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**PUBLIC HEALTH AT THE MARGINS:  
LOCAL REALITIES AND THE CONTROL OF  
NEGLECTED TROPICAL DISEASES IN  
EASTERN AFRICA**

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## **ABSTRACT**

Neglected Tropical Diseases (NTDs) are both causes and manifestations of poverty in developing countries. Recent advocacy efforts have increased the profile of NTDs, and led to bold new control and elimination targets set for 2020 by the World Health Organisation. However there are multifaceted challenges in effectively implementing NTD interventions in resource-poor contexts that need to be understood and engaged. While there is a growing call by researchers and international agencies for a science of global health delivery to understand these complexities, the exact nature of this science remains contested. This thesis contributes to these debates by advancing a critical social science perspective on the factors that mediate intervention effectiveness for NTD control. Grounded in a social constructivist approach using mixed methods, it critiques prevailing orthodoxies by unpacking the nature, processes and outcomes of three large-scale NTD prevention programmes in Eastern Africa. Focused on different diseases, these case studies represent different types of intervention approaches: top-down, participatory and public-private partnership. The thesis traces the social, technical and environmental processes that mediate the delivery, adoption and use of particular health technologies, such as pit latrines, insecticides and vaccination. Together, these case studies reveal surprisingly similar reasons for why many interventions do not perform according to expectations. Despite new approaches that claim to overcome stereotypical challenges of top-down planning, narrow technocratic perspectives continue to play a defining role in maintaining disjunctions between global aspirations, local realities and intervention outcomes. New perspectives and changes in orientation are needed that emphasise flexibility, learning and adaptability to local contexts. Towards this end, the thesis outlines a conceptual framework based on a comparative analysis of the case studies that highlights five interrelated domains where effectiveness is determined: geographical/livelihood variation, local agency, incentives, the socio-materiality of technology and planning/governance. I argue that addressing the shortcomings of contemporary interventions requires that programme planners actively engage these domains by seeking to “order complexity.” Greater integration of social science perspectives into the management of NTD programmes would provide significant benefit. In these ways, the thesis contributes to wider debates about the nature of global health interventions and the influence of local contexts in mediating efforts to improve the health and wellbeing of the world’s poor and marginalised.

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## **DECLARATION**

I declare that the research undertaken for this PhD thesis is, unless otherwise indicated, my own work and has never been submitted for the purposes of another degree or professional qualification.

A handwritten signature in blue ink, appearing to read 'Kevin Bardosh', is centered on the page.

Kevin Louis Bardosh

November 24, 2014



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## PREFACE

Chapters of this PhD thesis – specifically most of Chapter 3 and parts of Chapters 5 and 6 – have been published in the following academic journals. Details can be found in Appendix 2:

Bardosh K (2014) Global Aspirations, Local Realities: The Role of Social Science Research in Controlling Neglected Tropical Diseases. *Infectious Diseases of Poverty*, 3(1), 35.

Bardosh K, Sambo M, Sikana L, Hampson K, Welburn SC (2014) Eliminating Rabies in Tanzania? Local Understandings and Responses to Mass Dog Vaccination in Kilombero and Ulanga Districts. *PLoS Negl Trop Dis* 8(6): e2935. doi:10.1371/journal.pntd.0002935

Bardosh K, Waiswa C, Welburn S (2013) Conflict of Interest: Use of Pyrethroids and Amidines Against Tsetse and Ticks in Zoonotic Sleeping Sickness Endemic Areas of Uganda. *Parasites & Vectors* 6: 204. doi: 10.1186/1756-3305-6-204

## CHAPTER 1

### **Global Public Health and Neglected Tropical Maladies in Century 21: Disparities, Dichotomies, Tensions, Hopes**

“Since the millennium, the hopeless outlook for those afflicted with [Neglected Tropical Diseases] has undergone a surprising turnaround...a silent revolution is gathering, which could alleviate some of our planet’s greatest health disparities.”

*Peter Hotez et al. (2006)  
NTD Scientists/Activists*

“Mister President, Excellencies, honourable ministers, distinguished delegates, friends from the UN family, ladies and gentlemen, I have been doing this job now for nearly five years. Sometimes during meetings, I have to interrupt and make a simple request: *remember the people*. Never forget *the people*. All of our debates and discussions have meaning only when they improve the health of people and relieve their suffering.”

*Dr Margaret Chan (2011)  
Director-General of the World Health Organization*

“Raising problems with [Mass Drug Administration] does not mean that we are opposed to NTD treatment—far from it. But we are concerned by the way in which competition for multimillion-dollar grants is closing off debate and restricting critical analysis of what is actually occurring on the ground.”

*Tim Allen and Melisa Parker (2012)  
Anthropologists based at LSE and Brunel*

Before his death in 2007, Paul was a 12-year old boy living in a remote corner of the Kilombero Valley in Tanzania. Like many households in Ulanga district, Paul regularly helped cultivate the few acres of land his family owned using a hand hoe – a backbreaking activity for millions of families in Sub-Saharan Africa who cannot afford oxen or tractors. Dependent on rain-fed agriculture for their food and income, and living in a mud-hut with few possessions, Paul’s

family fit the stereotypes and statistics of rural African poverty. When I interviewed his father Michael in 2012, he told me of how prior to Paul's death, the boy had endured periods of hunger due to poor harvests, an over-crowded classroom at the local school, antagonisms from his father's new wife (Paul's mother had died of AIDS after he was born) and repeated bouts of what he suspected to be malaria, intestinal worms and diarrheal diseases. When Paul was bitten by an unknown dog in the wetlands, he knew he needed to get medicine fast because his teachers had told him about rabies. A dilapidated building with few supplies and only one nurse, the local clinic referred him to the nearest hospital some 100 kilometres away. It took the family more than a week to travel there, having to first gather enough money (by selling crops and borrowing from relatives) for transport, accommodation, food and the costs of rabies treatment, which they had been told was very expensive.

When they arrived the head nurse told them that the reference hospital, which Michael viewed as a beacon of medical science and socio-economic development for the few hundred thousand people in the district, had run out of rabies drugs. They should return in a week when a new supply would arrive, but everything would be fine – no reason to worry. After about two weeks, the family managed to gather enough money for a return trip. They flagged down a truck on the nearly impassable, water-clogged wet season dirt road that cut off travel to their village for a few months each year. But the delayed supplies, which involved many other important types of drugs for other equally desperate patients, had still not arrived at the hospital.

Waiting a few days, Paul began to show the classic symptoms of human rabies. His father rushed back home to borrow more money from neighbours and relatives in order to take him to Dar es Salaam where, so he thought, doctors must be able to do something. Over a week later, the drugs finally came but by that time Paul was tied down in an isolation room. He had become

aggressive, had difficulties breathing, was hallucinating and was petrified of water. Paul died minutes after his father arrived back to the hospital – one of the estimated 55,000 people worldwide who die every year from rabies. After Michael wept for his son, he had more mundane issues to deal with. Despite the incompetence of the hospital staff, he had to pay an unreasonably high hospitalisation fee because his son had been a “tricky case.” Second, he had to get transport back to his village for his son’s freshly dead body. Without enough money to hire a private vehicle, no one would take him. There was no other choice. Michael slung a *kanga* (a piece of cloth African mothers use to carry their small babies) on his back, had hospital staff help secure Paul’s lifeless body and, walking alone through a darkened and dreary night (there is no electricity in this part of the district), carried his son for some nine hours on his back, arriving to his homestead the next morning. Paul was buried in the afternoon. *“What could I have done differently?”* Michael asked me. *“I trusted the hospital; that they would know what to do. But they failed us. Now my son is gone. I cannot complain about it. After all, poor farmers like us we live like our crops – at the mercy of the weather.”*

## I. INTRODUCTION

The short and difficult life of Paul and his delayed treatment, death and burial bring home some of the global statistics about poverty. Paul, and the hundreds of millions of others living in extreme poverty worldwide, reminds us that the world continues to be a very unequal place at the beginning of the 21<sup>st</sup> century. At the same time as advances in astronomy and nanotechnology promise to send astronauts to Mars by 2025 to establish a permanent human colony (a lifeless planet some 225 million kilometres away from earth), many our own planet’s inhabitants continue to struggle with their basic human needs; things like food, education, security, sanitation, shelter and health. The statistics are sobering, grim and undeniable. Despite some

progress over the last two decades, poverty does not appear to be retreating into the dustbins of history. In fact many scholars suggest that the reverse is occurring – that there is an increasing concentration of wealth, resources, knowledge and technology driving a widening of global disparities and inequalities between the haves and the have-nots. Globalisation in Century 21 – the supranational criss-crossing of finances, people, ideologies, technologies and ethical regimes in a landscape of eroded state authority and increasing complexity – reveals its paradoxes. We live simultaneously in a “global village” and yet a deeply “divided world” with both winners and losers (Aginam, 1999).

