the most common chemicals used in treated bed nets, is likely carcinogenic to humans (U.S. Environmental Protection Agency, 2006).

While some public health officials and specialists suggest that cases like the one cited above are anecdotal or infinitesimal, the fact is that the free supply of millions of light, soft and incredibly strong bed nets is a classic example of the white man's burden, where an externally designed solution is not only regionally ineffective, but also the cause of an entirely new set of problems.

Where NGOs and not-for-profit organizations fall short

Even though it is difficult to offer an exact account, some experts estimate that there are about 5 million citizen-based organizations globally (Polak & Warwick, 2013). These organizations range dramatically in size and scope, with a few large INGOs² and a myriad of small, local NGOs. These organizations – seen as effective facilitators of change, stimulating social progress and economic development – are essentially established to fill gaps left by standard service packages provided by governments and market mechanisms and are alleged to be more personal, flexible and holistic, and thus more efficient in catering to societal needs (Brinkerhoff, Smith, & Teegen, 2007). One of the key characteristics of NGOs is the direct contact that they maintain with the members of the communities they are helping, usually becoming interaction brokers for these communities (Brinkerhoff, Smith, & Teegen, 2007). In fact, many CBOs are fundamentally the recipients of foreign aid funds.

The global citizen sector's activity has been estimated at about \$2.8 trillion in 2009 (Polak & Warwick, 2013). While this number can lead us to think that the citizen sector is doing a curiously large effort in the fight against poverty, let us not be too optimistic about the scale of this overly simplistic measure. First and

² International non-governmental organizations are essentially NGOs that are larger in scale, are international in scope and have an international footprint. Examples of INGOs include Amnesty International, Oxfam International, CARE International, Doctors without Borders, the Rockefeller Foundation and the Gates Foundation.

foremost, it is critical to understand that the sector's programmatic activities usually take place in the global north, while platforms in the global south tend to be underdeveloped and underfunded, as the amount of resources provided by rich-nation NGOs is very small as compared to what goes to foreign aid. To put things into perspective, in 2011 Americans contributed about \$299 billion to charity organizations, yet only 3% - or \$9 billion - went to organizations engaged in international aid and development (Polak & Warwick, 2013).

But the challenges faced by the citizen sector go beyond their balance sheets. Creeping formalization, the displacement of ends by means (e.g. fundraising), shift of focus away from target clientele to reflect funders' interests, ineffectuality and amateurism are some of them (Brinkerhoff, Smith, & Teegen, 2007). Still, the overarching concern here seems to be about scale, as it can dramatically affect the continuity of the organizations' impact in the long term. Although all these groups place a strong focus on implementation, occasionally the amount of resources devoted to the operation and maintenance of critical services isn't adequate.

Pumping expectations... away

Sub-Saharan Africa is home to 40% of the world's population without access to water (UNDESA, 2014). In that subcontinent, half of the population is under 18

(UNFPA, 2014). Those two seemingly disconnected facts inspired PlayPump International to create an innovative pumping system to provide water for thousands, or millions of people. The idea sounded appealing: for \$7,000, the organization would be able to install one colorful merry-go-round system connected to an elevated tank and a borehole. By playing in the new attraction, village kids would pump water to the tank and help fetch water for the entire community. Each unit would be able to help 2,500 people (Hobbes, 2014). To pay for maintenance, the raised tanks would become billboards for ad campaigns and awareness programs.

After announcing its intentions to install 4,000 units and impact 10 million lives by 2010, PlayPump International got more than \$60 million, pledged by celebrities, major foundations and the U.S. government (Chambers, 2009). By 2007, one quarter of all 1,500 installed pumps already needed repair and in 2010, pumps were rusting, with several billboards left unsold. In some villages, adults were using the system themselves or eventually paying children to pump the water.

PlayPump International's initiative, while noble in theory, reflects a sad but familiar story in the citizen-based sector: exciting idea, huge local impact, influx of donor's funds, attempt to expand quickly and failure to sustain success (Hobbes, 2014). It also reminds us that the reliance on voluntary transfers and donations

can in fact create more dependence, as the mere increase of charity could inhibit the creation of local economies or unhelpfully affect existing ones (Hahn, 2009).

The emerging role of the private sector

It wasn't until recently that academics and business organizations alike started to pay attention to the potential role of the private sector in poverty alleviation. The Millennium Development Goals, established by the United Nations in 2000, were originally launched without the recognition of the role that private sector organizations could play in this field and still today, the society is split between those willing to accept the idea, and others that are skeptical (Prahalad, 2009).

Even though businesses alone cannot solve all problems related to poverty, it is at the very least reasonable to argue that they can leverage world-class technical expertise and the entrepreneurial drive that, combined with a healthy level of accountability, equip them with the skills to tackle the problems and needs of this challenging segment of the society, promoting not only economic, but also social and environmental outcomes. Private sector organizations are less susceptible to political pressures than governments and multilateral organizations (Polak & Warwick, 2013) and can be more flexible to create, improve and maintain offerings according to the specific needs of their customers. Furthermore, profitable businesses can also stimulate the growth of local economies, thus

creating employment opportunities. Most importantly, they can attract and mobilize substantial amounts of capital to expand their activities and impact.

The reality is that businesses' interest in what's called the "Bottom of the Pyramid" or "Base of the Pyramid" (BoP) markets is rising (Hammond et al., 2007). In 2014, total private non-resident capital flow to emerging markets totaled to \$1.1 trillion (Institute of International Finance, 2015). To put that into perspective, the GDP of emerging countries in the same year amounted to \$30.3 trillion (International Monetary Fund, 2015). That suggests that investors are willing to capitalize on opportunities for lucrative new investments in this segment. And the combined purchasing power of the four billion low-income people in the world has been estimated at \$5 trillion (Hammond et al., 2007), which represents a significant opportunity for the private sector.

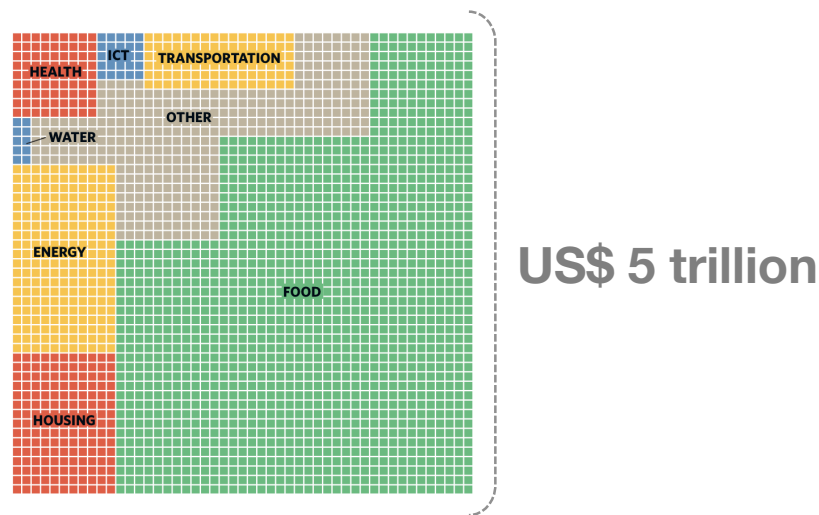


Figure 2 Estimated BoP market size, by sector. Source: World Resources Institute.

The core idea is to engage BoP markets with novel approaches to business, through the creation of ethical, self-sustaining market-based systems that complement other approaches to poverty alleviation. So what's preventing business organizations from succeeding in a large and ready market?

Where business organizations fall short

Even though it isn't hard to understand the economic reasons for why business organizations should explore opportunities at the BoP, the notion of creating market-based approaches to address the needs of the poor is easier in theory than in practice. As Blocker et al. put it:

“the distinction (and sometimes intentional overlap) between profit seeking and poverty alleviation efforts are typically unclear; that is, even good and noble-sounding initiatives can be mired in divergent aims, discourses, and practices that, instead of helping, further disadvantage poor consumers.” (Blocker, et al., 2011)

Perhaps the most common – incorrect – principles that can lead to failure when attempting to cater to poor consumers are to assume that low-income markets are similar to upscale markets that are just a few years behind in their development (London & Hart, 2004), as well as to regard the poor as consumers of existing or adapted offerings designed for middle to high income markets (Kolk, Rivera-Santos, & Rufin, 2013). Low-income markets, its consumers and their specific

needs are unique and can hardly be addressed by unpretentious product extension strategies.

Still when private sector organizations are committed to rethink their business models in order to address this market segment, they sometimes become overly concerned with the social mission of their projects that they end up neglecting the realities of working within corporations and walking away from business fundamentals (Simanis, 2014). Several initiatives at the BoP failed to prove themselves profitable within the challenging investment timeframes projected by companies and expected by their shareholders (Simanis, 2014).

Based on the common argument that making a high profit margin from low-income consumers seemed unethical³, Prahalad's initial ideas of pursuing of low-margin, high volume strategies sounded just right. Yet, reality again proved different and businesses started to realize that costs could be much higher in potential BoP markets, due to inefficient social institutions and poor infrastructure, the later one being responsible for the high costs to serve far away consumers in remote villages (Simanis, 2013). As a result, low-margin, high volume strategies required impractical penetration rates of the target market (Simanis, 2012) and overlooked the extra costs required to compensate for issues related to the protection of intellectual property and corrupt law enforcement

³ Simanis further disputes this argument by distinguishing investment profitability from operating and gross profitability.

agencies (Simanis, 2013). Under all these circumstances, corporations used to designing for affluent consumers can struggle to design for extreme affordability. And as said before, the naïve approach of simplifying existing products may not be the best answer.

Another common mistake made by corporations before entering BoP markets is believing that needs automatically translate into a market. As Simanis summarizes:

“for most products launched in the BoP, there is no market – instead, a market has to be created. With market creation, traditional consumer research and data are fuzzy signals at best, as consumers have no reference point for understanding the value of the new functionality, nor the various changes to their existing routines, budgets and lifestyles that product adoption will entail.” (Simanis, 2013)

As the list of challenges grew, a pattern started to repeat itself. Corporations start with a grandiose mission to cater to needs of the poor, and unfold it into abstract or unachievable goals. In order to pursue their goals, proponents design complex, holistic business models that fail to make money and deliver on promises. With frustrating results, corporate interest in the BoP fades and the initiatives are pushed to CSR areas of their organizations (Simanis & Milstein, 2012). But the downward spiral that pushes BoP initiatives from business development to CSR teams is just a symptom of a more fundamental problem in this debate: the strategies supporting BoP initiatives eventually fail to align with corporate managers' mindsets, routines, responsibilities and obligations (Simanis, 2014)

and, unless designed differently, are condemned to collapse since their very first day.

Signs of a chronic cultural-contextual sensitivity gap?

Designing, implementing and operating successful businesses at the base of the economic pyramid is far from simple. Poverty contexts are highly diverse in nature and can pose significant challenges to organizations interested in developing market-based approaches to the delivery of life-enhancing products or services.

Yet, as the reader may have noticed, most of the challenges mentioned so far seem to be related to the economical and technological aspects of business development.

Another set of mostly overlooked – and highly relevant – pieces of this complex puzzle relates to understanding the needs, perceptions, decisions and social dynamics of the potential users of an offering. A careful look at the development of the BoP agenda reveals that little has been made so far to fill in this knowledge gap. In their seminal paper, Prahalad and Hart highlighted:

“New business models must not disrupt the cultures and lifestyles of local people. An effective combination of local and global knowledge is needed, not a replication of the Western system. (...) MNCs must develop research facilities in emerging markets such as China, India, Brazil, Mexico, and Africa, although few have made a big effort so far.” (Prahalad & Hart, 2002)

Six years later, Karnani eloquently stressed the same concern:

“The problem is that the poor often make choices that are not in their own self-interest. The rich also often make choices not in their self-interest, but the consequences are not as severe in their case. Selling to the poor can in fact result in reducing their welfare. Therefore, there is a need to impose some limits on free markets to prevent exploitation of the poor. Markets work best when appropriately restricted to protect the vulnerable. (...) Unfortunately there are few micro-level studies on the purchasing behavior of the poor.” (Karnani, 2008)

Meanwhile, Canadian engineer and designer Krista Donaldson complemented:

“Calling for user-centric design is not a novel insight, particularly in HCI design; however, failing to understand users’ needs tends to be a recurring theme of Design for Development failures.” (Donaldson, 2009)

Despite the repetitive nature of the issue, the market and academics alike didn’t seem to address the user-understanding gap in the field. In 2013, after reviewing 104 articles published over a ten-year period, Kolk et al. concluded:

“The last identifiable cluster of articles, with only six articles, focuses on the description of BOP market characteristics. The limited number of articles in this cluster is somewhat surprising given the extent to which the uniqueness of BOP markets is emphasized in BOP research.” (Kolk, Rivera-Santos, & Rufin, 2013)

Undoubtedly, business and not-for-profit organizations alike are not always getting properly prepared to address the needs of the poor. When it comes to building a solid understanding of individual, social and cultural aspects inherent to subsistence marketplaces, it seems that organizations are working based on inaccurate and sometimes untested assumptions and extrapolations about their

target market. Poverty has a localized face and the solutions to these people's problems matter most at the local level (Kotler, Roberto, & Leisner, 2006). It seems reasonable to argue that in poverty contexts, where basic needs are more aggravated and the access to certain products or services can mean tremendous life quality improvements, the triumph of any feasible solution can be taken for granted. Nonetheless sometimes the adoption of innovation can be hard, even when the new is obviously better to the eyes of the users themselves. And if this hypothesis is to be accepted – at least relatively – as truth, it's implications apply not only for those attempting to cater to the pressing needs of the impoverished, but generally to anyone designing for people.

Therefore, the goal of this research project was to build the case for **how a close understanding of human activity can inform the design of culturally and contextually sustainable innovations for subsistence markets**. The choice to conduct my research with people living in poverty contexts derives from the fact that the immediacy of their needs often bears precocious conclusions that any solution will be successful, as long as it addresses a need.

Furthermore, in order to make the findings of this project more tangible and applicable in the real world, I decided to focus on a specific challenge faced by the poor: the substitution of unhealthy and unsustainable biomass as cooking fuels by

cleaner and competitive cooking alternatives in Kitintale, an urban slum in Uganda's capital Kampala.

Despite the localized face of this project, the challenge at hand has a global scale, affecting billions around the world. CleanStar Ventures, an organization that focuses on creating commercial ventures to solve social and environmental challenges, is currently developing affordable clean cooking fuel alternatives to urban low-income households in Uganda and planning expansion into other African countries.

I joined CleanStar Ventures for three months as a volunteer fellow in Kampala to carry out ethnographic research and provide them with product-service system recommendations, as well as to develop full-scale working prototypes for the main components of the system, the latter task being outside the scope of this research project. This research project has been conducted during the aforementioned period of engagement locally supported - not financially - by CleanStar Ventures.

Chapter 2

The Problem and its Localized Face

What fuel is on the menu today?

The most popular indigenous solution to cooking fuel in Sub-Saharan Africa is charcoal, which in recent decades emerged as an alternative to firewood.

Introducing new cooking fuels in African slums is a complex challenge. While the low level of household income is a plausible concern, it is undeniable that cooking with charcoal is a deeply rooted standard that is hard to change. Several organizations have been exploring different approaches to solving this problem, but the challenges related to changing behaviors dramatically increase the complexity of the problem to be solved. It is a big problem too.

There are 2.7 billion people relying on traditional biomass as cooking fuels around the world and according to the latest statistics, the figure has increased by 38 million people year over year (IEA, 2014). Sub-Saharan Africa is the region with the largest share of people relying on these fuels, where 80% of its population or about 727 million people still use firewood, charcoal, agricultural residues and animal excrement for cooking and heating. The use of charcoal in average-sized African towns and in rural areas is rising as a better alternative to wood and the

charcoal sector – mostly informal – has grown in economic relevance. As a consequence, about 4 million hectares of forest are felled every year in Africa, or twice as much as the world average (World Future Council, 2009). About 30.6 million tons of the fuel was produced in Africa in 2012, accounting for of at least \$9.2 billion dollars in annual revenues throughout the continent and in East, Central and West Africa, the net profit from trading and taxing of unregulated, illicit or illegal charcoal has been estimated at about \$7.4 billion. Surprisingly, this happens to be 2.8 times greater than the value of illegal drugs traded in the same region (UNEP, 2014). The comparison between illegal charcoal and illegal drugs may sound weak, but the fact is that both have direct implications in public health. Using solid fuels such as biomass for cooking indoors, on traditional stoves, results in smoke that contains pollutants, especially small particles. Under those circumstances, particulate matter levels in the air may be 20 times higher than accepted guideline values according to the World Health Organization.

Take a deep breath

Estimates show that about 600,000 deaths in Africa in 2012 were linked to the phenomenon known as household air pollution, or HAP. Globally, the number of deaths attributable to HAP amounts to 4.3 million, more than malaria and tuberculosis combined. Fatalities are mainly a consequence of diseases caused by the inhalation of pollutants and the most common illnesses include stroke,

ischemic heart disease, chronic obstructive pulmonary disease and acute lower respiratory disease and lung cancer (WHO, 2014).

There are three fundamental ways to reduce the effects of HAP: improved ventilation (which increases the discharge of pollutants and allows for the intake of fresh air), improved stoves (which reduce heat losses through better thermal insulation, thus reducing the required amount of fuel to cook) and improved fuels (which eliminate the source of pollution). While the two first approaches are more widespread in the African continent, the third one is perhaps the most effective. It is the most puzzling one too, not only because it attempts to change habits and old practices, but also because of the scale of the challenge: forecasts estimate that 406 million people will need to gain access to modern cooking fuels only in Sub-Saharan Africa between 2015 and 2030 (IEA, 2014).

I spent three months with CleanStar Ventures in Kampala, Uganda, in an attempt to deeply understand activities and human needs to advise the organization and to propose a model for progressive innovation to solve this problem. Yet, technology, material culture and activities are closely linked to the physical geography, as well as the local history. Therefore, before attempting to understand CleanStar Venture's target population, it is important to make some geographical and historical considerations.

A little context on Uganda

A landlocked country located in East Africa, Uganda's boundaries have been defined by British colonizers, who grouped together a vast range of different ethnic groups with different cultures and political systems (CIA, 2013). Today, it is home to about 36 million people, a number that's growing at 3.2% per year, which makes it one of the top 10 fastest growing populations in the world. That is because Uganda at the early stages of a transition to a low-birth-rate, low-death-rate country, with death rates having dropped significantly without a corresponding drop in birth rates (Mukwaya et al., 2012).



Figure 3 Map of Uganda

When it comes to cooking, latest statistics estimate that 97% of the country's population was using traditional biomass for cooking (IEA, 2014). As a consequence, Uganda is experiencing rapid forest depletion rates, having lost 26% of its forest coverage between 1990 and 2005 (GVEP International, 2012).

Intense deforestation and fast population growth are in fact strong drivers for recent surges in charcoal prices in the capital Kampala. The fuel's demand is growing at a yearly rate of 6% (NEMA, 2008) and the price of a 70 kg bag - a standard unit for the wholesale of charcoal in Uganda - rose from about 20,000 shillings in 2009 to between 55,000 and 70,000 shillings in 2012, depending on the location (UNDP, 2013). This represents a 175% to 250% increase in urban charcoal prices in just three years. And the impact of this increase is even more intense on those living in urban low-income, informal settlements.

While Uganda is a predominantly rural country, with very few urban areas and just 16% of its population currently living in cities, with a 5.4% rate of urbanization, this balance is quickly changing (CIA, 2013). Rural to urban migration is a coping mechanism for the rural poor in search for opportunities to work, better services, better housing and security, among other reasons (ACF International, 2012). That's because urban livelihoods are fundamentally different from their rural peers: income-generating activities are spread across different sectors, with a larger reliance on cash for transactions and better access to markets

and social services. On the other hand, there is discrimination and harassment due to the fact that multiple ethnic groups end up living together in high density settlements, employment opportunities for unskilled workers are typically uncertain and housing prices are higher (ACF International, 2012). As a result, about 60% of Uganda's urban population lives in slums (The World Bank, 2012).

In order to explore the slum environment in Kampala, we need to step back and understand the city's urbanization process, as well as the origins of informal urban settlements.

The birth of Kampala's slums

The British colonized Uganda in the late 19th century, but in pre-colonial times, societies in the country were organized around several tribal kingdoms.

Somewhere around the 14th century, the *Baganda* – largest ethnic group in the country – established the *Kibuga*, the moving capital of the *Buganda* kingdom. It represented the residence of the king, which placed his house on top of a hill and had the villas of the chiefs and close confidants around him, in a predominantly concentric setup, a physical manifestation of the hierarchical, centralized system it sustained. The *Kibuga* was based on rural administration modes, where the central ruling king would appoint the officials who ultimately had the authority, with peasants merely following orders (Richards, Sturrock, & Fortt, 1973). Upon a

king's death, his tomb would be placed in the capital, pushing following kings to establish new capitals. Agriculture was part of the urban fabric in the planning arrangements of the *Kibuga*.

The *Kibuga* system remained relatively isolated from the outside world until the middle of the 19th century, when long distance ivory traders started venturing into the country. Still, the first significant contact with colonial settlers happened in 1894, when the British Crown announced a protectorate over Uganda, taking over the administration of the country. The city of Kampala became the headquarters of colonial administration, and started to develop next to the *Kibuga*, the indigenous capital in Mengo hill.

It wasn't until 1912 that Kampala saw its first modern planning scheme, forming the basis for what is today's central Kampala. Yet in 1929, following a period of rapid growth, the administration commissioned a master plan, with the main goal of controlling the random growth of the city. The plan was designed to provide colonial administrators with basic infrastructure, as well as to protect them from tropical diseases. In that same period, research on malaria's causes and transmission indicated that the disease was transmitted by mosquitoes that fed on infected people (Omolo-Okalebo et al., 2010). This finding played a significant role on how the city was designed. The new plan imposed order and social

controls, transferring Africans to the outskirts of the city or to the *Kibuga*, thus planting the seeds of racial segregation (Gutschow, 2009).

Several planning interventions took place until in 1945, British authorities commissioned German architect and city planner Ernst May to create a plan for Kampala. His concept of a garden city emphasized the natural topography of the region, yet is also included large settlements for low- and middle-income Africans and Asians, setting aside entire neighborhoods for Europeans and further reinforcing segregation (Gutschow, 2009).

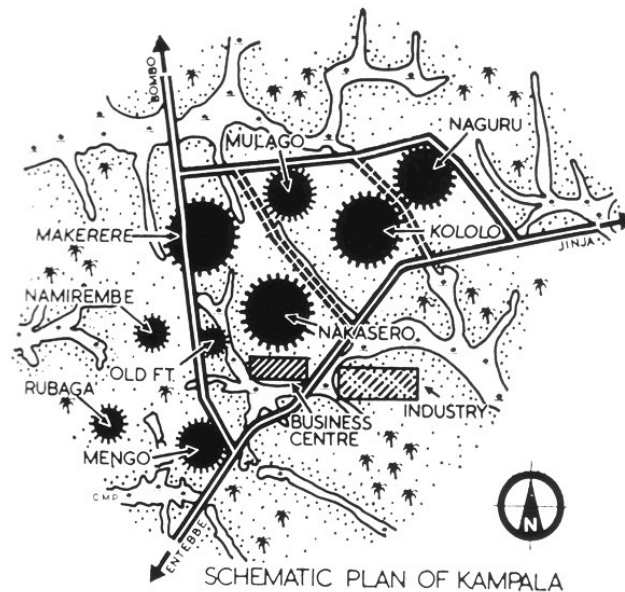


Figure 4 Ernst May's plan of Kampala as a multi-centered satellite city

Interestingly, urban planners in the region complained that Africans seemed to resist permanent settlements and noticed that, when they did stay in the city, they

could only afford crude mud huts with metal roofs (Gutschow, 2009), which closely resemble the simple round wattle-and-daub grass-thatched huts in which rural Ugandans still reside in modern days. Based on this perception, May's plans encompassed features that should supposedly help acculturate natives into European social norms. As Gutschow notes:

“Urban planning, he speculated, could provide a stable social and civic system for the natives ‘without previous training in citizenship,’ thereby ‘inducing the African laborer to become more stable, and to cease wandering back to his village after a few months, a practice which is most detrimental to any kind of systematic trade or production.’ Settling down would elevate the African to enjoy what he called ‘a full share in the duties and benefits of modern civilization’ and culture.” (Gutschow, 2009)

Following initial planning efforts, Kampala essentially evolved as a modern center next to the traditional *Kibuga*. While the city was designed and built based on modern urban principles, the *Kibuga* was based on traditional rural systems and this created a whole set of development disparities (Mugema, 2013). Under these circumstances, in 1968 nine surrounding villages became part of Kampala, marking the amalgamation of the traditional and the modern city (Musinguzi, 2013).

At this point, it is interesting to note that one possible reason for the origination and upsurge of informal settlements in Kampala was the fact that colonial administrators and planners were overly preoccupied with their own class

(Mukwaya, Sengendo, & Lwasa, 2010) and left the natives themselves to cater for their needs.

Conflicts and civil strife marked the era between the 70s and 80s, also characterized by economic collapse. Soaring inflation rates, a 90% drop in working class salaries and wages, as well as higher taxes on farmers served as drivers for the emergence of a parallel economy and the pursuit of additional sources of income (Sedigh & Ruzindana, 1999). Restructuring of the national economy only came in 1986, with the adoption of more liberal economic policies that increased the role of private sector in issues related to urban affairs (Mukwaya, Sengendo, & Lwasa, 2010). In the period between the late 80s and the early 2000s, Kampala experienced population shifts, which reflected in changes in urban land uses. Most town settlements occurred without planning, were not recognized by urban authorities and therefore, declared illegal.

Today, as existing urban plans for the main cities expired, most of the urbanization taking place in the country can be characterized as informal, organic or haphazard (Mukwaya, Sengendo, & Lwasa, 2010). As a result, housing in the capital is considered far from satisfactory or substandard – about 80% of households in Kampala lack toilets. Rental accommodations account for 65% of households, even in informal settlements. In these areas, where 80% of households are in the low-income group, incomes are generally low, intermittent

and uncertain, and small informal home-based enterprises have become an important element of livelihoods, predominantly contributing to household earnings (Mukiibi, 2012).



Figure 5 A hair salon, a hair product shop and a small vendor in Kitintale

As some authors observed, despite the general differences in livelihoods, in some aspects the lifestyle in Kampala's slums is curiously similar to that in rural areas. Outside the core business district, Kampala could be considered a rural city, with many of its settlements resembling rural villages and mostly occupied by rural-urban migrants, with urban agriculture playing an important role as a source of food and income (Otiso, 2006).

Chapter 3

Research Setting and Methodology

Diving deeper

However valuable geographic, historic accounts and practical comparisons may be to the appreciation of how Kampala's slum dwellers understand their environment, they do little to help us learn about the living circumstances and behaviors of its residents. To do so, this project took a deeper approach, engaging in field research conducted at the most local of levels: in people's homes.

The locus of my research was Kitintale, a low-income, informal urban settlement in the popular suburbs of Kampala, defined in collaboration with CleanStar Ventures' team.

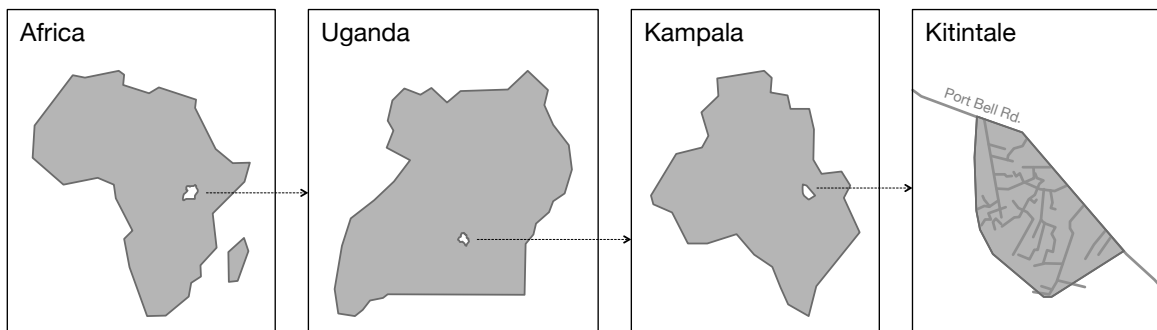


Figure 6 Kitintale's geographical context

Kitintale

Even though there are no official estimates, rough calculations indicate that the community covers about 4,000 households. At the core of this imprecision lies the fact that, in informal settlements, each room in a house can eventually become the household for an entire family. Household size ranges from one person to entire 13 people families, but with an average household size of 3.6 people, one can claim that Kitintale is home to approximately 14,400 people

When it comes to cooking, less than 2% of households still rely on wood for cooking at home, while 87% of them are using charcoal, a concrete example of the changing patterns in urban energy use. Of all charcoal users, eight out of ten are buying the fuel on a daily basis and nine out of ten do it from a supplier that's less than ten minutes walking distance from home, a sign of the pervasive availability of the fuel in the area.