Within this quagmire, infectious diseases like rabies and many others have come to symbolise the plight of the poor and disenfranchised. Since Friedrich Engels and Rudolf Virchow undertook their analyses of worker conditions and epidemics of typhus and cholera in the rapidly industrialising Europe of the 1800s, public health – at least in its more enlightened form – has come to view infectious disease not only as biological processes of contagion, degeneration and death but also as metaphors for broader social pathologies (Baer, Singer and Susser, 2003; Marmot *et al.*, 2008). Health serves as a significant “barometer of social progress” revealing broader trends in socio-political and economic relations both locally and globally (Lee, Fustukian and Buse, 2002). While aggregate data on global health statistics may appear to show a linear improvement over the last 50 years in life expectancy, infant mortality and maternal mortality (key indicators for a country’s health care system), gains in certain areas are counterbalanced by decline, stagnation and uneven distribution in others (Yong, Irwin and Gershman, 2000).

The tragedy of lives cut short, like those of Paul, continues to rally significant amounts of foreign aid. The last 20 years has seen a “golden age” of foreign development assistance directed

towards global health programmes, increasing from some \$5.7 billion USD in 1990 to \$28.1 billion USD in 2012 (Institute for Health Metrics and Evaluation, 2012). Beginning with the HIV/AIDS epidemic in the 1980s, deaths like Paul's have become framed as a breach of human rights, an aberration of modern global and progressive society and a failure of the "global community" (Patterson, 2006). Scholars like Paul Farmer (2013), and others, have argued for the need to frame global health practice through a shared attitude towards equity for the poor. However arguments based on principles of social justice co-exist, perhaps somewhat uneasily, with an increasing trend to view disease control as an economic investment (Butt, 2002). It has become commonplace for economists and policymakers to argue that investing foreign-assistance into health will yield high socio-economic returns and that econometric considerations should guide priority setting and funding, as argued in reports like *Investing in Health* (1993) by the World Bank and the WHO's Commission for Macroeconomics and Health (CMH) published in 2001 (Lawn *et al.*, 2008).

Since the end of the Cold War, there has been a re-fashioning of values, evidence, governance and organisational forms as *international* public health became *global* public health (Brown *et al.*, 2006; Macfarlane *et al.*, 2008). The temporal, spatial and cognitive dimensions of globalisation have unwittingly shaped the global health landscape in dynamic ways (Lee, Buse and Fustukian, 2002). As James Orbinski (2007), the past president of Medecins Sans Frontieres (MSF), stated, "Today there is a public health revolution forced from above and below as both adapt to new global forces." The global health architecture has become increasingly multifaceted with the proliferation of "new players" like the World Bank, International NGOs, the Gates Foundation, some 100 public-private partnerships (PPPs) and a new cadre of global health initiatives (GHIs), like the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM) and



The President's Emergency Plan for HIV/AIDS Relief (PEPFAR) (Birn, 2009; Cohen, 2006). The consequences of this new landscape are widely disputed and only beginning to emerge (Bozorgmehr, 2010).

## II. NEGLECTED DISEASES, NEGLECTED ISSUES?

Within this increasingly complex global health architecture, the new Millennium has seen a concerted advocacy effort to increase funding for a group of tropical infections under the umbrella of the "Neglected Tropical Diseases", or NTDs. Such tropical maladies, diseases like sleeping sickness, schistosomiasis, hookworm, leprosy and rabies have become known as the "forgotten diseases of forgotten people" (Hotez, 2008). Taken together, this heterogeneous group of 17 parasitic, bacterial, viral and fungal diseases are considered some of the most common infections of the poor, endemic in over 100 countries where they cause much human suffering, misery and poverty among the so-called "bottom billion" of the world's population (Hotez, 2008). Despite several with significant mortality rates, most are chronic, disabling, disfiguring and stigmatising but where the exact burden is difficult to quantify due to poverty-related issues like under-reporting, focal clustering and poly-parasitism (Singer and Bulled, 2012; Mantilla, 2011).

The NTD lobby has been highly successful in raising the status of these neglected pathogens. An unprecedented flurry of activity has followed the work of a number of important NTD scientist/activists in the last decade, much of it seen in their own high-ranking academic journal, *PLoS Neglected Tropical Diseases* (<http://www.Plosntds.org/>). Numerous public-private partnerships have been established, greater funding into scientific research and product development, significant donations of medicines provided by the pharmaceutical industry and

new and reinvigorated donor and country programmes, among other things. Illustrative of this global momentum, the WHO Director-General, Dr Margaret Chan, has called NTD efforts a “Cinderella tale...of moving from rags-to-riches” (Chan, 2012). Both the London Declaration in 2012 and a landmark WHO resolution in 2013 signified the political and financial commitment of endemic country governments and key donors, such as USAID, Gates Foundation and DFID, to support ambitious and bold new targets for control and elimination set for 2020, which I outline for all 17 NTDs in Table 1 below.<sup>1</sup> Over the last few years alone, more than a billion dollars have been mobilised to control these infections in the most impoverished countries and communities on our planet in order to, in the words of Peter Hotez (2008) editor-and-chief of *PLoS NTD*, help in “repairing the world.”

In their quest to (re-) brand tropical diseases to raise their profile and attract more funding, the NTD community, like all lobbies, has relied on a number of specific arguments to obtain global recognition (Allen and Parker, 2011; Mantilla, 2011). The first has to do with disease burden. NTD advocates have made strong arguments that current funding streams over-prioritise “the big three” (HIV/AIDS, tuberculosis and malaria) at the expense of other diseases and that the global metric system determining health funding – notably the Disability-Adjusted-Life-Year (DALY) – vastly underestimates NTD burden, and hence misallocated funds. To counter this metric system, the NTD lobby relied heavily on grouping together the NTDs so as to generate a “strength in numbers” policy narrative (Bhopal *et al.*, 2013). Calculations showed that, taken together, the NTDs were second only to HIV/AIDS in terms of infectious disease burden,

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<sup>1</sup> See: World Health Assembly: *WHA66.12: Neglected Tropical Diseases: Prevention, Control, Elimination and Eradication*: [http://www.who.int/neglected\\_diseases/mediacentre/WHA\\_66.12\\_Eng.pdf](http://www.who.int/neglected_diseases/mediacentre/WHA_66.12_Eng.pdf) and United to Combat NTDs: *London declaration on neglected tropical diseases*. [http://unitingtocombatntds.org/downloads/press/ntd\\_event\\_london\\_declaration\\_on\\_ntds.pdf](http://unitingtocombatntds.org/downloads/press/ntd_event_london_declaration_on_ntds.pdf)

affecting over one billion people and killing some 500,000 people every year; and yet they only receive a piecemeal 0.6% of overseas development assistance allocated to health (Hotez *et al.*, 2009; Hotez *et al.*, 2007; Liese and Schubert, 2009). Controlling the NTDs, therefore, would bring significant social and economic benefits, and help lift people out of poverty. While the burden argument has been quite successful, some have questioned the arbitrary definition of which diseases are considered NTDs and which are excluded. After all, many other infectious diseases (pneumonia, diarrheal diseases, etc...) disproportionately affect the poor (Broadbent, 2011).

The second dimension of the NTD movement involves discussions about funding into research and development (R&D) for new diagnostics and treatments (Moran *et al.*, 2009). Since these are “diseases of forgotten people”, there is a lack of market incentives for pharmaceutical companies to invest in the costly and lengthy product development phase for new technologies – the drugs still used for visceral leishmaniasis and sleeping sickness, for example, were developed during the late colonial era and remain highly toxic and complicated to administer. Neglect, therefore, in its original usage, was often framed as an unequal distribution of biomedical research and product development funding, which led to the development of new initiatives like the Foundation for Innovative New Diagnostics (FIND), and others (Broadbent, 2011).

The third major narrative used to generate policy traction involved arguments about the “low-hanging fruit” of interventions. NTD control was framed as a cheap but effective poverty reduction strategy, especially the integrated control of parasitic worms. The discussion of the “value for money” of the integrated control of schistosomiasis, trachoma, soil-transmitted helminths, lymphatic filariasis and onchocerciasis through mass drug administration (MDA) has been widely discussed. These “rapid-impact packages” were claimed to, through preventative

chemotherapeutic drugs alone, significantly control (even eliminate) the most burdensome NTDs. This involved the distribution of 4 pills either alone or in combination: Albendazole/Mbendazole, Mectizan, Zithromax and Praziquantel. MDA would reduce health inequities and poverty, with costs as low as \$0.50 USD per treatment.

**Table 1: Major NTD Control Targets set for 2020 by the WHO**

NTD	WHO Target (WHO, 2012)
Dengue	"...an integrated vector management approach should reduce rates of morbidity by at least 25% and of mortality by 50% by 2020."
Rabies	"Elimination of human rabies transmitted by dogs and dog-to-dog transmission is achievable by 2015 in all endemic areas in Latin America; and by 2020 in all affected countries in WHO's South-East Asia and Western Pacific regions."
Trachoma	"...global elimination goal by 2020...By 2020, all countries will have achieved the UIG and be free from blinding trachoma as a public-health problem, and by 2020, 75% of countries will have been verified as free from blinding trachoma as a public-health problem."
Buruli ulcer	"WHO aims to cure 70% of all cases with antibiotics in all endemic countries by 2020."
Endemic treponematoses	"Elimination of yaws in Africa is feasible by 2020, therefore leading to global eradication"
Leprosy	"Vigorous case finding and treatment would lead to global interruption of transmission by 2020."
Chagas disease	"A milestone will be reached when peri-domiciliary infestation has been eliminated in Latin America by 2020."
Human African Trypanosomiasis	"...eliminate the disease in 80% of foci by 2015 and achieve elimination in 100% of foci by 2020."
Leishmaniasis	"WHO aims to detect at least 70% of all cases of cutaneous leishmaniasis and treat at least 90% of all detected cases in the Eastern Mediterranean Region by 2015. With sustained efforts on the Indian sub-continent, 100% case-detection and treatment of visceral leishmaniasis is feasible by 2020..."
Cysticercosis	"A validated strategy for the control and elimination of <i>Taenia solium</i> taeniasis/cysticercosis will be available by 2015; and interventions for control and elimination scaled up in selected countries in Africa, Asia and Latin America by 2020."
Dracunculiasis	"Dracunculiasis is now on the verge of eradication."
Echinococcosis	"Pilot projects to validate the effectiveness of echinococcosis/hydatidosis control strategies...by 2015. Scale up of interventions in selected countries in Central Asia, North Africa and Latin America for control and elimination as a public-health problem will be in place by 2020."
Foodborne trematodes	"By 2020, 75% of the at-risk population will have been reached by preventive chemotherapy and morbidity associated with foodborne trematode infections will be under control in 100% of the endemic countries."
Lymphatic filariasis	"By 2020, 100% of all endemic countries will have been verified as free of transmission or will have entered post-intervention surveillance."
Onchocerciasis	"It is currently estimated that, by 2020, 12 APOC countries and 11 ex-OCP countries may have achieved elimination, out of a total of 31 countries affected..."

Schistosomiasis	“...could be eliminated as a public health problem in multiple countries in Africa by 2020, and globally by 2025.”
Soil-transmitted helminthiases	“...75% coverage will be reached in all countries by 2020.”

Although much of the recent NTD policy momentum was borne from these three interrelated arguments – much of it focused on MDA – control of NTDs (including so-called “tool deficient” diseases like leishmaniasis) have a number of different intervention tools and strategies. These range from vector control, active case detection and treatment, targeting of the animal reservoir, environmental modification, improvement of water, hygiene and sanitation as well as mass chemotherapeutic treatment of populations (WHO, 2011). Depending on the NTD, the effectiveness of different strategies has, in large part, been evaluated in different contexts; NTD control, therefore, has a practical “tool box” of different intervention modalities. Most interventions, both historical and contemporary, have tended to combine different techniques. For example, the SAFE strategy for trachoma combines surgery for trichiasis, mass administration of antibiotics, health promotion (for facial cleanliness) and environmental modification. The Guinea Worm Eradication Programme – predicted to soon be the second human disease to be purposively eradicated from the earth – has predominately relied on cloth water filters, education and case containment supported by village volunteers since the 1980s, with some emphasis on vector control and safe water provision. Control efforts for schistosomiasis in China have successfully used vector control of the snail population and praziquantel administration, alongside efforts to mechanize agriculture, fence water buffalos and improve water and sanitation.

While there have been important successes in NTD control over the last few decades that should not be overlooked (Molyneux and Malecela, 2011), the increased advocacy efforts by the NTD

community has also, sometimes rather quietly, acknowledged the many challenges in reaching these new 2020 targets. While policy narratives present a “great leap forward” to control these neglected tropical maladies, embedded challenges remain (Gulland, 2012). These include both questions about what strategies show the most promise as well as how these control strategies move from management boardrooms into local contexts. The WHO has acknowledged a number of complicated obstacles and risks to meeting the 2020 targets, ranging from socio-political trends, challenges in vector control, lack of local health system capacity, scientific gaps and a lack of funding for implementation research (WHO, 2012). More broadly, there have been disagreements between strategies that promote “top-down” vertical approaches that rely solely on disseminating biomedical technologies (sometimes called “military style” operations) and more “bottom-up” strategies that emphasis community participation. This classic dichotomisation has been seen in the recent literature; Spiegel and others (2010) argued that current NTD programmes over-prioritise narrow technical solutions at the expense of prevention and addressing of the social determinants of health.

Within the NTD community itself, debates have emerged most visibly in the rapid scaling-up of integrated MDA for parasitic worms, which treated a reported 887.8 million people in 2009 (Moleyneux and Malecela, 2011; Allen and Parker, 2012). Some have questioned the scientific evidence-base of the MDA strategy (Negpal *et al.*, 2013), potential development of drug resistance (Gryseels, 2006), the feasibility of integrating several existing national programmes at the country-level (Kabatereine *et al.*, 2010), the effectiveness of using unpaid volunteers for distribution (Kolaczinski *et al.*, 2007), negative effects on the health systems (Cavalli *et al.*, 2010), and local resistance and non-compliance with free treatments (Parker and Allen, 2010). Although many studies continue to affirm the efficacy of MDA, local resistance to MDA

treatments has been reported in numerous studies in the last few years (Brieger *et al.*, 2011; Bhullar *et al.*, 2010; Muhumuza *et al.*, 2013). A review of research for lymphatic filariasis control identified causal relationships between resistance/non-compliance and multiple factors: local fears over treatment and side-effects, individual characteristics (including mobility patterns of communities), local knowledge and awareness, prior experiences with MDA and the training, motivations and characteristics of volunteer distributors (Krentel *et al.*, 2013).

In the absence of integrating MDA with other strategies, such as water, hygiene and sanitation improvements, case management and vector control (most current funding provided by international donors like USAID AND DfID are almost exclusively for the distribution of between one to four different pharmaceutical tablets), others have argued a continuing “drug dependence” will be created since underlying causes that drive the transmission of these NTDs are left unaddressed (Utzinger *et al.*, 2009; Dembele *et al.*, 2012). More provocatively, Allen and Parker (2013) have recently argued that behind donor-driven grant cycles to “look good”, there is a drive to limit opportunities to discuss operational challenges for integrated MDA programmes – discussion of failures and low coverage are effectively “controlled” in the fear that funding will be cut.

In the field of NTDs, the Special Programme for Research and Training in Tropical Diseases (TDR) – funded by UNICEF/UNDP/World Bank/WHO – have coordinated and funded much ground-breaking multi-disciplinary research on the challenges of implementing NTD interventions in resource-poor contexts. Through training and small grants, TDR has stimulated the development of social and economic research into tropical diseases, brought social scientists

into collaborative arrangements with biomedical scientists (especially on malaria, schistosomiasis and onchocerciasis) and worked to highlight otherwise overlooked areas, such as the importance of gender and community participation (Manderson *et al.*, 2009). Despite these efforts dating back to the 1970s, a number of recent publications (some commissioned by TDR itself) have criticised the contemporary NTD landscape for a lack of social inquiry and consideration of local contexts in devising and implementing control programmes (Allen and Parker, 2010; Allotey *et al.*, 2010; Samsky, 2012; Parker and Allen, 2013; Spiegel, 2011; Reidpath *et al.*, 2010).

In many ways, these publications have reiterated old debates about the limited cross-fertilisation between biomedical and social scientists. Allotey *et al.* (2010) summarily stated that “research and interventions for neglected tropical diseases, largely neglect the social and ecological contextual, factors that make these diseases persist in the target populations” and that social research, when it is conducted, is largely “hand-maiden” to biologically-defined solutions and perspectives. Another recent paper claimed that the epistemic communities working on NTDs and social determinants have been largely “passing in the night” with little direct contact (Spiegel, 2011). A bibliographical analysis on dengue, visceral leishmaniasis, chikungunya and onchocerciasis emphasised that the social sciences are being “under-prioritised” and “neglected” by the contemporary NTD research and programme landscape (Reidpath *et al.*, 2010). This has most vividly been shown in a series of publications, including in *The Lancet* (the prestigious UK medical journal), between anthropologists (quoted at the beginning of this chapter), who found community resistance to MDA in Uganda and Tanzania, and some longstanding NTD advocates



based at the WHO and elsewhere who disputed and challenged these emerging critiques (Allen and Parker, 2012; Molyneux and Malecela, 2011).

Some social science scholars, albeit largely from the margins of contemporary debates, have argued that the NTD community has over-emphasised the poverty-alleviating influence of controlling specific pathogens (Allen and Parker, 2011; Mantilla, 2011). Equating disease control with the ability to raise communities out of embedded cycles of poverty, a narrative that MDA and NTD control more generally has relied upon for fundraising, is viewed as inherently problematic. Rather, there is a need to consider and address the reasons *why* NTDs cluster in marginalized populations and the role of broader social determinants of health in driving transmission through maintaining and reproducing poverty and socio-economic exclusion (Farmer and Ivers, 2012). According to this line of reasoning, over-emphasising the control of specific diseases as a poverty reduction strategy instead of addressing wider contextual factors mistakes the effect for the cause (Mantilla, 2011).