In Kitintale, about 20% of charcoal users have nothing to complain about it, yet one quarter of households admitted using kerosene as a main fuel, as a backup or as an alternative for cooking faster and even though experts in the field argue that the awareness of household air pollution amongst the general population is virtually non-existent (GVEP International, 2012), in Kitintale, one out of five households alleged disapproval of wood, charcoal and kerosene on the basis that these fuels are unhealthy.

The stories that these statistics introduce are rich, instigating and invaluable for whoever intends to design for these people. But in order to dive deeper, this research project went beyond numbers and tried to cast some light on these people's stories.

Ethnographically-informed fieldwork methodology

As already mentioned before, part of this research project has been conducted during a period of engagement not-financially supported by my fellowship host CleanStar Ventures between November 2014 and February 2015.

The research process and methods used in this project are summarized in Figure 7 and Table 1 below.

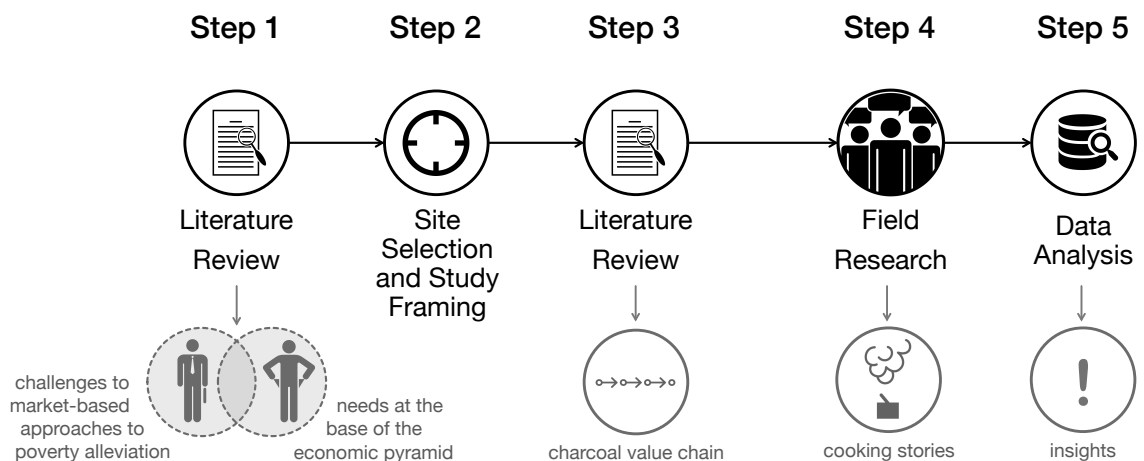


Figure 7 Research process schematic

Table 1 Research methods employed in the project.

Step	Method	Procedures	Justification	Where	Key Reference
Step 1	Desk Research	Literature review	Identifying gaps related to the needs of the poor, as well as to market-based approaches to poverty alleviation	Toronto	N.A.
Step 2	Expert Interview	Videoconference; in-person meeting	Identify the site for the field research	Toronto Rio de Janeiro	N.A.
Step 3	Desk Research	Literature review	Map the charcoal stakeholders in the targeted region	Toronto	N.A.
Step 4	Individual Interviews	Semi-structured interviews, based on pilot tested protocols; audio recording and transcription	Gain deeper understanding of users' behaviors and reasoning	Kampala	Sanders, L., & Stappers, P. J. (2012). <i>Convivial design toolbox: generative research for the front end of design</i> . BIS.
Step 4	User Observation	Sketches and photography, classified using the POEMS framework	Gain deeper understanding of users' experiences and fuel usage contexts	Kampala	Kumar, V., & Whitney, P. (2003). Faster, cheaper, deeper user research. <i>Design Management Journal (Former Series)</i> , 14 (2), 50-57.
Step 5	Data Analysis	Spreadsheet analysis	Describe and interpret the data	Toronto	Ladner, S. (2014). <i>Practical Ethnography: A Guide to Doing Ethnography in the Private Sector</i> . Walnut Creek, CA: Left Coast Press.
Steps 1 through 5	Review and Discussions with Primary Advisor	Videoconference; in-person meeting	Plan the research steps and keep on track and on scope	N.A.	N.A.

The starting point of this project was a comprehensive review on the bottom of the pyramid literature with the goal of mapping potential gaps and opportunities for future research. In this process, gaps related to market-based approaches to poverty were analyzed and the key barriers were documented and pondered. Also, gaps related to the needs of the poor were broadly identified.

Once the challenge was identified, the second stage was to define the locus and broad site boundaries for the research, which was accomplished together with CleanStar Ventures, followed by a comprehensive mapping of the charcoal system's stakeholders in the targeted region based on academic papers, public reports and the general media, comprising stage three. The goal of this latter phase was to uncover the key participants of the charcoal marketplace, as well as the priorities for each stakeholder and the current incentive structures in the system.

In a fourth stage, the missing information regarding lifestyles, behaviors and choices – not reachable through prior studies in the previous stage – was complemented with ethnographic research, the main field research method employed in the project. From defining research protocols and planning activities to executing the research and analysis, this step took about three months and allowed for a deeper, more nuanced understanding of the complexity of the issue being explored in this project. The main goal at this stage was to interview and

observe users, collecting stories from the key stakeholders that are involved in the cooking process and that would be impacted by an external intervention.

Contextual observations and individual interviews provided in-depth data about specific informants in their living and cooking contexts.

The fifth and last step of this research project comprised the analysis of all collected data – mainly primary – in order to find adoption patterns, barriers and levers.

Getting acquainted

Even though the third stage didn't start until the first day of February, I decided to fly to Kampala earlier in order to frame my research approach locally, taking customs and culture into consideration and adapting protocols whenever necessary. Interestingly, just two days after landing in Kampala, I went for a first walk in Kitintale, the slum in which I would conduct my research. A few minutes into my initial venture in the field made me realize that the official language (english) was not commonly spoken by Kitintale's residents. The support of a local research partner to help me with local language skills was an imperative.



Figure 8 First few minutes in Kitintale

In my first day with CleanStar Ventures, I learned that they had conducted an extensive survey with about 1,000 households in Kitintale, comprising of 124 questions ranging from household demographics to fuel usage patterns and budgets. Valuing the depth and breath of the existing data, and knowing that all participants provided contact details and were geographically tagged, I decided to use that database to select the participants for my research.

Choosing participants

Because of the nature of the research topic (i.e. cooking fuel choices and associated experiences), the ideal participant profile would be adult, female homemakers that are directly involved in purchasing and using cooking fuels at

home. That choice was made mainly because of cultural reasons: in Uganda, families have distinct and very well defined gender roles and domestic activities such as cooking, cleaning, fetching fuel and water, as well as taking care of children and elders are responsibilities of the women, while men are the main providers and central decision makers in their families. Thus, eventually, adult men participating in the cooking process could as well be invited to join in the research, their availability permitting. The map below locates the selected participants according to their household size, fuel stock volume and fuel of choice.

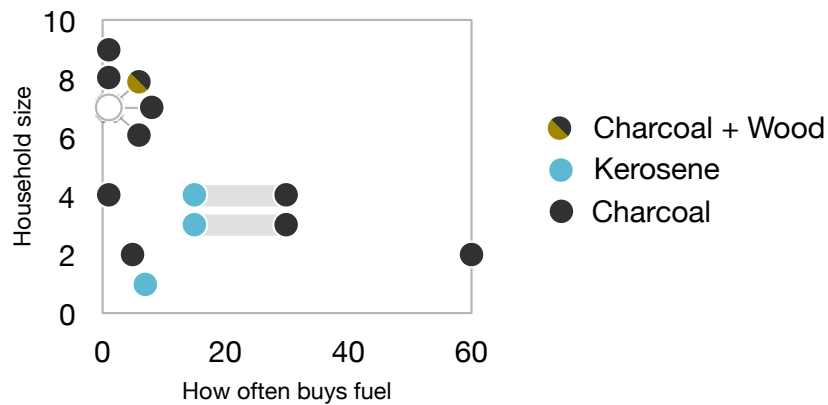


Figure 9 Research participant map

When choosing the specific participants, I tried to find and select extreme users in a range of variables, such as the main choice of fuel, household size and fuel purchasing habits, among others. Even though the map above summarizes their

characteristics across three key variables, chosen participants perceptions about charcoal varied between “nothing good about it” and “nothing to complain”. Moreover, several households had more than one cooks, such as children and elders, which also contributed to a diverse range of cooking experiences and needs. Finally, three of the selected participants explicitly declared using more than one cooking fuel besides charcoal, either at home under certain circumstances, or as a business activity.

Table 2 Research participants.

Participant (<i>pseudonym</i>)	Gender (<i>M/F</i>)	Occupation (<i>-</i>)	Household Size (<i>people</i>)	Fuel of Choice (<i>-</i>)
Olivia	Female	student	2	charcoal
Sarah	Female	house wife	8	charcoal
Norah	Female	hawker	7	charcoal
Rae	Female	unemployed	7	charcoal / wood
Sally	Female	teacher	4	charcoal
Joana	Female	homemaker	3	charcoal / kerosene
Brenda	Female	charcoal vendor	7	charcoal
Michael	Male	entrepreneur	9	charcoal
Hannah	Female	tailor	2	charcoal
David	Male	community leader	4	charcoal / kerosene
Joe	Male	student	1	kerosene

Designing research protocols

Once the participants were selected – and realizing that indeed most of them were women – I learned that it would not be appropriate for a white man to spend a significant amount of time inside a woman's house without the presence of the

husband. The presence of local woman who could speak the local language would be ideal, not only to break cultural barriers, but also to build a stronger bond with the informant, in addition to helping me interpret some cultural elements in the collected data. Therefore, a local female research partner, with native language fluency and a previous experience in conducting research was recruited earlier in the process.

The research protocols and activity worksheets were entirely developed together with the local research partner, which ensured that the approach and methods are appropriate to the local context, considering and respecting culturally-sensitive issues. Likewise, research participants were initially contacted by phone with the support of the local research partner, speaking in their local language and following the protocols and guidelines developed beforehand and scripted. The research protocols are at the appendix section of this report.

Approval, participant briefing and consent

After adapting the protocol and making an initial phone contact with the selected participants, the next crucial step to starting the research activities was getting the approval of the local council chairman (LC I chairman). The governance structure in Ugandan districts is divided in five levels of Local Councils, where the LC V is responsible for an entire district, while on the other end, the LC I is responsible

for a village or neighborhood. The LC I chairman, officially elected by the village, has sufficient authority to resolve problems at the area under his administration and to locally implement centrally planned rulings. Being a respected individual in the community, his approval seemed almost mandatory, as well as desirable for the CleanStar Venture project's success.

Following the approval by the LC I chairman, the research partner and I visited each participant for the initial briefing, with the main intention of explaining our intentions, getting their consent and scheduling a day to conduct the in-context interviews and observations. According to locals, the amount of time necessary for the interviews – between one and two hours – should not have an economic impact on the participants, especially because the interview will be conducted while the participants prepare their meals. It would not disrupt their normal activities.

A challenge emerged during the briefing process in the field: about one third of the selected participants couldn't – or didn't want to – participate in the research. As a way to cope with the losses, we requested participants to recommend friends that could be interested in participating (i.e. snowball recruiting). In the end of that stage, eleven informants agreed to participate.

During the course of the interviews, the research partner communicated with informants in local language. After each reaction, the research partner translated

the response into English. All the interviews have been audio-recorded with the consent of the informant and transcribed into digital format. Additionally, after every interview, a debriefing session with the research partner took place in the office. All relevant observations were categorized using the POEMS framework (Kumar & Whitney, 2003) and documented for future analysis, together with photos and transcripts. A sample observation sheet is provided at the appendix section of this report.

Data reduction and analysis

After collecting more than 16 hours of audio recordings, over 260 photos, 45 sheets of field observations and 108 pages of interview transcripts, I returned to Toronto to analyze the data. In total, 519 data points resulted from the decoding process. Each data point was then compiled into a digital spreadsheet software, recommended by my principal advisor as a tool for sorting and grounded theory coding, and as an effective instrument to handle the large number of data points that surfaced from the decoding process. In an iterative process, I worked through the data, initially finding the common patterns related to **pains, gains, coping strategies** and **cultural insights**. In this process, sub-themes started to emerge and the possibility to reorganize the data under evolving sub-themes, applying filters to sort out data points and find patterns, was also a key aspect that led to the choice of a digital spreadsheet for the analysis of the qualitative data. As a result,

key themes emerged as insights about their living circumstances, coping strategies and cultural insights, as showed in Table 3 below.

Table 3 Top-level themes that emerged from the analysis.

Living Circumstances	Coping Strategies	Cultural Insights
Limitations & Constraints	Avoidance	Strong ties to the villages
Dependence	Optimization	Creation of social capital reserves
Marginalization	Hedging	Charcoal as a safe economic entity
Uncertainty	Growth	Charcoal as objectified cultural capital

Sensemaking and synthesis

To compile all my research insights into a coherent storyline, sticky notes were used as the key sensemaking artifact, each one representing a single hypotheses or argument to be tested and ultimately compiled into the final report. Figure 10 below is a snapshot of this synthesis process.



Figure 10 Synthesis process using sticky notes

Additionally, in order to uncover the intricacy of people's lives and preserve the user-centered orientation of this research project, I chose to increase clarity and consistency in the communication of my findings by revealing insights from the field through narratives inspired by research participants interviewed. Each narrative represents someone in the real world and enables readers to concentrate on a manageable set of findings. Names and specific identifiers were carefully removed for anonymity purposes and the stories are shared in the following chapter.

Chapter 4

Research Findings and Discussion

More than just a dirty cooking fuel

Even though documented evidence from the Ugandan charcoal market is incomplete, the resulting combination of secondary and primary research can help understanding this complex system, starting by the main stakeholders in the charcoal value chain.

Who's getting their hands dirty?

Many people. Getting the charcoal to the hands of a homemaker in Kitintale is a long process that takes several steps. In fact, twelve categories of stakeholders were identified in the charcoal system in Uganda, summarized in the diagram below.

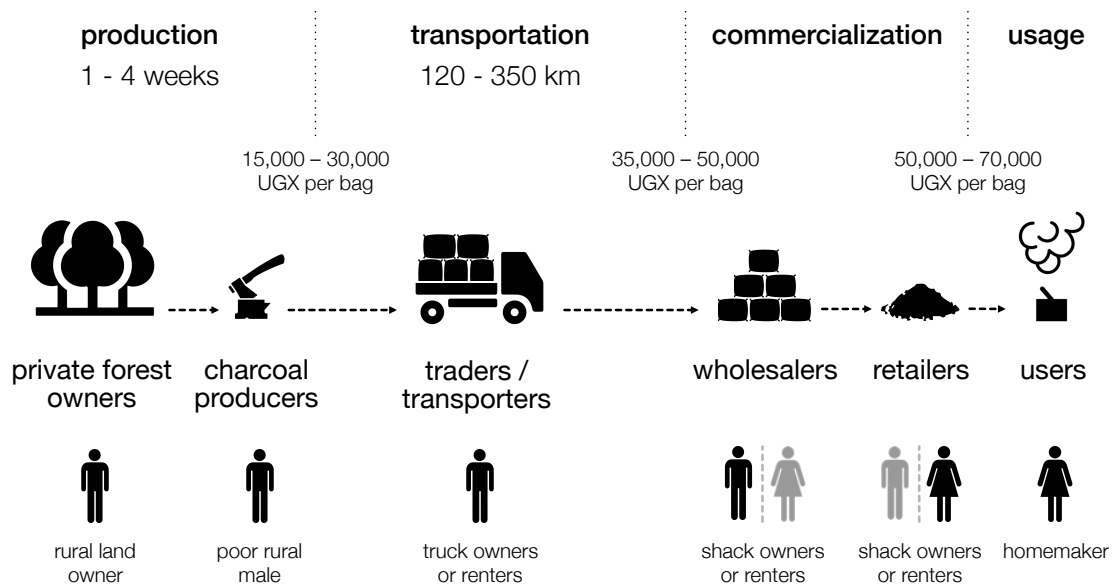


Figure 11 Charcoal cycle with main touch points, average price and gender roles

It all starts somewhere in central, western or northern Uganda, where most charcoal comes from. There, owners of private forests sell their trees – mostly native – to charcoal producers. To private forest owners, who possess about 70% of the total forest area in the country, there are virtually no incentives to protect their biomass, and selling their trees represents not only a source of revenue to complement agricultural income, but also a cost effective way to convert forestland into productive land. Yet, because the charcoal sector and its activities are highly distributed and disorganized, the enforcement of deforestation laws is highly uneven and difficult (UNDP, 2013).

The chopped wood is then processed into charcoal by **producers**, typically poor, unskilled rural men from the area, with low crop capacity and few productive assets, whose low, unstable income is complemented by the production of the fuel (Shively et al., 2010). Some charcoal producers develop financial arrangements with forest owners based on traded volume of wood. Nevertheless, this activity tends to be unorganized and producers have a low bargaining power. That, combined with their limited technical knowledge, restricted financial capacity and lack of incentives to increase production efficiency, reduces their share of the revenue to no more than 10% (UNDP, 2013). Apart from small, independent producers, some regions also draw wholesale merchants from Kampala, who buy the “rights” to the trees in large areas and then hire large crews to clear the area and process the wood (Shively et al., 2010).

After production is over, the charcoal is packed in bags of about 70 kg each and sold to **transporters** at nearby roadside collection points (UNDP, 2013). Usually truck owners who act like (or work with) **traders** moving the charcoal from the production site to the main urban areas, transporters drive long distances – sometimes up to 300 km – to Kampala, where they sell to wholesalers or occasionally to retailers. In order to increase their productivity, transporters frequently overload their trucks, compressing the bags and thus producing a significant amount of charcoal dust or essentially, waste. However, the crushed

charcoal is not exposed until the closed bags reach a retailer, who ends up bearing all the losses.



Figure 12 Charcoal bags at a roadside selling point

Because of the difficulties monitoring deforestation, several districts tax charcoal exports up to 20% of the charcoal value being transported instead (UNDP, 2013). These fees are collected at road checkpoints, but in order to maximise their profits, transporters divert their routes or drive to farther districts with lower on no fees to avoid being charged. Furthermore, some also suggest that transporters leverage personal contacts with forest officials to avoid paying charcoal taxes (Shively et al., 2010).



Figure 13 Charcoal transportation by trucks (left) and motorcycles (right).

Upon arrival in Kampala, the charcoal is sold to **wholesalers**, who operate from markets in the city and in the periphery, reselling the bags to **retailers**, the last supply-side point of the value chain. As mentioned above, transporters sometimes sell directly to retailers who, due to lack of access to – and capacity to process – market information, have reduced bargaining power over upstream agents (Shively et al., 2010).

The retailer – typically a slum dweller with very limited working capital operating from a small shop close to, or at home – dismantles the bags, separates charcoal pieces from the dust, roughly sorts the charcoal chunks by size (large and small) and sometimes by quality (hard and soft) before selling it to the final users in tins of about 1 kg each. Because the price of a tin can't be adjusted by a single retailer

without a general price adjustment in the area, to cope with the extremely high competition, some retailers adopt retention strategies such as quality differentiation and giving away crushed charcoal at every purchase, as well as leveraging personal relationships with customers.



Figure 14 Charcoal wholesaler (left) and retailer (right) in Kitintale

As mentioned before, Uganda has very defined gender roles, being the women responsible for household-related activities like cooking, fetching water and buying food and fuel, in addition to taking care of the kids and elders. Hence, the fuel users are normally female homemakers. They tend to be aware of charcoal quality differences, as they are the ones who use it. Nevertheless, they can work on fixed daily budgets established by the **husband**, typically the main provider of a

household who, without directly deciding the type of fuel to be purchased, can affect the decision by limiting access to financial resources.

Still in the households, **kids** and **elders** play an important role, especially when they have a strong dependence on the fuel user. Children can help with household activities early on in their lives, but can also require changes in cooking requirements and routines depending on their age and health. The same can happen with elders, which can show varying levels of dependence and ability to support with everyday activities due to reduced physical capacity.

Friends and **neighbours** essentially constitute the fuel user's safety net. They may also affect the cooking process and routines, in that they can provide – or restrict – access to key resources, such as fuel, stoves, money and food in case of emergency.

Taking one step back from the commercial chain, two other stakeholders can be identified as playing a relevant role in the charcoal system. **Cookstove manufacturers** tend to be small in scale – mostly artisans – and operate informally, getting small margins on their sales. Their production capacity is normally driven by demand and the final stoves typically have a short lifespan (GVEP International, 2012).

On a broader sphere, **government** and **policy makers** can dramatically influence the market. However, even though the promotion of alternative sources of energy is part of the public agenda, improving transportation and energy infrastructure

are higher priorities (GVEP International, 2012). Furthermore, the institutional framework to deal with issues relating to charcoal is complex: the National Forestry Authority, under the Ministry of Water and Environment, oversees the standing trees, but once they are felled for charcoal production, jurisdiction shifts to the Ministry of Energy and Minerals (UNDP, 2013), thus leaving institutional grey spaces that make it harder to regulate the sector.

Stories from Kitintale

As the reader might have already noticed at this stage, the charcoal system is complex, dynamic and many of its variables are highly context dependent. While in some occasions the characters of the system can be well defined, sometimes one individual plays different roles in different situations. Thus, I chose share my insights from the field through by presenting five participants and their stories. These narratives will help the reader grasp what it feels like to live in Kitintale through the lens of its dwellers, hopefully embracing a standpoint that's closer to the participants'.

Sarah, the concerned mother

Sarah is a housewife in an 8 people household. She lives with her grandmother, her two nieces, school-age kids and a newborn. Her oldest child, a nine-year-old daughter, helps her with some household tasks, as well as taking care of some of her younger siblings, while Sarah caters to her baby.

Sarah is currently unemployed and gets her money mainly from her grandmother, who sells crafts in the neighborhood and sometimes downtown. Occasionally, she also gets a nice surprise from friends: as they know she has a big family and has to take care of all her kids, they send her mobile money to help her with the household expenses. When the amounts are large, she uses the excess money to invest in her grandmother's business, but when they send her small sums, she prefers to buy her kids some treats.

Her household is not connected to the electric grid and charcoal is her main source of energy. To avoid the process of lighting up the charcoal stove, she lights it up once a day, in the morning, and she cooks throughout the day. This way she can have the stove ready to feed the kids whenever they're hungry. They are usually around and she's caring for them during most of her day. When she's not cooking for her family, she uses the stove to boil drinking water instead of putting out the fire. That's because she doesn't like the process of lighting the charcoal stove. She improvises a lighting device using small wood chops and pieces of PVC pipe that her kids collect in the area, but that doesn't make the process easier and she has lost count of how many times she has burnt her fingers trying to light her stove.

Sarah doesn't have a water tap at home and she believes the water credit token project⁴ was only for selected participants. She heard some of her neighbors say that they got their tokens from intermediaries, but they were costly. So she gets water from her neighbor's tap, which charges her a fee for the service.

Apart from using charcoal at home, Sarah also wants to start a charcoal business herself. Right now she has no money to start it. Moreover, because she has to take care of her kids, she doesn't want to leave them alone at home, so she'd have to find a convenient location to start her business and bring the kids with her so she can keep an eye on them while she's working. Because she rents her house, she wouldn't be able to start a business in her front yard, as her landlord would start asking her for more money. With all these barriers, she feels helpless... but she has hope.

⁴ See appendix section for a brief description of the water credit token project.

Sarah also has a kerosene stove, which she only uses when it's raining or when she can't get charcoal in the area. Yet, she believes the liquid fuel is very risky when you have children, as they can cause accidents. She never trusts her kids with kerosene and wouldn't let them buy or manipulate it, even though she sometimes sends them to get charcoal from a nearby vendor.



Figure 15 Sarah and her neighbor preparing lunch

Joana, the dependent elder

Joana is a grandmother who usually stays at home. She has several health problems that limit her lifestyle. Thus, she lives with her adult niece and a school going child, the former being the main caregiver, helping her with almost all household tasks, such as cooking and washing her clothes.

When she was younger and living in her village, Joana was a farmer. After moving to Kampala, she started growing yams in the swamp. At that time, she used to cook with

firewood, because it was free. But today, free wood is rarely available. Moreover, wood produces a dense smoke that she doesn't like. So nowadays she cooks with charcoal, which her son gives her every month. He lives just across the street and is her main provider, as she has no source of income. He facilitates her traditional African lifestyle, usually checking on her and buying her a new sack of charcoal before she runs out of fuel. He understands that for her, as an old African lady, it is important to live according to local traditions and even though he lives close to her, he prefers letting her live in her own house, “independently”, dictating her own rules and doing whatever she wants.

Joana also uses kerosene as a cooking fuel, but specifically to boil water for her tea and medicinal herbs, on a stove that was also given by her son. She boils water every day but confessed that sometimes she doesn't boil drinking water to save fuel. That's because she believes that the water she gets from the well is safe... after all, nobody in her family fell sick for drinking it.

In the recent past, she ran out of kerosene and had nobody around to buy it for her, so she gave someone on the street 10,000 shillings⁵ to fill a three-liter jar with the fuel. The boy came back with no change, what made she believe he kept some money for himself.



Figure 16 Joana's niece washing clothes while waiting for kerosene stove to cool down

⁵ In regular gas stations, one liter of kerosene would cost between 2,700 and 3,000 shillings at the time this research project was conducted.

Brenda, the constrained

Brenda is currently unemployed. She was a charcoal vendor in Kitintale, but her business collapsed. She wanted to work in a milk business, but her husband didn't allow her to do so. Hence, she's now trying to save money to start a grocery business, which she expects will allow her to get enough capital to buy about five sacks of charcoal and restart the charcoal business.

As for now, she works irregularly at a friend's charcoal shack, keeping half of the money she makes in sales. This is good, as she lives on a fixed daily budget, set by her husband. She has to make sure she has enough money to feed her family the whole day.

She currently lives with four school-age children and her husband, who leaves for work every morning, coming back at dinner time. Charcoal is her main cooking fuel, but lighting the stove is always a hassle and sometimes she asks her kids to help her on that tiresome process. Nevertheless she likes the fact that it is easily accessible. In fact, she doesn't like walking long distances to get fuel, food or water. For her, a 3-minute walk is already too far.

Brenda also had an electric coil to cook at home, but once it got damaged, her husband promised to fix it and never brought it back. Similarly, she had a kerosene stove which got started to leak. Because she didn't know anyone who could fix it, she ended up selling it to a scrap dealer and keeping the money for herself.

Brenda knows that beans are a nutritious meal for her kids, but she also knows that cooking beans requires a large amount of fuel. Because she sometimes doesn't have enough money to buy beans for her family and the necessary amount of fuel to cook it, she resorts to simples, less nutritious foods.

Yet, even though she lives on constraints, Brenda considers herself to be a social person and she likes having her friends around for snacks sometimes.



Figure 17 Brenda's closed business next to her house

Michael, the knowledge seeker

Michael is a charcoal seller, a construction contractor and above all, a resourceful inventor. He lives at his own house with his wife and his kids, all still young.

As a charcoal vendor, his household's main source of cooking energy is charcoal, but sometimes they also use wood in an improvised three stone stove. He is proud of his efficient anthill charcoal stove, which he built as an experiment, based on knowledge he acquired while rearing chicken, another of the family's businesses. He lends his stoves to neighbors whenever they ask for it, as he believes his neighbors are the most important people in your life... it is very important to be in good terms with them.

As part of his charcoal business, Michael occasionally hires a truck to go to Gulu and buy charcoal sacks directly from the producers. That, according to him, increases his profit margin, but also consumes a lot of his time, as he can sometimes wait for weeks until the charcoal is ready for shipping. Nowadays, however, he is temporarily out of business because he doesn't have the money to hire the truck and get the charcoal sacks from his known suppliers in the north.

As an entrepreneur, his money is always in circulation, what he believes, is a better way to get value from the financial resources as compared to keeping savings in a bank. He finds it particularly important, however, to keep accounts of all his expenses and revenues.

Michael's house is connected to the electric grid, mostly as a result of his own efforts to bring an electric pole to his front yard. He paid a significant amount of money in that investment, but according to him it pays back, as every new user that connects through his pole pays him an installation fee. He likes being involved in community projects and walks extra miles to bring development to his neighbors.

He personally believes that everyone should live within the limits that their current conditions allow. For Michael, his businesses are just learning steps in his personal evolutionary path and being stuck in one of them would not help him evolve.