### **III. GLOBAL HEALTH: COMPLEX AND CONTESTED**

The MDA debate reflects much larger trends, revealing that the objects of global public health – particular diseases and their related socio-political systems – are both complex and yet contested. Solutions are not self-evident, universal and without ambiguities. Rather, global public health is defined by multiple dichotomies of perspective and emphasis, as well as contested approaches and fields of action. Many of these are often assumed and implicit, part of the tacit knowledge of researchers, bureaucrats and field practitioners and rarely something that is discussed openly. The inner workings, tensions and contradictions of interventions are simplified and hidden from view in order to mobilize resources and sustain narratives (Roe, 1991). However recent

anthropological critiques of global health have emphasised that unpacking these dynamics are essential to understand why global public health programmes are not always successful; they also offer a powerful tool to help improve intervention outcomes. Adams *et al.* (2013) called for a movement in “slow research” to parallel the “eat locally” food movement in order to critically inspect the processes involved and their multiple associations. Also using metaphor, Panter-Brick, Eggerman and Tomlinson (2014) outlined what they called the need to master the four “deadly sins” of global health through greater attention to local contexts in order to foster a “change of heart”: the coveting of silos, lusting after technological solutions, boasting of small successes and leaving broad promises unfulfilled.

While global health problems are viewed differently and their proposed solutions are equally contrasting, one common theme permeating the literature is the question of *implementation*. Paradoxically, at the same time as more foreign aid is being directed to global health problems, there is a growing recognition of a wide gap between “what we know” and “what we do” in global health (Sanders and Haines, 2006). Away from emphasis on new vaccines, diagnostics and treatment regimes that promise to alleviate suffering in easily definable strategies, the more mundane yet sobering reality exists that many existing disease control tools and strategies are not optimally implemented (Frost and Reich, 2008). Many efficacious, affordable and even “appropriate” (i.e. simple and culturally-acceptable) health technologies promoted by global agencies are regularly achieving sub-standard impact. Control approaches found to be effective in one context, once transplanted and scaled-up to other settings in an effort to reach “big impact”, are found to flounder and run afoul. There is a desperate search for the ingredients of success in the hope that greater knowledge will bring better implementation (Levine et al., 2004; Yamey, 2011). The major dilemma of global health in Century 21 is not necessarily about new

tools (although new tools are certainly needed), but is rather related to implementation: to the *lack* of “an equity plan linked to a delivery system” to scale-up the effective implementation of tested and efficacious existing technologies, strategies and interventions in poor places (Farmer and Ivers, 2012).

However, the nuanced, day-to-day realities of how the context of poverty itself influences the implementation and outcomes of global public health interventions for NTDs continue to be a largely unseen and untold story (Allotey *et al.*, 2010). Just as there have been many successes disseminated and discussed at global conferences, in academic publications and in international boardrooms, so too many interventions are falling short of their goals in access, sustainability and technological adoption and use. Interventions, their drivers and their consequences are ambiguous, multifaceted, uncertain and context-specific. Despite this, how programmes actually operate, the ways in which knowledge about global health is (re)produced and the socio-cultural specificities and particularities of interventions continues to be, paradoxically, both de-contextualised and, in many cases, de-politicised (Biehl and Petryna, 2013). There is a lack of locally-grounded understandings to guide global policy and implementation plans (Feierman *et al.*, 2010). Embedded within a political field, tools and strategies are implemented but rarely critically reflected upon, planned but not so thoroughly evaluated. In many cases, there is a dearth of data to judge whether interventions have been successful or not. However if global public health practice for NTDs is to come to terms with its own causality, there is need for a more theoretically robust understanding of how complex interventions actually play out in real time among the so-called “target populations.” Interventions, as composed of relationships and their interactions, need to be unpacked.

Standing between pathogens and intervention strategies are people, complicated by history, social norms, established relationships, interests and agency. Despite the rhetorical emphasis on invisible pathogens, in many ways controlling disease is about controlling, ordering and managing populations. The term *intervention* itself (with Latin roots) literally means “a coming-between”; in the global health sense, an intervention is about moving knowledge, technologies and social forms between the global and local – a coming-between of cultures, geographies, histories and politics that is experienced and represented through the particular tools and strategies used. This takes on specific tensions and conflicts in the context of NTDs where global intervention plans migrate to the vulnerable, the poor and the disenfranchised, whose experiences and existential preconceptions differ dramatically from the biomedical experts and bureaucrats tasked with designing, mobilising resources, researching, developing tools and implementing projects. While global actors exert their influence and power in order to extend notions of biomedical order into these neglected populations and marginalised places, social encounters produce specific types of tensions, disjunctions and conflicts. Some scholars have even argued that despite the rhetoric of poverty reduction, global health interventions designed within a neoliberal ideological space actually drive greater political and economic inequality at the local-level (Butt, 2002).

Therefore, global public health, as a field of action, is replete with quandaries and paradoxes. But what are the overarching preoccupations of global public health practice? How can we understand the existing dichotomies and tensions that together compose interventions and are concerned with closing global disparities, and bringing hope? What continues to maintain disjunctions between global aspirations, technical solutions and the myriad of local realities that shape outcomes? How can such processes be researched and understood? And what role does

social research have in contemporary programmes, and in imagining new types of approaches? This thesis is concerned with answering these questions.

However before outlining in more detail the aims of my thesis, the particular case studies, the endless list of methods and the major findings, it is useful to first explore in more detail some of the defining tensions of global public health as seen from the perspective of critical social science studies. Understanding these processes is central to this thesis. Following a dialectical approach that synthesises major elements of the contemporary social science literature on global health programmes, I propose that we view the tensions inherent to global public health practice as *interaction* (between the global and local), as *process* (between policy and practice), as *strategy* (between technology and people) and as *understanding* (between constructivist and positivist standpoints). This broad discussion allows me to introduce the major themes and sub-themes of this thesis as they apply to interventions to prevent NTDs in Africa. These themes will be explored in more depth in three empirical chapters, whose details are outlined in the next section of this introductory chapter.

### ***From the Global into the Local***

In their book, *Global Health Policy, Local Realities: The Fallacy of the Level Playing Field*, Whiteford and Manderson (2000) repeat a common maxim among social scientists involved in public health research when they state that “health policies that are conceived as “global” too often fail because they do not account for local specificities.” These ubiquitous terms – “global” and “local” – reveal that at the most basic level global health interventions are about the *interaction* of people and institutions with very different power, knowledge, values and norms. The multitude of actors involved in planning NTD control programmes form what Prince (2014)

called the “new global health elite.” Such organisations have huge influence on the health of poor populations; Nguyen (2009) showed how some global initiatives, represented in disposable funds, equal those of the entire health budgets of some African countries. The pharmaceutical industry, through market forces, shapes trade practices, product development, patent protection and distribution in ways that irrevocably influence individual bodies and pathologies. Antagonisms between industry and patient interests, for example, are well represented in social movements like the Treatment Action Campaign, who are focused on making access to HIV/AIDS drugs available to all (Petryna *et al.*, 2006). Frequently, global health decisions are made in international boardrooms with little direct accountability to those they affect; the masses remain cut off from the echelons of power and influence, under-represented in policy (Lee, Fustukian and Buse, 2003). The gap between the global and local is maintained by the relative positions of the centres and peripheries of the global economy, reinforced by differences in class, wealth, education, language, resources, history and geography.

The influence of global actors in shaping NTD control has a long genesis in the early colonial encounter, imposed (and yet often successful in terms of reducing disease prevalence) through colonial policies and in concerted campaigns by early philanthropic organisations like the Rockefeller Foundation, who aimed to re-shape society for capitalist economies (Farley, 2004; Farley, 2003; Lyon, 1992; Packard, 2007). Although not fashionable today, NTD control involves some degree of social ordering – rearranging the relationships between pathogens, people, institutions and ideas towards predefined and codified goals. Contemporary programmes speak about “partnership” with endemic country actors attempting to move away from paternalistic development rhetoric; nonetheless interventions remain entrenched in unequal power relationships; as the Malian philosopher Amadu Hampata Ba put it, “the hand that gives

always stays on top” (Airhihenbuwa, 2007). Geissler (2013) has made this point when he argued that the class divisions inherent in global health programmes require an active state of “not-knowing” – while not concealed, they are unspoken and uncomfortable truths. With both policymakers and policy subjects, particular roles and modes of interaction are generated by these relationships.