Figure 18 Michael's front yard with water standpipe and light pole

Hannah, the professional cook

Hannah considers herself unemployed after she stopped working as a cook at a restaurant. Nevertheless, she is currently self-employed as a tailor, as well as the leader of a women's group she founded in the community to help women learn manners and duties. She lives with her daughter, a curious child who's currently in primary school. When she's at home, she likes being sent to get daily supplies for the house.

Hannah has used all types of cooking fuels in the past, but now that she's unemployed, she resorted back to charcoal, the fuel she used at the hotel. After using this fuel for years, she is very experienced in correctly measuring the amount of charcoal she needs for each type of food. She normally buys charcoal for more than a day and then puts it in a bin in the kitchen. She buys once and stores it because she doesn't want to keep going every day. Besides, when she buys in bulk she also gets extra charcoal chunks from the vendor, her friend.

She lights her stove once a day and cooks enough food for lunch and dinner. To keep her food warm until dinner time, she stores it in thermal bags she learned to make by observing someone else making it. Sometimes when her daughter is at school, however, she prefers eating outside with her friends or at a restaurant. If she could choose, her fuel of preference would be gas, because it is fast and the cylinder can last for a long time. Yet, apart from being expensive, she also thinks that cooking the food fast takes away its flavor. Her signature pilaf rice is widely known in the area and she can't afford to ruin her reputation as a good cook.

Hannah's household is connected to the electric grid and she usually buys prepaid electricity credits between the first and the fifth days of every month, because when she does that, the power utility company gives her extra power units.

Hannah is disciplined with her money and keeps it spread across four different "wallets". She has a bank account to keep her money safe - even from herself, as she believes that cash in hand is a temptation to spend. Her mobile money account is used to keep some of

her money, which she uses to pay for electricity and water. Hannah has tap water at home, but because she knows that she may experience water outages frequently, she also has a water credit token that she uses as an emergency water reserve. She also keeps cash reserves at home for her daily expenses with food and charcoal.



Figure 19 Hannah's charcoal stove and charcoal bucket serving as a kitchen table

* * *

There is no universal definition for poverty

As already mentioned in the first chapter, defining poverty in general terms can be controversial, especially when the definition is based on culturally-insensitive quantitative indicators, such as household income. Some authors, though, attempted to portray poverty contexts qualitatively, rendering the living circumstances of poor people in frameworks that support their particular objectives.

Amartya Sen, for instance, described poverty as a set of interconnected “unfreedoms” in capability and opportunity, dimensionalizing it in terms of economic, physical, psychological and knowledge deprivations (Nakata & Weidner, 2012). Caroline Moser, on the other hand, focused her description on what the poor have, rather than what they do not have, categorizing their fundamental resources into an asset vulnerability framework comprised of labor, productive assets, human capital, household relations and social capital to assess urban poverty reduction strategies (Moser, 1998).

Others see poverty contexts as loci for transactions, eventually unfolding the main aspects that affect new product adoption. Prahalad, for instance, defined poverty contexts as markets characterized by illiterate consumers, poor in health and of meager resources, as well as inaccessible geographically and by the media, and therefore inexperienced with consumption (Moser, 1998). Viswanathan, in contrast, takes a more structured approach, proposing themes that characterize the marketplace experience and classifying them into three different groups: marketplace context, interactional environment and exchange elements (Viswanathan et al., 2012). His definition is based on the idea that poverty contexts are in essence what he calls subsistence marketplaces, highlighting both, the significance of the survivalist consumption needs of these people, as well as the exchanges and relationships on which both sides of a transaction rely on to satisfy their livelihood needs, proposing a bottom-up oriented analysis that allows

for the understanding of the micro-level daily circumstances of consumers and entrepreneurs in their communities (Viswanathan et al., 2012).

While these terminological definitions attempt to – and to some extent succeed in – defining poverty contexts for the purposes of their studies, this research project attempts to build a new perspective, one that is specifically focused on the living circumstances of the people for whom CleanStar Ventures is designing.

Life in Kitintale

In his book entitled “Scarcity: Why having too little means so much”, Sendhil Mullainathan calls our attention to the cognitive effects of scarcity in the lives of the poor:

“Poverty itself taxes the mind. It reduces fluid intelligence and executive control. This is not because they are less capable, but rather because part of their mind is captured by scarcity.” (Mullainathan & Shafir, 2013)

As the five stories illustrate, scarcity is indeed an important aspect of poverty, as it lies at the core of these people’s vulnerabilities. **Limitations and constraints**, in distinct levels of intensity, form a crucial element of these people’s living circumstances, narrowing their margins for errors in a pronounced way (Bertrand, Mullainathan, & Shafir, Behavioral Economics and Marketing in Aid of Decision

Making Among the Poor, 2006). They more evidently manifest in relation to tangible resources.

The lack of money is frequently at the root of their constraints. Yet, even for those who possess the financial resources to maintain some level of improvement in certain aspects of their lives, the limited access to – or to some extent the complete absence of – resources or better quality substitutes prevents them from doing so.

Take the supply of charcoal as an example. Most households in Kitintale use charcoal as their main cooking fuel. Nonetheless severe weather events in the country can affect the production, as well as the transport of charcoal to Kampala. Under those circumstances, charcoal supply is disrupted and users are forced to resort to other fuels, usually firewood, the dirtier, cheaper alternative to charcoal. Kerosene – the following step in Uganda’s fuel ladder after charcoal – is used as a cooking fuel by 25% Kitintale’s households, nonetheless it is still far from ideal and its users frequently complain about its malodorous black smoke as an extremely undesirable aspect of that fuel. Even to those who can afford gas, the next better alternative after kerosene, its availability is limited to certain gas stations not necessarily close to their households.

But limitations and constraints can also manifest in immaterial terms. The shortage of time or physical energy to perform certain activities are common examples. Lighting the charcoal stove and waiting for it to get ready to cook is an

activity that consumes time, sometimes more than 30 minutes. To some homemakers who have small children to feed or who sell lunch as a side business, that time is not always available.

Another key element in these people's livelihoods is **dependence**. The reliance on family members, neighbors, friends and others in their safety network can be a positive aspect, as the relationships with these people represent reserves of social capital that can be leveraged in crisis situations. However, dependence also has negative sides, as it limits their freedom of choice and actions, thus eroding their ability to take full control of their lives. Imagine if Brenda wanted to buy an extra charcoal stove to spend less time cooking lunch for her children. The purchase of that new stove would then have to be negotiated between her and her husband, and because he is the ultimate decision-maker of the household, the enhancement of the Brenda's life is contingent on her husband's decision – and capacity – to financially support it. She might even choose not to ask for the extra money, as she knows that she has to live within the budget set by her husband and given in the form of cash every time he comes back home. She tries to save changes at every transaction, but with four children to feed, saving enough to buy a new stove is nearly impossible.

What happened with Brenda only hints into the third important vulnerability.

The strong interdependence between individuals, combined with scarcity allows

for the emergence of intentional and unintentional **marginalization** in some segments of the community, which can manifest itself in the form of violence, exploitation or extortion.

The lack of access to public services is a general basis of exclusion of entire communities. Yet, marginalization can be intensified for certain individuals inside their own communities. Remember Sarah? Like many others in the area, she doesn't have tap water at home and could go to the water well to fetch water for free. But the sometimes-violent environment at the water well can be unsafe for her or her children. Thus, she has only one alternative left: paying to buy from a nearby neighbor's tap – who sells tap water at a 100% markup.



Figure 20 Quiet day in the water well

In other circumstances, information asymmetry can also lead to marginalization. Sarah could get a water credit token to buy water at roughly half of the price charged by her neighbor, however because she believes that the water credit tokens were only given to chosen individuals at the implementation stage of the standpipe project, she doesn't know she has access to it. Based on that, others who have a water credit token can also make a profit by selling water to those who do not have it.

The combination of the three living circumstances mentioned above lead to a higher level of instability throughout these people's life journeys and forms the fourth key aspect of their living circumstances: **uncertainty**. From micro-level volatility, such as variations in the quality of the purchased charcoal and the amount of money to be earned today, to macroeconomic concerns related to inflation rates or future charcoal price movements, the high level of unpredictability tends to reduce the timeframe of their decisions, occasionally focusing their attention in the here-and-now. But are these people really stuck in the present?

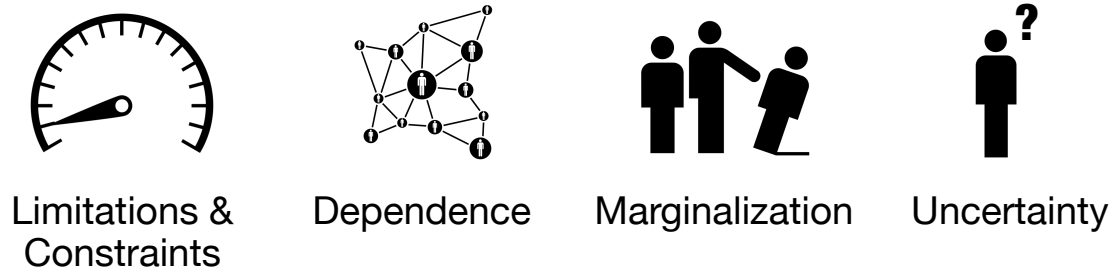


Figure 21 Four key vulnerability factors identified in Kitintale

Surviving, adapting and evolving

The four vulnerability dimensions described above serve as a frame to understand the living circumstances of people living in Kitintale. But another interesting set of insights the stories from Kitintale provide, relate to the coping mechanisms used by these people to adapt to those situations on a daily basis. From a careful exploration of the observed coping mechanisms, four broad categories emerged.

The four categories are illustrated in Figure 22 below.

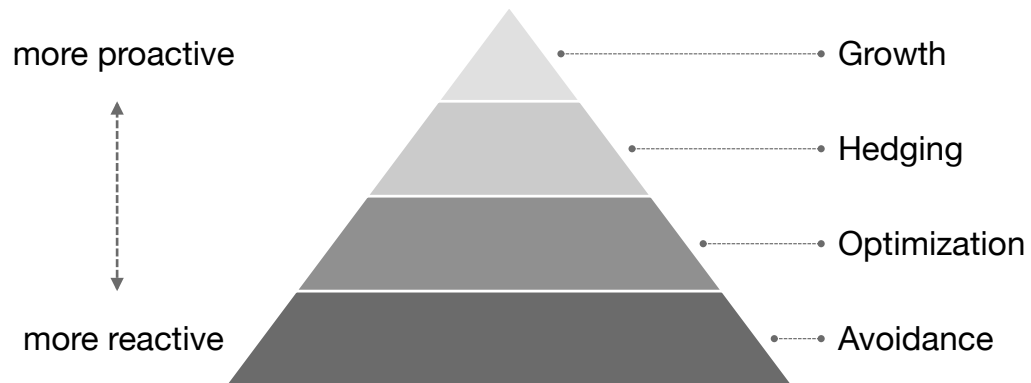


Figure 22 The four types of coping mechanisms

Avoidance

The first category deals with **avoidance**, or a motivation to escape undesired or tiresome activities. Typically manifested as the outsourcing of tasks, the modification of processes and the accumulation of resources, avoidance mechanisms help us reflect on the full cycle of exchanges, accounting for financial, as well as non-financial transaction costs.

To explain this, I would like to go back to Sarah. Last year she received a TivaWater filter from the eponymous organization. The 60 liter filter has been given to Sarah's family for free, but has never been used. Instead, she prefers buying tap water from her neighbor and boiling it before drinking. However confusing this may sound, her reasoning is valid. When TivaWater gave her the filter, they also provided instructions on how to setup the equipment: before using

it, Sarah would have to fully load the filter with water and discharge the entire volume without consuming it. For her, that would mean carrying three 20-liter water containers – or simply put, 60 kilograms of wastewater – from the nearby water well. But she doesn't feel that she has the physical energy to perform that single activity and prefers to pay for extra charcoal to boil drinking water for her family. Moreover, because she doesn't want to be exposed to a potentially violent environment in the water well, she pays for her water every day.



Figure 23 TivaWater filter: never used

At the core of Sarah's assessment is the fact that all transactions, financial and non-financial in nature, involve the expenditure of economic, physical and emotional resources, as well as time. If the perceived value obtained from a transaction is lower than the anticipated bio-cost consumed to perform that exchange, the transaction will be either avoided or achieved on the basis of a different resource. Dahlman has noticed a similar phenomenon in his study on externalities:

“Just as self-interested individuals will select the cheapest mode of transportation, it is possible to show that they may choose to use a medium of exchange as an alternative to barter if less resources are used as a consequence.” (Dahlman, 1979)

In our specific case, Sarah's physical health is being saved on the expense of her scarce financial resources, in a reactive behavior with what could be rationally portrayed as sub-optimal economic results.

Optimization

Under other circumstances, people accept to spend certain resources, but do so with a conscious effort to optimize their allocation, within the boundaries of their control. Sometimes, **optimization** of resource allocation comes as a response to a necessity to save. A recurring case observed in Kitintale is related to homemakers living on fixed budgets who don't have enough money to buy a desired type food – usually those requiring a long cooking time, such as beans – and the needed

amount of fuel to cook it, forcing homemakers to accommodate the amount of food and fuel to be purchased within the set budget.

In other occasions, optimization comes as a more proactive, deliberate decision to save financial resources in general or in its various forms, like Hannah's four distinctive "wallets": physical cash, mobile money account, bank account and water credits. The compartmentalization of financial resources not only helps her allocate them more efficiently and plan future expenditures, but most importantly, works as a strong barrier to impulse spending. Remember that, by planning the payments of her electricity bill in the first five days of the month, she can leverage a utility company's promotion that gives away extra electricity credits to consistent clients.



Figure 24 Mobile phone and water credit token (blue device hanging on the right)

Hedging

Curiously for Hannah, certain “wallets” also perform the role of virtual reserves of critical resources, such as water, in what can be considered an example of a **hedging** behavior, the next relevant coping mechanism that emerged in Kitintale. That’s because in some cases, people can go beyond saving resources and make investments to reduce their vulnerability to adverse, unforeseeable future incidents.

Vulnerability is a function of a system’s exposure, sensitivity and capacity to adapt to unfavorable events. Yet, moving to a better area, getting a better paying job or improving physical and mental health come at a cost and people in urban slums can’t simply change their exposure or sensitivity to living circumstances instantly. Their only possibility to reduce vulnerability is by increasing their adaptive capacity. To do so, common approaches include creating additional sources of income, building redundancies and accumulating resources, the latter one with an interesting component.