There are, of course, limits to the influence of global planners. Economists and political scientists have criticised top-down development planning due to shortcomings with incentives and information flows; highly centralised initiatives lack a mechanism to gather and integrate fragmented information to coordinate efforts, creating inertia and discontinuities between plans and effects (William, 2009; Easterly, 2008). In contrast to the successful global eradication of smallpox in 1979 (aided, no doubt, by its distinctive rash, an effective vaccine, absence of an animal vector, and a frightful mortality rate), the WHO’s Malaria Eradication Program (MEP) begun in 1955 aptly reflect these challenges (Staples, 2006). The MEP achieved considerable success in many countries but Africa’s lack of health infrastructure, low health budget, diverse populations and landscape, and the recognition of the negative health effects of DDT, forced the programme to close in 1969. Conceived during the age of modernisation theory, the programme was based on an assumption that technology (in this case DDT) together with a highly technical, coordinated and expert-based approach could overcome all obstacles posed by social conditions (Cueto, 2013). Despite the renewed clarion call to eradicate malaria by the Gates Foundation in 2007 through increased investment in a malaria vaccine (Cueto, 2013), recent studies have emphasised the need to consider and engage with more context-specific, local conditions through capacity building and community mobilisation; for example, addressing the lack of public

knowledge, perceptions of treatment modalities, drug resistance and the misuse of bednets (Maslove *et al.*, 2009).

The strict separation of the global and local, however, can cloud our understanding of how different actors, in fact, interact and shape the outcomes of individual interventions. Latour makes this point when he argues for a sociology that localises the global and redistributes the local (Latour, 2005:192). Anthropologists and sociologists are, after all, concerned with “studying people-in-places or people-in-contexts” (Janes and Corbett, 2009) and have long pursued analysis to “ground globalisation” – Burawoy (2001) argued that the global is itself manufactured and constituted within local settings, in real organisations and communities of actors through chains of connections and disconnections. There is a need, therefore, to deconstruct the positions of different actors inherent in the notion of “global” and “local”. Briggs and Mantini-Briggs (2003) make this point in their ethnography of a cholera epidemic in Latin America, where global/local dichotomies, reflecting broader categorization of modern/premodern and progressive/backward populations, were “used to regulate power, capital, information, goods and justice” by stereotyping poor indigenous farmers as “unsanitary subjects” instead of locating the real causes and consequences of the epidemic in wider social determinants and political marginalisation. Cases of active resistance to programmes, as with polio elimination in Nigeria and Pakistan, similarly make this point (Yahya, 2010).

### ***Translating Policy into Practice***

Aside from interventions as *interaction* between diverse actors, global public health programmes face the equally nebulous, but interrelated, *process* of moving policies into practice, often



discussed in relation to the problem of “transplanting” models across disparate geographies (Hanson *et al.*, 2003). As Van der Geest (2006) argued for the global regulation of pharmaceutical drugs, there would appear to be an over-emphasis on creating policies throughout reports and recommendations as *solution* – often framed as dominant narratives about what actions are needed and why – instead of investing in actual programmes. Policy processes, as composed of discourses, networks and interests, involve not only the mechanics of decision-making but also of implementation, framed by specific underlying assumptions that create boundaries around a problem, define the limits of action and what is to be included and excluded (Leach, Scoones and Stirling, 2010). In its idealised form, policy can simply be thought about as the attempt to translate ideal forms of knowledge into action, where practice represents the actual process of translation as it moves from the global into the local (Janes and Corbett, 2009).

The movement of policy into practice in global public health is the moment when the cognitive, spatial and temporal worlds of the planners and implementers intersect. Without adequate mechanisms to translate policy into action, policy can quickly become void of effect (Manderson and Whiteford, 2000). In her now classic book, *Policies, Plans and People: Foreign Aid and Health Development*, on the culture of health planning bureaucracy, Judith Justice (1986) describes the confluence of factors that derailed Nepal’s new Integrated Community Health Programme. Within many larger structural processes, Justice details the “communication gaps” where information was filtered in different ways by donors, Nepalese officials and traditional village culture. Assumptions, interpretations and actions were transformed as they traveled up or down the chain of personal relationships that together composed these systems, making complex and perplexing the relationships of planning to practice.

The transformation of policy as it moves into practice – that is, when global aspirations intersect with local realities – is a major preoccupation of critical social science studies on global health. This literature discusses interventions as “battlegrounds of knowledge” where different lifeworlds and socio-political experiences intersect (Long, 2001). Presented as well-designed and well-targeted spatially and temporally discrete projects, policy translation often takes out histories, social relationships and futures, focusing instead on technical prescriptions. However as Mosse (2005) and others have pointed out, policy is in many ways antithetical to practice. Policy mobilises and legitimises rather than orientates; interventions are rather driven by the exigencies of organisations and the need to maintain relationships. Those who actually implement policy models, in a strategy of brokerage, exert their own agency, building on social, political and economic roles instead of following the provided normative scripts (Mosse and Lewis, 2006). Whyte *et al.* (2013:150) highlighted the inherent contradiction of how donor-funded projects fit into the pattern of neo-patrimonialism that largely defines the modern African state and yet remain firmly in the realm of rational legal bureaucratic authority, where activities are simultaneously “logically frameworked, benchmarked, quality assured, and evaluated through standardised mechanisms.” The actual day-to-day strategies used may differ fundamentally from those promoted, and outcomes and effects may be highly diverse, unknown and difficult to assess. This is especially the case in many countries where NTDs are endemic. Here, the devolution of financial, planning and managerial spheres from the central to the district health systems level is weak, and feedback and responsiveness to local needs generally limited.

### ***Technologies and Approaches***

Intervention outcomes and effects are influenced by the particularities of the approaches and strategies used, as embodied in specific organisational forms and technologies, which shape

global public health as *strategy*. The historical dichotomisation between horizontal and vertical approaches – between technological “magic bullets” and “people-centric” primary healthcare – has come to best represent divergent opinions. Moving from colonial medicine to international health, the 1960s saw the “boom and bust” of unremitting faith in large-scale, top-down and expert-orientated technological fix approaches with the failure of the WHO’s malaria programme discussed above and the establishment of the New International Economic Order of the 1970s (Cueto, 2013). This was followed by a radical re-invented agenda in the Alma Ata Declaration (1978), signed by all member states of the WHO that emphasised human rights, appropriate technology, bottom-up participation and multi-sectoral integration in health development.

However controversy began less than one year after Alma Ata. The Rockefeller Foundation, and others, claimed the declaration had unrealistically vague goals, arguing instead that specific cost-effective interventions, aimed largely at infectious diseases, should be prioritised since they would have a “trickle down” effect on the general health system. UNICEF’s adoption of what became known as “selective primary health” began with the Children’s Revolution Initiative; a series of vertical programs, run outside a country’s normal health infrastructure with their own staff, resources, and managerial systems, focussing on oral re-hydration, breastfeeding, growth monitoring, and immunisation, which achieved high coverage during the 1980s.

Thus the battle lines were drawn between vertical (technological, top-down and magic-bullet approaches) and horizontal interventions (focused on organisational capacity, general health systems and community participation) that continues well into the 21<sup>st</sup> century. Proponents of the PHC strategy argue that technocratic approaches harm health systems by creating parallel delivery structures, diverting resources and staff away from other activities, over-emphasising

one disease at the expense of others and not being sustainable (Keugoun *et al.*, 2011). They also argue that vertical approaches typically over-emphasise technological solutions and leave little room for building infrastructure, community participation, prevention, and addressing problems of equity, sustainability and social determinants – an argument that goes back to discussions about the work of the Rockefeller Foundation in the early 20<sup>th</sup> century, the precursor of contemporary “Big Philanthropy”, like the Bill and Melinda Gates Foundation (BMGF) (Farley, 2004).

Speaking of the involvement of the Gates Foundation in malaria – accused of following a “magic bullet” approach in their heavy funding of biotechnology research and development (R&D) (Birn, 2005) – Kelly and Beisel (2011:79) argue that despite historians having shown that malaria control in Europe and the Americas was achieved through draining swamps, screening houses, providing patient treatment and wider socio-economic development, many contemporary initiatives presume that through “massive infusions of funds, celebrity power, diplomatic activity, advances in genomics and bioinformatics and sheer creative pluck, malaria can presumably be isolated and out-paced.” Some political economy critiques of vertical programmes extend this argument further, showing how prevailing orthodoxies offer an avenue for donors and governments to avoid the more difficult, fuzzier and ultimately more radical tasks of tackling the underlying causes of ill-health, building strong primary health services and addressing the adverse effects of the macroeconomic policies of the global financial institutions on what are nearly defunct public health systems (Global Health Watch 3, 2011:45-60; Rowdon, 2009).

However proponents of vertical approaches point to considerations of cost, clearly measured targets and impact indicators, the need for vertical structures to achieve results (given the

existence of dysfunctional national structures) and the fact that biomedical technologies have become more appropriate for developing countries contexts. They point to the many successes of vertical programmes going back to the Rockefeller Foundation and, indeed, of the Gates Foundation and many others. Studies have also revealed that vertical interventions can, in fact, have significant benefits for the broader health system by strengthening information systems, increasing motivation of staff and generally increasing political and community awareness for health problems (Keugoun *et al.*, 2011).

The classification of interventions using oppositions such as vertical/horizontal or magic bullet/people-centric, while occasionally clearly warranted, often requires more nuanced understanding. Marchal *et al.* (2011) discussed how NTD programmes can make use of health systems in three general ways: integration within health services (used for many leprosy programmes), structures completely outside (most mobile HAT screening services), and programmes organised by the central-level but carried out by district staff (many current integrated MDA programmes). Much depends on the actual implementation of the intervention, the nature of the technology involved, and the ways in which planners and implementers communicate and interact with the health system. Despite this, studies about the translation of global health technologies into local contexts and how the agency and wider contextual factors of end-users influence their appropriateness, adoption and subsequent use are, in comparison to other areas of inquiry in global health, surprisingly few and far between (Frost and Reich, 2010).

While some problems are clearly more amenable to vertical structures and technical strategies, much of global public health activities tend to operate in a de-politicised arena where biomedicine is detached from the social context that drives disease transmission. There remains

an over-emphasis on quick technological fixes, historical amnesia of past experiences and a downplaying of the long-term needs of populations and broader contextual factors.

Despite high-level statements to the contrary, interventions continue to be constructed within opposing ideas about how we define “health”: improving lives or targeting pathogens. The constitution of the World Health Organisation (WHO) drafted in 1948 defined health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (Brown *et al.*, 2006). More recently, the WHO’s Commission on the Social Determinants of Health, which advocated for “improving daily living conditions” and “tackling the inequitable distribution of wealth, resources and power at the global, national and local scale”, has emphasised that addressing the health needs of the poor requires thinking beyond narrow interventions (Marmot *et al.*, 2008). Health goes well beyond biomedical pathologies to involve broader cultures of understanding and acting; Etounga-Manguelle (2000:77) stated the need for a “revolution of minds without which there can be no transfer of technology” in Africa. This critique can also be extended to global health.

In the NTD lobby, there is a perplexing trend towards emphasising neglected infectious disease as causes of poverty but not as consequences and manifestations of inequality, which could rationalise more broad-based intervention strategies. Clearly, however, the NTDs reflect not only individual predisposing risk factors but larger structural inequalities in access to health services, infrastructure, food security, education, political voice and markets that drive poverty and maintain social and economic exclusion. The MDA strategy discussed above, as a strategy based on a cheap set of tablets, is a good example of an over-dependence on technological fixes that may, at first glance, appear to be “simple technology.” Upon closer inspection, however, MDA

involves a complex set of vertical structures that medicalizes a global public health problem. The solution, made discrete and tangible, becomes a tablet to be distributed and then counted; however, anthropological research shows that outcomes bifurcate into variable results when they intersect with local realities (Parker and Allen, 2011; Samsky, 2012). This is a very real tension in global public health with no clear end in sight, that continues to be debated in the margins and on the sidelines of dominant orthodoxies perhaps due to, above anything else, a failure of imagination, the sheer scale of global health disparities, existing governance structures and available expertise.

### ***Expertise, Evidence and Epistemologies***

Much of what we have so far discussed make inroads, in one way or another, into the arena of data, research, evidence and epistemology where global public health is represented as *understanding*. How do global health interventions conceptualise the local, understand approaches and technologies, assess impact, and frame evidence? At the level of understanding, global health encounters a new set of dichotomies between positivism (the idea that scientific information is the sole authoritative source of knowledge) and constructivism (that all knowledge, even scientific knowledge, is socially constructed and hence reflective of social relations and prevailing norms) (see Hacking, 2000). Given the centrality of biomedical forms of knowledge in global public health, it is no surprise that prevailing tendencies emphasise quantitative, statistical and generalizable data. Some fruitful areas of anthropological engagement, with epidemiology and in the study of interventions, have noticeably become more accepted over the last 30 years (Troostle, and Sommerfeld, 1996; Nichter, 2008). Nonetheless, there remain tensions between social and biomedical forms of global public health expertise, research and evidence.

This has become most noticeable with the evidence-based medicine movement where an unprecedented emphasis on “high-quality” evidence and evaluation has followed, revealed in a new emphasis on randomised control trials (RCT) and systematic reviews (Adams, 2013; McMichael *et al.*, 2005). The field of *implementation science* has further attempted to redefine the basics of evidence-based policy, and research on “implementation gaps” has become a new vogue. Furthermore, the culture of planning has become permeated with the discourse of cost-effectiveness, seen in the reigning logic of the DALY and the cost-per-DALY averted (Henry and Farmer, 1999). While this has undoubtedly helped provide a framework for decision-makers, there are important limitations that need to be considered (Kumaranayake and Walker, 2002). Business-style evaluations and the ever-present predominance of cost-benefit analysis legitimises certain forms of knowing while excluding others, often narrowing activities to only those most favourable to clearly defined and measured metrics. As with biomedical science more generally, this has driven a homogenisation and standardisation of measurement. Global public health technoscience – the collection of things, ideologies and representations – generates legitimacy through “statistical variables, terminologies, languages, scales, standards and properties” that tends to decontextualize interventions and their effects (Simpson and Sariola, 2012).

One of the primary drivers of intervention research and data collection is about framing evidence to attract funding, which orientates how scientific data and subjects are approached, measured and then publically discussed. While this “audit culture” attempts to circumvent the problem of accountability, assessment and an objective platform for measuring interventions, social scientists have criticised the prevailing form of public health knowledge as demanding the erasure of the “local”, “social” and “tacit” despite their hidden pervasiveness in the construction of public health facts and praxis (Simpson and Sariola, 2012; Adams, 2013; Adams *et al.*, 2005).



Furthermore, with this landscape social inquiry itself has been narrowly conceived, over-dependent on attempts to uncover individual risk factors and address issues of “non-compliance” in rather reductionist terms, revealed in the prevailing logic of the “knowledge”, “attitude” and “practice” survey (Launiala, 2009).

Global health players have their own bureaucracy, organisational norms and operational demands, some of which require the crafting of data to meet expectations and ensure future funding. Justice (1986:133) showed how the collection of village-level statistical data in Nepal was more about satisfying official requirements for charts and graphs; accuracy and reliability were seriously compromised. Acquiring numbers rather than actual conditions were the aims of these village health workers, tasked with passing up a semblance of objectivity on disease frequency and health clinic performance to their superiors, who were not interested in ambiguities but rather the maintenance of cognitive and bureaucratic order. Statistics, which make possible the audit and accountability systems that prevail are nonetheless linked to their social milieu, despite the illusion that, as artifacts, they are freely formed and accurate (Erikson, 2012). Lorway and Khan (2014) speak about the “reassembling of epidemiology” in a Gates-funded HIV initiative in India where monitoring and evaluation specialists and community members co-created scientific knowledge, transforming the very objects of surveillance. Global health research as *understanding* attempts to objectify the local through what is seen to be clean, pure and efficiently collected data; however, representations of social relationships and realities are transformed and managed in particular ways (Biruk, 2012). As Scott (1998) argued in relation to the modernist state, global health planning as a process of administrative manipulation aims to order, standardize and simplify society to make it amenable to interventions.

However the fact that the objects of global public health, as situated in social, political and cultural milieus, are not stable but rather always on the move shows that “much of what we can learn from those who are the “targets” of medical interventions simply does not fit and cannot be made to fit the epistemological architecture” of the positivist straightjacket (Adams, 2013:85). While there is a hope that the variability, interaction and complexity of the social world is somehow captured and conveyed by easily collected quantitative data, social scientists remain concerned that much of what actually makes global public health interventions work (or not work) are being lost in translation. Such understanding shapes the particularities of intervention strategies, with profound influence on outcomes. Part of this trend relates to larger issues of research funding and the biases towards the biomedical and the promises of new technological breakthroughs. While the WHO estimates that 90% of the global disease burden only receives 10% of health funding – the so-called 90:10 gap – social scientists speak about the “table crumbs” directed towards health systems research and social determinants. As Leroy *et al.* (2007) showed in relation to child mortality, there is a serious discrepancy between heavily funded emphasis on new medical technologies compared to issues of delivery and utilisation, despite the estimated mortality reductions of the two.

At the same time, social scientists have put themselves into two polarised camps: the *in* public health camp (instrumentalist research) and *of* public health camp, which is considered to be more critical of the interventionist landscape and the underlying drivers of policymaking and practice (Parker and Harper, 2006). While I do not disagree with this distinction (discussed more in the next chapter), there is a need to reveal the discontinuities between the global and local, policy and practice, and technological and people-centric approaches in ways that transcend meta-

critique, making social science knowledge amenable and receptive to intervention planners in order to improve strategies. Social scientists cannot simply criticize at a distance; they also need to engage, in whatever ways they see best and are able, the messy and fuzzy world of pragmatic recommendations, politics and action.

#### **IV. THESIS OUTLINE AND AIMS**

As discussed above, the recent global policy momentum mobilized around NTDs represents a significant opportunity to help alleviate the devastating impacts of tropical diseases on poor people around the world. However the wider anthropology, development and public health literature suggest that dichotomies and tensions between the global/local, policy/practice, technology/people and positivist/constructivist perspectives present complex and context-specific challenges in effectively implementing control interventions. Although global health actors continue to emphasise the importance of implementation research, the exact nature of this research, its scope and the role of the critical social sciences remain uncertain and contested. To date, few investigations have explored the effectiveness determinants of NTD interventions from a critically engaged social science perspective. A more systematic study that draws upon multiple case studies is certainly warranted to increase our knowledge of this important but overlooked field.