Most of the interviewed participants stressed the fact that money has to be kept in circulation, reducing their capacity to accumulate financial resources. Yet, as Viswanathan et al. noticed, marketplace relationships and interactions can yield social capital reserves, which can be traded in the informal economy (Viswanathan et al., 2012) and result in a range of benefits that emerge from the collaboration,

trust, reciprocity and knowledge flowing within social networks. In fact, the investment in social capital is such a central aspect of their lives that the substitution of private activities by social events has also been observed. Take for example Hannah, who would not prioritize cooking only for herself, meeting friends for meals or resorting to a restaurant when she's alone; who voluntarily started a women's support group to teach them how to cook and financially support them; or Michael who likes to share his improved charcoal stove with neighbors.

An interesting difference between hedging strategies and avoidance or optimization behaviors is the timeframe based on which decisions are made. While avoidance is mostly based on trade-offs between the current values perceived in a transaction, the further a user moves towards hedging, the longer the timeframe accepted to have a return on their transactions, as illustrated by Figure 25.

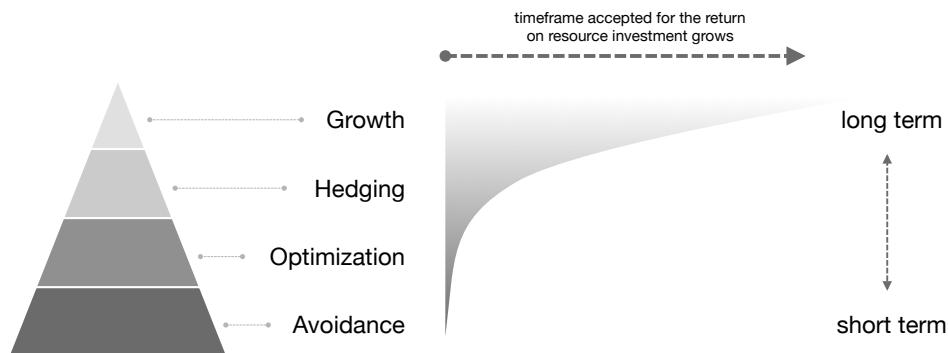


Figure 25 Expanding timeframe for return on resource investment

Growth

And the last coping mechanism category, related to **growth** strategies, can be considered to be at the extreme of this scale. At their essence, growth strategies are about individual and social evolution, typically emerging as more abstract mindsets that can, on the long run, sustainably move individuals beyond their current lifestyles.

Consider Michael's attitude towards evolution. His philosophy towards life can be summarized by the passage below, inspired by a quotation from an actual informant:

“To me gas is a luxury. People end up buying cars and yet they're still renting... they're doing things the wrong way. It is supposed to be a step at a time, a step at a time until you get there. You use what you can afford... it's like a stage to get you to some place.”

Even though one may argue that he has the financial resources to use gas in his household, he has never used the fuel because he believes he hasn't reached that evolutionary stage in his life, preferring to take one step at a time. Furthermore, he believes that investing in his children's education is also a way to achieve evolution, as can be seen from the passage below.

“My children are too young and I have to educate them, so they will know that they once used firewood and charcoal. And because I'm able to use what I can at each time and educate them, when they grow and there's an even better cooking fuel, because they're educated, they can afford it and maybe they'll bring it to me.”

As Carole Dweck notes:

“When parents help their children construct growth-minded ideals, they are giving them something they can strive for. They are also giving their children growing room, room to grow into full human beings who will make their contribution to society in a way that excites them.” (Dweck, 2006)

By actively adopting experimentation as a way to approach personal evolution, overcoming failure in a constructive way and introducing this mindset to his kids, Michael can be considered someone who embraces what Dweck calls the growth-mindset.

* * *

In some cases, the same decision can emerge from different motivations, depending on the circumstances. Buying charcoal in bulk is a good example: while some participants justified their decisions as a way to avoid walking to the charcoal vendor every day (avoidance), others do it only when the price is lower than normal (optimization), whereas someone else may do it to hedge against fuel shortage in the future (hedging).

While the four proposed behavior categories could be the starting point for a marketing segmentation of a target consumer-base, the people interviewed in Kitintale use a mixture of all four types over time, depending on the circumstances. The intentional – and sometimes unavoidable – overlap between

the four categories serves as a reminder that people's lives and motivations are complex, context dependent and in constant change.

Past, present and future

Social scientists typically describe the behaviors of the poor as either calculated adaptations to prevailing circumstances, or as emanations from a “unique culture of poverty” that is rife with deviant values (Bertrand, Mullainathan, & Shafir, 2004). In the first case, the economically disadvantaged are seen as rational decision-makers and planners, taking coherent steps to pursue their goals, while the proponents of the second perspective highlight the psychological and attitudinal weaknesses that lead to imperfect decisions (Bertrand, Mullainathan, & Shafir, 2004).

Backing the latter view, some authors defend that in poverty contexts, the management of assets and activities pursued are often opportunistic reactions to variable circumstances rather than planned strategies (Rakodi, 1999), implying a paternalistic approach to poverty alleviation. Yet, while the foundational circumstances that support this viewpoint are aligned with some of the living circumstances uncovered and proposed in the present research project, the adaptation schemes embraced by the poor in Kitintale can't be qualified under either of both discretely.

As uncovered in the section above, the people I met in the field adopt a complex series of behaviors and strategies, some simply triggered by everyday circumstances and others more oriented towards the future. This is an important finding, as it challenges a common underlying assumption of generalized descriptions of the lives of the poor: the fact that they live in the present, for the present.

While the goal of this project was not to understand these people's aspirations in depth, an analysis of their living circumstances and coping mechanisms can throw some light over some of their aspirations. The passages below, inspired by actual participant quotes, are some examples.

"I enjoy working, because on school holidays, where will I get money from? On holidays I have to hassle... look for money somewhere else." (Participant 14, female, teacher)

"Long ago the price of a sack of charcoal used to be 30,000 shillings, but it just kept increasing... now it is 70,000 shillings" (Participant 15, female, retired)

"Right now I have good quality charcoal. But I don't know tomorrow what they'll bring for me. Because they may bring bad quality charcoal. And there's nothing to do but to keep it." (Participant 2, female, student)

"I don't like charcoal because it makes my hands dirty... I have no other choice but to use it." (Participant 8, female, vegetable vendor)

"My landlord would just look at what I'm getting... if I'm earning a lot of money in my landlord's eyes, than the landlord is going to get a bigger bite." (Participant 18, male, construction worker and entrepreneur)

“I wasn’t part of the water credit token project... I’d have loved so much to be part of that project.” (Participant 16, female, unemployed)

As hinted by the quotes above, at a fundamental level, their aspirations come down to having greater control over their lives. Of course like in any other segments of the society, the people in Kitintale have aspirations, hopes and desires and even though commitment to their intentions can get diluted in a complex mesh of reactions to daily events, they take progressive steps to pursue goals to the extent that they can.

But building a link to Sohail Inayatullah’s futures triangle (Inayatullah, 2008), the push from the present and the pull from the future are not the only elements defining these people’s behaviors and shaping their decisions. While daily circumstances work as decision triggers and aspirations work as future reference points to some of their actions, cultural symbols and values can work as anchors that hold them into existing practices, thus suggesting a triad of decision-shaping forces.



Figure 26 Triad of decision-shaping forces and Inayatullah’s futures triangle

Drawing on the origins and evolution of Kampala's informal settlements, together with evidence from the field, one can conclude that urban dwellers still have very strong ties to the land and their villages. The maintenance of certain symbols, such as traditional Ugandan food and cooking processes, are links to their culture and a way to preserve and strengthen their ancestral origins as an evolving society.

This is not to say, for instance, that more modern modes of cooking are not acceptable by low-income urban Ugandans, but their acceptance tends to be higher with the consumption of food introduced by foreign immigrants – using kerosene to boil tea is a classic example in Kitintale. Moreover, cooking is seen a social activity, an enabler of an exchange, a way to create reserves of social capital. Traditionally, food was an indispensable sign of reverence, used to please the Gods and in a context of extreme material scarcity, offering food is a culturally and socially relevant sign of honor and appreciation to visitors.

When it comes to cooking fuels, while users can go up and down the fuel ladder according to daily circumstances, charcoal is still a very strong attractor in the fuel system. As an economic entity charcoal means security for vendors, because unlike food, its physical proprieties allow for very long storage times with virtually no maintenance costs, thus reducing cost and losses to retailers. It also means security

for users, as its pervasive availability in the area is seen as a guarantee of availability, despite sporadic supply shortage events.

But beyond its economic properties, which endorse its material transmission and appropriation, charcoal is also a form of objectified cultural capital, symbolically appropriable. In an oral society where history, culture and norms are passed on via stories, music and rituals, and traditional socialization processes are based on early gender role definition in order to prepare children for successful family lives, the symbolic appropriation of charcoal by the parents exert a strong educational effect on children. As Bordieu noticed, “a growth in the quantity of cultural capital accumulated in the objectified state increases the educative effect automatically exerted by the environment” (Bordieu, 1986).

In Uganda, the cooking fire also has a deeper meaning. Ugandan social life usually revolves around the community and the family, the latter extending to grandparents, uncles and aunts, orphans, etc. This extended family - especially grandparents - also plays an important role in educating children and socializing them through stories told at evening firesides while people sit around it and chat as they wait for the meal to cook.

Still, apart from being an anchor to traditional culture, cooking fuels and cookstoves in Kitintale seem to be signifiers of evolution and upward mobility and even though aesthetic features of artifacts are important for users, the association

of cookstoves and social status doesn't seem to be strong enough to determine the choice of a cooking fuel. So what could be?

Chapter 5

Conclusions and Recommendations

So what?

It is understandable that a desire to change is a strong leverage to the adoption of innovation. But however strong this motivation may be, adoption in subsistence marketplaces goes beyond simple availability, and the commonly heard “build it, and they will come” approach fails to take into account cultural, contextual and behavioral nuances that may dramatically affect it. Even though four out of five people in Kitintale have something to complain about charcoal, barriers can be strong and prevent them from switching to a different fuel.

Let’s take PlayPump’s carousel pumps and the mosquito nets in Lake Tanganyika, both revealed in Chapter 1, as instances of well-intentioned solutions designed without taking cultural and contextual aspects into consideration. In those cases, unforeseen negative outcomes remind us how a culturally insensitive solution can be as fruitless as its very inexistence. In communities around Tanganyika, mosquito nets – a solution that has proven to be successful in several other geographies – is posing a serious threat to the continuity of life in the lake, one of the most significant sources of livelihoods in that region. There, the urgency to

feed a family today dramatically offsets the need to prevent malaria in the future - in this case not too distant. Even when that might not be the case, the benefits of using a treated bed net are not necessarily evident and thus sometimes, not worth the transactions its usage involves. Moreover, the different uses of the nets in the region suggest that transactions other than financial ones might be involved in their use. When kids roll their bed nets into soccer balls, they are essentially transforming an individual artifact into a social object, which enables them to undergo a variety of social exchanges with other children in the village.

The PlayPump example, on the other hand, is a good case for how a failure to uncover different roles and responsibilities in a society might affect the desirability and ultimately, the use of a service. While PlayPump's design legitimately attempted to merge together two roles in what was predictably an effective way to harness collective recreational energy to benefit the entire community, it is important to consider that in a different society, roles might be different from the ones we - designers - might presume based on our cultural backgrounds and contexts. Just like in Kampala's slums, children in poverty contexts in Africa - and maybe in other poverty-stricken regions of the world - have a desire to perform the role of a child by playing and engaging in collective activities with their peers. Nevertheless after a certain age, they are also expected to perform household activities, which are usually defined according to their gender. By failing to acknowledge that distinction, PlayPump might have created some role ambiguity

and what was supposed to be entertaining ended up becoming an obligation and a paid occupation for some kids, thus reducing the desire to use it.

It is critical to acknowledge that in certain contexts, some tasks have added layers of meaning that go beyond pure functionality. While the act of cooking in Kitintale may represent a way to preserve their ancestral origins in a colonized society, the journeys to gather water may have other connotations, known by and relevant only to the people living under the circumstances found at the locations originally targeted by PlayPump. The unconsented substitution of existing indigenous pumping solutions might have unintentionally replaced existing and contextually significant social dynamics, further reducing its acceptance in some communities. This is probably why some villages serviced by PlayPumps just decided to reinstall their original hand pumps and discontinue the carousel.

It is important to emphasize, however, that these examples shall not be considered complete failures. Although the cases above were indeed used to highlight some of the design failures that might be prevented through a local understanding of human activity, some of its concepts – and even the entire solution – proved effective in other geographical contexts. The important idea to keep in mind is that, while some of the solution's design criteria might be entirely generalizable to other geographies and markets, others will require adaptations, according to

specific cultural, contextual and behavioral dynamics that define the choice of an offering.

Starting from a broad standpoint, it is reasonable to suggest, for instance, that not only the global poor but also everyone else's choice is shaped by the triad of forces presented in Chapter 4. Nevertheless the weight assigned to each of the forces will vary according to the immediacy of needs, access to resources and thus, capacity to plan for the future experienced by individuals within their contexts. I would even suggest that the living circumstances faced by poor groups and discussed in Chapter 4, together with the coping strategies they engage in might also be a valid arrangement to generally describe contextually vulnerable groups, such as other underprivileged communities and even prisons and refugee camps, for instance.

Yet, cultural references and evolutionary aspirations might be entirely different depending on the geography and historical background of the group for which a solution is being designed. A community's definition of gender roles, as well as its relationship to their friends and relatives living in rural villages are examples of aspects that have a very strong influence in how social dynamics unfold in Kampala's slums, but could be irrelevant in other specific contexts being researched. Similarly, the transmission of knowledge around the cooking fire and the tradition of having a cup of tea as the first thing in the morning, relevant concepts in Kampala, might be irrelevant even in other urban slums in East

Africa, depending on several aspects such as their historic background, climate and religion, among others.

The examples above highlight the fact that, when designing solutions to a complex problem such as household air pollution in poverty contexts, success boils down to understanding users' cultures and contexts. Designers have to be able to learn about users to prevent this cultural-contextual sensitivity gap from translating into not only business, but also environmental and social outcome gaps. This is not to say that the first solution is going to be successful at all. It probably won't, because design is not a linear process and needs to be open and iterative, and designers have to be willing to work alongside the people they want to help. As the learning process evolves, some foundational requirements will emerge to further guide the design of solutions. These requirements – also known as design criteria – encapsulate relevant characteristics that solutions should incorporate and will serve as consistency boundaries for future iterations. Thus, the sections below justify the eight initial principles to be considered in the design of new household energy solutions for Kampala's slum dwellers.

Make it triable

As already suggested by previous studies, one of the strongest determinants of new product adoption in poverty contexts is the value perceived in an innovation

as compared to its existing alternatives, a fact that is not different for cooking systems. Yet, while the clear articulation of an offering's benefits to the user is an important part of product introduction, giving users the possibility to test and experiment is highly beneficial. The main reason is the fact that it is hard to foresee how poor consumers will derive value from a new offering and even clearly articulated desires – such as the need to cook fast – can be ambiguous, if not misleading.

Most informants of this research project, for instance, have stated a desire for faster cooking solutions, yet almost all of them also complain about traditional Ugandan food that's been cooked fast, saying it doesn't taste as good. That's based on the fact that traditional dishes in the country require hours of cooking time. Take the plantain-based *matooke* as an example, which requires at least three hours of steaming before being served. Regardless of how fast the food was prepared, the mashed plantains wrapped in banana leafs will be steamed for a few hours. And here's the nuance: "slow" is too general to describe what users think about charcoal and the stress typically originates from the process of setting up the stove before cooking. Once consistent heat is available, users seem to be less concerned about time and willing to wait for the food to be ready, according to their quality parameters.

In low-income contexts, affordability is also an important determinant of adoption. Nevertheless, while the articulation of savings offered by product developers is usually associated with the costs of acquisition of a technology, it is hard to anticipate all positive externalities to the use of a technology that can lead to savings for the customer. Users of a new cookstove, for instance, can be willing to switch to cheaper food that couldn't be prepared in the previous system, or even leverage savings opportunities related to cleaning products if the new system proves to generate less dust. Still, they might not be willing to acquire a product without first testing its value-proposition.

These arguments also support the experimentation-driven approach to product development and marketing, where users are able to derive value from a new product without committing large amounts of resources, while also providing relevant information to the company developing the offering.

Make it social

As already mentioned in the previous chapter, people in poverty contexts depend on others in their safety networks and are used to sharing artifacts, resources and information as a way to sustain relationships and to build social capital. In subsistence marketplaces, sharing is at the core of people's lives and new offerings should take this into consideration, not only in the products themselves, but also

as embedded features or services that create opportunities for sharing among its users. Facilitating discussions where users can share money-saving practices acquired during the testing phase of a product is a good example of such an offering.

Leverage expected entry-points

Even though people in poverty contexts can be highly sensitive to costs and resistant to adopt an innovation, their usage of existing offerings in traditional or modern rituals can provide relevant information about expected entry-points for new products and services.

Think of the apparent inconsistency between their willingness to cook fast and their complaints about the lack of taste in food that has been cooked too fast. Some users may be willing to give up the taste in their food to cook faster, while others may resist to the adoption of faster cooking systems and practices in order to preserve the taste in their food and appeal to the taste buds of whoever they are serving. Yet in Ugandan cities, the first order of the day is usually to have a cup of tea and most users would agree that faster cooking systems are ideal for preparing their morning tea, boiling drinking water or even to prepare side dishes and sauces that traditionally don't require long cooking times. These practices are potential entry-points for faster cooking systems as they closely appeal to existing users

expectations, promising them a satisfying first impression with a much lower adoption barrier.

Go through their leaders

Like any other community, low-income contexts have formal leaders elected by the local population through formal processes (e.g. the LC I who approved the research in Kitintale), as well as informal leaders that emerged to address specific needs of the community or a subset thereof (e.g. Hannah who voluntarily formed a women's group). Because quality education is hardly accessible to the majority of its population, leaders play an important role in these communities, offering a broader understanding of the world and translating relevant information to the locals who trust them as protectors of the community's interest.

Thus, it is important to identify the leaders and get them to know what you're going to do. They will then know the project and understand how it is going to work, disseminating the proposal and its potential benefits to their community.

Partner with informal market competitors

It is important to highlight that, even though the poor have plenty of pressing needs related to several aspects of their lives, agents in the local marketplace have most probably evolved to address some of these needs in an efficient way, at least

in certain aspects. Looking again at cooking fuels as an example, it is remarkable that charcoal vendors have figured out a way to make one of the cheapest cooking fuels extensively available and accessible to everyone in Kampala's slums. Even though their economic efficiency is highly debatable, the fuel is pervasively available and is sold every day to people who can find it just a few minutes walking distance from their households, no matter where they live.

Another important aspect to consider about the local competition related to the linkages to the informal market. It is common to see intermediaries filling unaddressed gaps in the system (such as availability or accessibility), usually acting as resellers and exploiting users by charging mark-ups on top of the original product price. As this practice can distort a product's value in the marketplace, it can compromise its acceptance by the people it is trying to serve. Yet, linkages to the informal market can be beneficial if organizations realize how to leverage their market knowledge and penetration in a productive relationship. Formal-informal partnerships involving performance-based payment schemes, for instance, can be a way to improve product penetration while preventing the emergence of undesired intermediaries.

Help users manage their resources

Most products developed for subsistence marketplaces are based on the assumption that low-income consumers only buy in small quantities. However, this generalization not always applies. As seen in Kitintale, some users prefer to buy resources in larger quantities for several reasons, be it motivated by unwillingness to go every day or a desire to hedge against future “surprises”. Thus, it is important to allow for flexible quantity purchasing instead of fixed, small volume packaging strategies commonly adopted by multinational organizations when entering low-income markets. Likewise, providing a choice of different sizes or volumes during a purchase, offering virtual wallets, such as a dedicated water credit token used by Hannah and many other households in Kitintale, is an alternative way to help them stock resources in virtual form, with access to the real resources at any given time.

Another interesting aspect to highlight is the fact that, due to cognitive difficulties, people in low-income communities may struggle to understand their stocks using standard units of measure. While the existence of universally used units such as liters and kilograms is acknowledged, the practical understanding of how much that represents in terms of resource stocks is very small. Instead, users tend to express their stocks in terms of their money value or using locally defined, concrete units, such as charcoal sacks or tins, or water jerry cans. Thus, in order to

lower cognitive barriers to the adoption of new cooking systems, it is important to provide alternative units through which users can understand their stocks, as well as an easy correlation to the money value of these units, so that the translation into virtual resources (i.e. virtual money) is less complicated and easily integrated into wallet compartmentalization strategies.

Virtual money can also be a relevant way to nudge customers into loyalty schemes in your product-service system and facilitate the granting of better deals to loyal users. Yet, as observed in the field, people seem to be less sensitive to discounts than they are to the free provision of extra quantities. Thus, promotional schemes should focus on giving more for the same value, instead of charging less for the same amount.

When it comes to payments, it is also important to remember that different users prefer to pay using different media. While some may allocate fuel, water and electricity spending in their mobile money “wallet”, others may not be willing to pay the high usage fees charged by phone companies for small transactions, therefore preferring to pay in cash. Keeping payment mechanisms flexible may also lower one of the barriers to the adoption and continued usage of a service.

Focus on benefits today

Even though innovative cooking solutions may achieve health improvements, lower risks of respiratory diseases the reduction of deforestation and climate change in the long run, people in poverty contexts will not base their purchasing decision on future benefits, but rather in the present benefits that an offering promises to deliver. The quote below, from a research participant interviewed in Kitintale, is a specific example of a largely observed tension between climate change concerns and present needs:

“Right now charcoal, we're just cutting down trees. And the trees that we're planting now take long to grow. So the global [weather] will be changing. From rain to desert. But Ugandans are like... they are so funny... when it doesn't rain, that's when they know that they are knocking down trees. But when it rains, they will not know that they are cutting down trees. So that's it.” (Participant 1, female, student)

Make it children-friendly

Last but not least, it is important to remember that children are involved in household activities. While traditional approaches could advocate for systems that prevent children from using the system, reality shows that workarounds are inevitable, especially when it comes to kids. Thus, it is highly recommended that products be designed taking into account the fact that children will probably use the system. Safety features, as well as usability features should consider this and failing to do so not only could put children at risk, but would also go against one

of the first arguments proposed by Prahalad in the base of the pyramid development: “new business models must not disrupt the cultures and lifestyles of local people. An effective combination of local and global knowledge is needed, not a replication of the Western system.”

Limitations and next steps

Even though this research project is a small and limited qualitative study entirely conducted in one community, there is enormous value in repeating, validating and refining its findings in order to expand its potential impact in Uganda and beyond. The frameworks offered in this report help situate some of the findings in a broad, holistic system in Kitintale and the proposed design criteria represent some of the key characteristics that a cleaner household energy solution should incorporate if it is to be successful in Kampala’s slums. Thus, it would be interesting to not only create ideas based on those principles, but also build prototypes for the system’s main touch points, which allow for the testing, validation and refinement of the underlying concepts and recommendations on which ideas are based.

On the other hand, although some of the findings might be broadly generalized, the extent to which cultural-contextual insights and design principles might be extrapolated to other regions in Africa and elsewhere is yet to be validated.

Specific insights might not be directly applicable to other geographies, but could be tested in other regions where CleanStar Ventures is planning to bring innovative household energy solutions. These known variations across industries, offerings and consumer needs at the Base of the Pyramid also offer fascinating possibilities for future research. Therefore it would be interesting to research, for instance, cooking-related activities in other territories, as well as other activities related to basic needs in Uganda, such as water, sanitation and housing, among others.

Finally, it is important to remember that, even though most of the insights revealed here came from a subsistence marketplace context, the people living in those environments are ultimately people. The need to be immersed in the users' settings is valid not only in poverty contexts, but in every design effort. As Krista Donaldson recalls:

“Design for development customers are like customers in any society – except they are vulnerable.” (Donaldson, 2009)

Bibliography

- ACF International. (2012). *Exploring livelihoods of the urban poor in Kampala, Uganda – An institutional, community, and household contextual analysis*.
- Banerjee, A. V., & Duflo, E. (2007). The economic lives of the poor. *The journal of Economic Perspectives: A Journal of the American Economic Association* , 21, 141.
- Bertrand, M., Mullainathan, S., & Shafir, E. (2004). A behavioral-economics view of poverty. *American Economic Review* , 419-423.
- Bertrand, M., Mullainathan, S., & Shafir, E. (2006). Behavioral economics and marketing in aid of decision making among the poor. *Journal of Public Policy & Marketing* , 25 (1), 8-23.
- Blocker, C. P., Ruth, J. A., Sridharan, S., Beckwith, C., Ekici, A., Goudie-Hutton, M., et al. (2011). Applying a transformative consumer research lens to understanding and alleviating poverty. *Journal of Research for Consumers* (19).
- Bourdieu, P. (1986). The forms of capital. In I. Szeman, & T. Kaposy (Eds.), *Cultural Theory: An Anthology* (pp. 81-93).
- Brinkerhoff, J. M., Smith, S. C., & Teegen, H. (2007). Beyond the 'non': The strategic space for NGOs in development. *NGOs and the millennium development goals: Citizen action to reduce poverty* , 53-80.

Center for Disease Control and Prevention. (2014, 03 26). *Insecticide-Treated Bed Nets*. Retrieved 03 12, 2015, from CDC - Malaria:

http://www.cdc.gov/malaria/malaria_worldwide/reduction/itn.html

Chambers, A. (2009, 11 24). Africa's not-so-magic roundabout. *The Guardian* .

CIA. (2013). *The World Factbook 2013-14*. Central Intelligence Agency, Washington, DC.

Dahlman, C. J. (1979). The problem of externality. *Journal of Law and Economics* , 22 (1), 141-162.

Donaldson, K. (2009). The future of design for development: three questions. *Information Technologies & International Development* , 5 (4), 97-100.

Easterly, W. (2007). Was development assistance a mistake? *The American Economic Review* , 97 (2), 328-332.

Gettleman, J. (2015, 01 24). Meant to keep malaria out, mosquito nets are used to haul fish in. *The New York Times* .

Gutschow, K. K. (2009). Das neue afrika: Ernst May's 1947 Kampala plan as cultural program. In F. Demissie (Ed.), *Colonial Architecture and Urbanism in Africa: Intertwined and Contested Histories*. London: Ashgate.

GVEP International. (2012, 03). Uganda market assessment - Sector mapping.

Hahn, R. (2009). The ethical rationale of business for the poor – Integrating the concepts bottom of the pyramid, sustainable development, and corporate citizenship. *Journal of Business Ethics* , 84 (3), 313-324.

Hobbes, M. (2014, 11 17). Stop trying to save the world - Big ideas are destroying international development. *The New Republic* .

IEA. (2014). World Energy Outlook 2014. *Traditional use of solid biomass for cooking* . Paris.

Inayatullah, S. (2008). Six pillars: Futures thinking for transforming. *foresight* , 10 (1), 4-21.

Institute of International Finance. (2015). *Capital Flows to Emerging Markets*.

International Monetary Fund. (2015, 04). *World Economic Outlook Database April 2015*. Retrieved 05 12, 2015, from <https://www.imf.org/external/pubs/ft/weo/2015/01/weodata/index.aspx>

Karnani, A. G. (2008). Romanticizing the poor harms the poor. *Journal of International Development* , 21, 76–86.

Kolk, A., Rivera-Santos, M., & Rufin, C. R. (2013). Reviewing a decade of research on the "base/bottom of the pyramid" (BOP) concept. *Business & Society* .

- Kotler, P., Roberto, N., & Leisner, T. (2006). Alleviating poverty: A macro/micro marketing perspective. *Journal of Macromarketing* , 26 (2), 233-239.
- Lancaster, C. (1999). Aid effectiveness in Africa: The unfinished agenda. *Journal of African Economies* , 8 (4), 487-503.
- Lancaster, C. (2006). *Foreign Aid: Diplomacy, Development, Domestic Politics*. Chicago: University Of Chicago Press.
- London, T., & Hart, S. L. (2004). Reinventing strategies for emerging markets: Beyond the transnational model. *Journal of international business studies* , 35 (5), 350-370.
- Moser, C. O. (1998). The asset vulnerability framework: Reassessing urban poverty reduction strategies. *World Development* , 26 (1), 1-19.
- Moss, T., Pettersson, G., & van de Walle, N. (2006). *An Aid-Institutions Paradox? A Review Essay on Aid Dependency and State Building in Sub-Saharan Africa*. Working Paper, Center for Global Development.
- Mugema, B. A. (2013). *The City as the Medium: Communication and Culture in Uganda's urban space*. Undergraduate Thesis, Makerere University, Department of Literature, Languages and Communication, Kampala.