This thesis aims to fill this significant gap by exploring the multifaceted challenges facing planners, implementers and communities in NTD control. Specifically it asks: How do local contexts shape the implementation of NTD interventions? What are the most important factors and processes that mediate effectiveness? How and why are promoted health technologies

adopted and used (or not used) by poor farmers? Do contemporary programmes engage with these local realities? How important are context-specific strategies? How do intervention strategies change as they move from policy into practice? What are the promises and perils inherent in new institutional arrangements like public-private partnerships and community-based participatory approaches? Do these new approaches live up to their expectations in overcoming the shortcomings of more traditional top-down approaches? And what role and value is there for applied social science research in highlighting the complexity of interventions?

Grounded in a social constructivist approach using mixed methods, this thesis addresses these questions. The specific aims of the thesis are:

1. To explore how contemporary NTD interventions are being implemented, the shortcomings with current implementation strategies and the relationships between policy and practice;
2. To understand how intervention effectiveness is mediated by the relationships between intervention technologies, delivery strategies, local livelihoods and community beliefs, perceptions, logics and practices;
3. To investigate the ways in which programmes engage with local realities and broader social determinants of health;
4. To explore the unique contribution of critical social science approaches in understanding NTD intervention effectiveness.

The thesis addresses these research questions and aims through three diverse intervention case studies based on a one-year period (2011 – 2012) of empirical fieldwork in rural Tanzania,

Zambia and Uganda. There were important differences between these three interventions that provide this thesis with its analytical terrain: they involved different NTDs (sleeping sickness, rabies and parasitic worms) in three different Eastern African countries with diverse cultures, geographies, and ecologies, languages and other contextual factors. The interventions also represented very different institutional arrangements (top-down, participatory and a public-private partnership), control technologies (pit latrines, veterinary pharmaceuticals and vaccination), delivery networks and local incentive structures to enrol support and participation by implementers and communities. As a collection of three context-specific case studies, this diversity forms the depth of comparative analysis, provided in Chapter 6, that offers a unique contribution to contemporary debates about the importance of understanding effectiveness and local contexts in NTD control.

My research approach is largely based in applied anthropology and development studies. I am concerned with tracing the multitude of social, technological and environmental factors that influence intervention outcomes. This methodological approach is informed by the social constructivist agenda in medical anthropology and actor-oriented approaches to development studies, as well as recent work in Science and Technology Studies (STS) – specifically tenets of actor-network theory where analytical attention is given to how technologies (the “things” themselves) arrange social relationships. My research strategy in each of three case studies involved two main streams: first, I assessed the actual coverage and adoption of intervention technologies through some sort of quantification. I then used this to frame what I call “ethnographically-orientated” research unpacking the various processes that mediated this coverage, centred on the relationships between local contexts and the particularities and specificities of the technologies themselves. This explored the multiple facets of how

intervention technologies were conceptualised, delivered, adopted and used (or not used). Chapter 2 outlines this methodological approach and critically reflects on the research process, including issues of access, ethics, methods and analysis. Chapters 3, 4 and 5 then present my individual case studies, which reflect, in different ways, on the tensions between the global/local, policy/practice, technology/people and positivist/constructivist perspectives in global health.

**Case Study 1:** Conducted in two of 28 intervention districts, the first case study (Chapter 3) explores the effectiveness of a rabies elimination programme funded by the Bill and Melinda Gates Foundation (BMGF) and coordinated by the WHO country office in Tanzania. The WHO/BMGF project used a top-down strategy to plan, and disseminate information about, annual canine vaccination at established central points, using government veterinary extension workers. Interviews with district officials, extension officers and dog-owners revealed contradictory claims about coverage. A population-based survey I conducted in six selected villages revealed that only 25% of dogs had been vaccinated in 2011, far below the 70% target for elimination. The chapter explores why the campaign achieved such low coverage and to this end focuses on local understandings, livelihood patterns and dog ownership practices as well as campaign mobilisation, timing, the location of central points, equipment and staff, and project organisation and government bureaucracy. The case study shows many of the common shortcomings of such top-down vertical interventions as situated in the project planning level, especially the role of overlooking geographical and livelihood diversity and limitations in management and capacity.

**Case Study 2:** In the second case study (Chapter 4), I present an analysis of the implementation of an innovative participatory sanitation intervention called community-led total sanitation (CLTS) as it was scaled-up in eight districts of Eastern Zambia. Such participatory strategies are

often promoted in contradistinction to the shortcomings of top-down programmes reflected in the rabies control programme. CLTS is about motivating villagers to construct latrines with locally-sourced materials and does not provide any subsidies or technical inputs. In this way, it adheres to some of the Alma Ata Declaration tenets discussed above and is presented as a people-centric approach, while still (somewhat contradictorily) claiming to generate rapid sanitation improvements. My research in eight villages in Katete district (done before and after CLTS was implemented by a network of volunteers associated with local government) revealed the piecemeal application of the approach. The case study explores the context of sanitation in Katete, the history of past interventions and the local politics between different stakeholders that inhibited CLTS. One year after implementation, latrine coverage had only increased from 17 percent to 31 percent in my study villages with noticeable impacts in only one village, reflecting wider trends in Eastern Province as a whole. The chapter argues that although participatory approaches offer the possibility to circumvent some of the problems with top-down interventions and link with wider livelihood concerns, narratives of rapid behaviour change are prone to being rendered technical. Sanitation and hygiene practices are deeply rooted and demand a long-term approach to engage with wider societal, organisational and structural change. Despite the focus on participation, CLTS in Katete district showed the perils of conceptualising a societal problem as a technical problem. It also showed the need for more attention to broader social determinants in NTD control.

**Case Study 3:** The final empirical case study (Chapter 5) explores the Stamp out Sleeping Sickness (SOS) intervention to control zoonotic sleeping sickness in post-conflict Uganda. As with CLTS, this intervention also promised to overcome the shortcomings of top-down interventions through new forms of expertise, incentives and organisational arrangements as an

innovative public-private partnership (PPP). After mass-treating hundreds of thousands of cattle, SOS transitioned to a bottom-up market driven strategy, supporting private veterinary shops and networks of sprayers for sustainability. This relied on poor livestock-keepers demanding, purchasing and using insecticides on their cattle, motivated largely by the desire for tick control. Related to wider trends of bottom-of-the-pyramid economics, the SOS business phase sought to reconcile the goals of maintaining eleven profitable veterinary businesses with the promotion of tsetse control (the vector responsible for sleeping sickness). This was to be done by selling a particular brand of insecticide, establishing “village sprayers” and promoting a restricted application method to reduce the costs to farmers. However appropriate the technologies and social forms promoted by SOS, the complexities of a post-conflict economy, existing business practices and the prevailing drive for profits severely constrained sales of tsetse-effective insecticides, especially in endemic villages. The case study shows how sustainability relies not only on a combination of enticing incentives and locally-appropriate technology but also on the need for constant adaptation to local contexts and processes. This demands new forms of expertise and management to locally ground NTD control.

Together, these three interventions offered surprisingly similar trends. The rabies vaccination case study, reflecting elimination-orientated programmes that are planned using top-down approaches, represents stereotypical problems in moving global interventions into local contexts that have come to define global health. Critiques about the need to understand and engage with effectiveness have demanded new approaches; the two other case studies in this thesis (CLTS in Zambia and SOS in Uganda) are representative of the movement for more innovative project strategies that claim to ground global health in the local – they involved new ways of doing things that attempted to address past failures and critiques. Although both case studies promised



new approaches and better results, this thesis shows that, despite the rhetoric, the old ghosts of top-down information flows, reductionist perspectives and technocratic strategies remained.

These case studies show that the lack of engaging local contexts continues to be, despite other issues, one of the major overarching barriers to intervention effectiveness for global health projects on NTDs. There was limited engagement with the myriad of local realities that structured low coverage, adoption, use and suboptimal implementation in all three projects, regardless of policy narratives. The management and ownership of these interventions marginalized the contexts and concerns of district and village actors in the planning process, despite the fact that they were tasked with the actual implementation of policy models. These actors operated in their own social, cultural, economic and political landscape where important resource constraints shaped delivery outcomes. Without considering the contexts, and their variations, of implementers and communities externally-driven agendas led to significant fragmentation at the planning-level between policy, practice and local realities. This critique – that there is a tendency for the erasure of the local in global health programmes – begs-the-question of just how “global” global health should be.