Mukiibi, S. (2012). The effect of urbanisation on the housing conditions of the urban poor in Kampala, Uganda. *Second international conference on advances in engineering and technology*. Noida.

Mukwaya, P. I., Sengendo, H., & Lwasa, S. (2010). *Urban Development Transitions and their Implications for Poverty Reduction and Policy Planning in Uganda*. Working Paper, UNU-WIDER.

Mullainathan, S., & Shafir, E. (2013). *Scarcity: Why having too little means so much*. New York: Allen Lane.

Musinguzi, B. (2013, 07 14). How Kampala was designed by colonialists. *Daily Monitor* .

Nakata, C., & Weidner, K. (2012). Enhancing new product adoption at the base of the pyramid: A contextualized model. *Journal of Product Innovation Management* , 29 (1), 21-32.

OECD. (2013, 04 03). Retrieved 06 30, 2015, from Aid to poor countries slips further as governments tighten budgets:
<http://www.oecd.org/dac/stats/aidtopoorcountriesslipsfurtherasgovernmentstightenbudgets.htm>

Otiso, K. M. (2006). *Culture and Customs of Uganda*. Westport: Greenwood Press.

- Polak, P. (2009). *Out of Poverty: What Works When Traditional Approaches Fail*. Berrett-Koehler Publishers.
- Polak, P., & Warwick, M. (2013). *The business solution to poverty: Designing products and services for three billion new customers*. Berrett-Koehler Publishers.
- Prahalad, C. K. (2009). *The fortune at the bottom of the pyramid, revised and updated 5th anniversary edition: Eradicating poverty through profits*. New Jersey: Wharton School Publishing.
- Prahalad, C. K., & Hart, S. L. (2002, 01 10). The fortune at the bottom of the pyramid. *Strategy+Business* (26).
- Rakodi, C. (1999). A capital assets framework for analysing household livelihood strategies: Implications for policy. *Development Policy Review* , 17, 315–342.
- Richards, A. I., Sturrock, F., & Fortt, J. M. (1973). *Subsistence to commercial farming in present-day Buganda: An economic and anthropological survey*. Cambridge: Cambridge University Press.
- Sedigh, S., & Ruzindana, A. (1999). The fight against corruption in Uganda. In R. Staphenurst, & S. J. Kpundeh (Eds.), *Curbing Corruption: Toward a Model for Building National Integrity*. Washington, DC.

- Simanis, E. (2013). Bringing bottom of the pyramid into business focus. In *A Planet for Life*.
- Simanis, E. (2012). Reality check at the bottom of the pyramid. *Harvard Business Review*, 90 (6), pp. 120-125.
- Simanis, E. (2014, 06 06). The rise and fall of BoP ventures. (F. Massé, Interviewer)
- Simanis, E., & Milstein, M. (2012). Back to business fundamentals: Making “bottom of the pyramid” relevant to core business. *The journal of field actions* (Special Issue 4).
- The Global Fund. (2014, 12). *Global Fund Results Factsheet*. Retrieved 06 04, 2015, from http://www.theglobalfund.org/documents/results/Results_2014-12-01_Factsheet_en/
- The World Bank. (2012). *Uganda - Promoting Inclusive Growth*. Synthesis Report, Washington, DC.
- U.S. Environmental Protection Agency. (2006, 06). *Permethrin Facts (RED Fact Sheet) | Pesticides | US EPA*. Retrieved 07 03, 2015, from http://www.epa.gov/pesticides/reregistration/REDS/factsheets/permethrin_fs.htm

UNDESA. (2014, 05 16). *Africa | International Decade for Action 'Water for Life'*

2005-2015. Retrieved 05 08, 2015, from

<http://www.un.org/waterforlifedecade/africa.shtml>

UNDP. (2013). *Nationally Appropriate Mitigation Action Study on Sustainable*

Charcoal in Uganda. United Nations Development Programme, New York.

UNEP. (2014). *Illegal trade in wildlife: the environmental, social and economic*

consequences for sustainable development. Nairobi.

UNFPA. (2014). *The State of World Population 2014*. Prographics, Inc.

United Nations. (2006). *Fast Facts: The Faces of Poverty*. Retrieved 06 26, 2015,

from UN Millenium Project:

http://www.unmillenniumproject.org/resources/fastfacts_e.htm

World Future Council. (2009). *Renewable energy: Sustainable development in*

Africa. Policies to Change the World . Hamburg.

World Health Organization. (2013, 12). *Factsheet on the World Malaria Report*

2013. Retrieved 07 02, 2015, from

http://www.who.int/malaria/media/world_malaria_report_2013/en/

Appendices

Appendix A: Field Research Protocols

**General
Recruitment
Guidelines**

Participants for this activity will be recruited from the database of 1,122 respondents of the household survey conducted between September and November 2014 in Kitintale.

Each participant will be initially contacted by phone. At this moment, the research team – consisting of a primary researcher and a research assistant – will arrange a first, very brief visit to each participant.

The first visit shouldn't take more than 30 minutes per participant – although there is no limitation to staying longer, if the participant invites the researchers. During this visit, the researchers will introduce themselves, brief the participant in terms of time commitment, dynamics and possible follow-up activities. Individuals agreeing to participate will be asked to suggest the most appropriate time for the researchers to visit them.

When arranging the day and time for the individual activities, the researchers have to keep in mind that this activity should allow them to shadow the participants in their daily actions, mainly those related to buying and using cooking fuels (e.g. follow them to the fuel vendor, see them cooking, etc).

In the second visit, the research team can spend between 1 and 4 hours with each participant, observing them and talking to them in order to document their journeys from choosing a fuel, to going to a selling point, negotiating the price, paying, going back home, using it and cleaning the waste.

Activity Type	In context immersion with semi-structured individual interviews
Objectives	Understand the context in which different cooking fuels are used in urban slums of Kampala, as well as the people buying and using these fuels on a regular basis. While meeting the people where they live, work and socialize, this stage will involve a detailed exploration of activities and interactions associated with the acquisition and use of cooking fuels, searching for deeper insights into their choices, experiences and lives. It may as well explore similar experiences in contexts other than those narrowly related to cooking fuels (e.g. buying food, paying for electricity, mobile money transactions).
Final Outcome	A synthesis of people's journeys related to the acquisition and use of cooking fuels, highlighting the different stakeholders involved in the journey, as well as the points and modes of interaction between them.
Participants	Targeting 14 participants in total (minimum 10)

Activity Guide

Participants for this activity will be recruited from the database of 1,122 respondents of the household survey conducted between September and November 2014 in Kitintale. The research team will target both the mainstream users, as well as those on the extremes of the spectrum.

Each of the 14 selected participants will be individually briefed about the activity, in terms of time commitment, dynamics and possible follow-up activities. Participants agreeing to participate will be asked to suggest the most appropriate time for the researchers to conduct the activity with them.

The research team – consisting of a primary researcher and a research assistant – will spend between 2 and 4 hours with each participant, observing and interviewing them in order to document their journeys from choosing a fuel, to going to a selling point, negotiating the price, paying, going back home, using it and cleaning the waste.

To categorize and analyze the data captured in the field visits, the research team will use the five elements of the POEMS framework: People, Objects, Environments, Messages and Services. Data captured in the field will consist of photography, videos, quotes and notes.

After each visit, the research team will meet in the office to discuss the findings, highlights, insights and eventually point out data gaps.

From Bottom of the Pyramid to Bottom Line

Target Participant Characteristics	Household with 5+ people	Someone who hates charcoal
	Household with 1 person	Someone who likes charcoal
	Cooks with wood only	Walks long distances to get fuel
	Cooks with kerosene only	Uses boda/car/bike to get fuel
	Cooks with gas and kerosene only	House where kids cook
	Has only one stove	House where elders cook
	Has many stoves	Hasn't bought stove for long time
	Doesn't spend a lot on fuel	Has recently bought new one(s)
	Spends a lot on fuel	Buys fuel daily
	Uses basic cookstove	Buys fuel monthly (or longer)
	Uses improved cookstove	Has no electricity at home
	Uses basic and improved stoves	Has electricity at home

Interview Guide The following semi-structured interview guide will serve to lead the discussion in the participants' settings:

Opening Questions

- Who do you live with? Tell us more about them.
- Have you always lived here?
- Tell me how you will cook/cooked today?

Specific Questions – Cook Stove

- Who bought this stove?
- And who decided to buy this stove? Why?
- Where do you use your stove(s) when you cook?
- Can you teach me how you normally cook?
- And who uses the stove(s)? Why?

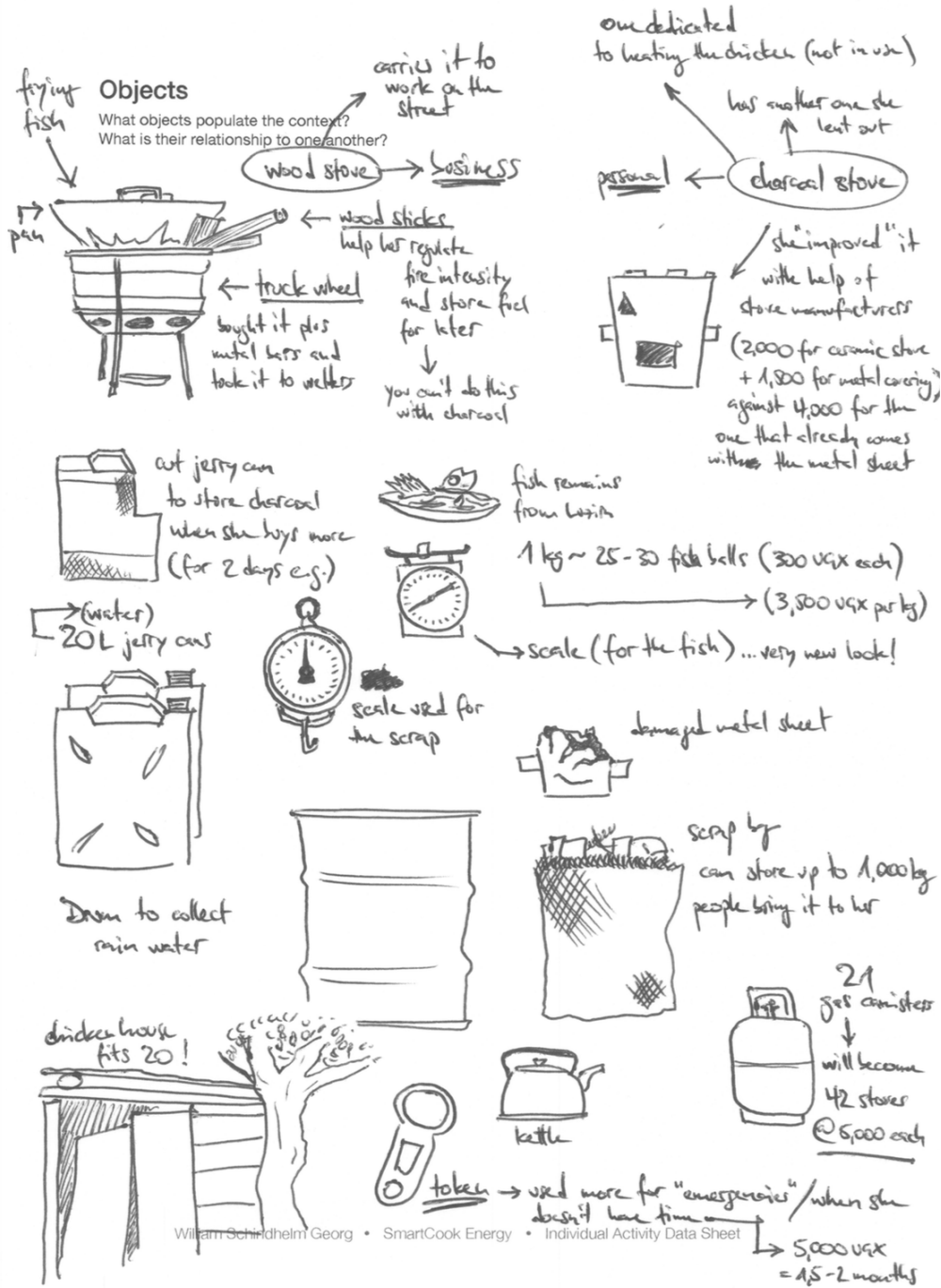
Specific Questions – Fuel

- Who buys the fuel(s)?
- When do you buy it (them)? (daily, weekly, monthly) Why?
- How do you know when it's time to buy more fuel?
- Do you prefer buying fuel for a day, a week or a month? Why?
- How do you get the money to buy fuel?
- How do you know how much fuel you need to buy?
- Where do you go to buy fuel? Why there?
- Have you tried buying from different places? Why?
- How do you pay for your fuel? (cash, mobile money, others) Why?
- Do you use mobile money? When? Do you like it?
- How do you carry the fuel(s) back home?
- How do you store the fuel(s)?
- Has your fuel supplier ever run out of fuel when you needed to buy?
- What did you do when this happened?

Aspirational Questions

- Have you heard about different types of stoves and fuels? How did you hear about them?
- Have you thought of using a different stove or fuel? Why?
- If the charcoal was 700 UGX instead of 1000 UGX, would you buy more? Why?
- And if it were 1000 UGX, cleaner, faster, easier to use, but a bit further than where you buy charcoal? Would you still buy it? Why?

Appendix B: Sample POEMS Observation Sheet



Appendix C: Water Credit Token Project

Kampala has about 1.8 million inhabitants. More than 60% of the city's residents live in poor-quality housing located in informal settlements (i.e. slums). The majority of residents in slums are tenants.

In 2004, the National Water and Sewage Company of Uganda (NWSC) attempted to expand access to water by reducing the cost of individual water connections. Yet, even subsidized, private connections remained out of reach for many poor households, as this policy mainly favored property owners instead of not tenants. Moreover, housing density in low-income, informal settlements would make piping works for individual connections almost impossible in some areas.

In order to address this problem, as well as ongoing payment problems with conventional standpipes, the NWSC decided to install prepaid, public standpipes in Kampala's slums, giving users a virtual wallet (water credit token) which they can use to access water from the pumps.

NWSC started preparing the project in 2006, working with community leaders (i.e. LC I and his team) to identify and map areas where new standpipes were needed. Every installed standpipe with its prepaid meter is then registered to the landlord of the land in which it is situated. The company is aiming for 5,000 by

next year. With each standpipe serving about 15–30 households, it is estimated that nearly 30,000 households already have their own credit tokens. (The World Bank, 2014).



Figure 27 Prepaid water standpipes in use