This thesis shows that NTD interventions involve much more than the control of invisible pathogens; rather disease control needs to engage in the understanding and management of people, organisations, incentives, histories, technologies and environments in new ways. Chapter 6 contributes to these wider debates by presenting a conceptual framework for understanding the major effectiveness determinants of NTD interventions from a critical social science perspective, as based on a comparative analysis of my three case studies. It is here that the intellectual contribution of this thesis is most fully manifested as I unpack the major elements that together composed my three case study interventions and mediated outcomes. I argue that preventative

NTD interventions should be viewed as contested, and socially constructed assemblages and that planners need to take on the responsibility of actively engaging the tensions between the global/local, policy/practice and technology/people. I draw together five operational domains where the effectiveness of interventions as “negotiated assemblages” (as I call them) are played out and, to a large extent, determined. This analysis is based on my empirical data and includes: geographical/livelihood variation, local agency, incentives, the socio-materiality of technology and planning/governance. This framework offers a pragmatic heuristic device, drawing attention away from interventions as established models and frameworks to be linearly translated into practice and illustrating the value of a more fluid and reflexive perspective dependent on the need to unpack and engage the local.

In summary, this thesis shows that the tendency for decontextualized interventions in global public health is a major impediment to effectively controlling NTDs. To address this, there is a need to destabilise prevailing conceptual approaches through locally grounded analysis of the contexts and challenges to implementation. This thesis advances important analytical contributions towards this end, revealing the need for changes in orientation and management to improve the effectiveness of contemporary NTD interventions in African and elsewhere.

## CHAPTER 2

### Unpacking NTD Interventions: Methodologies, Methods and Field Moments

“This is an assertion that needs to be supported with evidence...the paper is highly subjective, using examples from limited field studies”

*Comments made by Molyneux and Malecela (2011) regarding ethnographic research that revealed community resistance to MDA in East Africa*

“I would dearly love a greater appreciation from those who can affect policy that some questions are better answered by locally produced ethnographic knowledge than that generated by large-scale ‘scientific’ trials”

*Medical anthropologist Ian Harper (2014:143)*

#### I. INTRODUCTION

As discussed in the last chapter, critical social science perspectives on global public health interventions offer unique conceptual tools that diverge, in many ways, from the prevailing ethos of biomedicine and public health.<sup>2</sup> Rich textual expositions of contexts, actions, values, norms, beliefs, knowledge and power stepped in interpretative judgements that move beyond the descriptive are the foundations for anthropological and sociological inquiry. As Bent Flyvbjerg (2001) commented in *Making Social Science Matter: Why Social Inquiry Fails and how it can*

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<sup>2</sup> In this thesis, I use the term social sciences to mean theories, methods, knowledge and approaches derived from the fields of anthropology, sociology, political science, development studies and related fields. I use the term “critical” social sciences to refer to research that engages in understanding power dynamics, actor relationships and knowledge construction from a social constructivist perspective.

*Succeed Again*, part of the tensions between anthropology and biomedicine have to do with the fact that social constructivist approaches do not offer the same explanatory and predictive theories that are the hallmarks of the natural sciences; the social “sciences” are not necessarily sciences at all in the proper laboratory or mathematic sense where researchers thrive for general causative theory. As noted by the two NTD scientists quoted above, who directed their critique at an anthropological paper on MDA in Uganda and Tanzania by Parker and Allen (2010), this makes natural scientists sceptical of the nature of ethnographic fieldwork due to, among other reasons, its “limited field studies” that are “highly subjective” and therefore lacks “evidence.” Paradoxically, this continued apprehension of social research as “anecdotal”, scepticism of the generalizability of social studies and suspicions about how “factual” anthropological interpretations really are coexist, with some uneasiness, with greater recognition of the value of qualitative research in public health and collaboration with social scientists (Forman *et al.*, 2008).

Understanding the complex relationships that mediate the effectiveness of large-scale disease control programmes for Neglected Tropical Diseases cannot be approached from a narrow positivist standpoint: we cannot simply count the number of drugs distributed and understand community perceptions by asking a few pre-arranged yes-or-no questions. Despite lingering scepticism, there is a general recognition that anthropological and sociological ways of understanding social contexts and processes add value to the nexus of global health practice, including for NTDs. There are certain expectations, however, about what the social sciences offer. Small-scale ethnographic fieldwork (despite the usefulness and insights of findings, their theoretical depth and their ability to challenge common assumptions) leave themselves open to dismissal by the prevailing orthodoxies of the global health and biomedical establishment,

concerned with large geographical areas and prone to value numbers over “thick descriptions.” There is, therefore, a need to take a pragmatic approach to applied social inquiry on NTD control, especially regarding studies that aim to directly improve or influence policy and practice, which requires thinking critically about methodology and method.

From the perspective of donors, international agencies, national governments and biomedical technical experts there are often two paramount questions to a large-scale preventative disease control programme: What proportion of people are complying, adopting and/or using the promoted intervention technology? How can we increase this? The relationships between delivery, adoption, compliance and use of health technologies and intervention outcomes offer a fertile analytical interface for critical social inquiry to explore. Quantifying the coverage, adoption and use of particular health technologies and/or services and then relating such data to the wider social, cultural, economic, political and ecological contexts that shape these trends is an area where social science research can most directly reveal its relevance to NTD control. Such research can highlight the need to consider context and process in implementation, and promote interventions that adopt, what Biehl and Petryna (2013) calls, the task of “endlessly tinkering” intervention techniques and strategies. This requires, to some degree, a revisiting of method: how might a critically-engaged, but operationally relevant, applied social science understand the complexities involved in moving knowledge, social forms and technologies from the global to the local in NTD programmes? What theoretical approaches and methods are most useful? In-so-far as the purpose of this thesis is to explore the effectiveness of particular programmes, I am also interested in what particular contributions critical social science approaches can make in global health, what types of expertise and methods are required to explore the interface between

technical strategies and local realities, and how critical perspectives can be framed and presented to the global health establishment.

This chapter explores the contours of a social constructivist research approach to preventative NTD interventions, which aims at straddling the divide between a critical and instrumentalist orientation. It discusses how and why I did what I did; it reflects on my methodological choices, my own experiences in the field and the process of interpreting my data. As we will see, my case study approach was a curious mixture of critical and instrumental, self-reflective and assuming, and insider and outsider. In approaching a study on disease control programmes, this thesis “walked a fine line” between breadth and depth of data. This is especially the case given the disparate field sites over three Eastern African countries and the demands of social studies that claim to understand “context” to be situated through lengthy engagement in the field, generating intimate familiarity (as with traditional ethnography). My orientation, however, was never firmly dedicated to the nuanced cultural, linguistic or historical details of my field sites but rather to the particularities of disease control tools and strategies. The “field” to me was rather the associations that mediated the application and use of the intervention technologies I was studying; albeit in the end, I did cast my net wide.

This chapter outlines how my research aims, as discussed in the previous chapter, required that I adopt particular choices regarding methodology and method. To this end, I discuss how I made use of a number of theoretical strands from medical anthropology, development studies and Science and Technologies Studies (STS) in orientating my fieldwork. This approach led me to trace the multitude of social, technological and environmental factors that influenced intervention outcomes in context. The chapter also discusses how I approached my field sites,

participants and case studies where my fieldwork and data interpretation were informed by, and approached through, an ethnographic perspective.

Hence this chapter outlines my methodological approach, use of methods and the mechanics of fieldwork. The first section situates the thesis in the wider context of implementation research for NTDs, debates about the value of applied anthropology and rapid appraisals and the rationale for my theoretical approach, including the *raison d'être* and value of three case studies. In the second section, I reflect upon the more personal dimensions of my work: how I entered the field, conceptualised my activities, defined my sampling strategies, negotiated research assistants and gained access to research participants. The third section discusses the mechanics of fieldwork, including the methods that I used. In the fourth section, I discuss how I analysed my data and the various difficulties encountered during my interpretation and writing of my case studies.

## II. SITUATING THE RESEARCH

### *NTDs, Implementation Research and Effectiveness*

As mentioned in Chapter 1, research into the so-called “implementation gap” – factors that mediate efficacy – of disease control programmes in developing countries has become a top priority in global health. Allotey *et al.* (2008) and many others have noted that such research offers one of the most cost-effective strategies since, unlike investments in new science and technologies, its aims are to better translate existing tools and strategies into positive health outcomes. Part of the “neglect” of implementation research has to do with its low status (it is often not considered a “serious science”), the need for multidisciplinary teams to address the

various facets of a problem and a lack of consensus on what sorts of methodologies should be used (Global Health Watch 3: 133-145). While there are a variety of definitions, Allotey *et al.* (2008) defined implementation research as:

Applied research that aims to develop the critical evidence base that informs the effective, sustained and embedded adoption of interventions by health systems and communities. It deals with the knowledge gap between efficacy, effectiveness and current practice to produce the greatest gains in disease control.

Against this backdrop, there has been a proliferation of frameworks, models and approaches aimed at understanding the implementation process and the factors that mediate effectiveness. In reviewing the bulk of implementation theories and frameworks, Damschroder *et al.* (2009) discussed the multitude of interacting domains and factors that drive the implementation process and its outcomes: characteristics of the intervention and institutions involved, individual perceptions, ability and willingness of planners, and the process of implementation: planning, engaging, executing, reflecting and evaluating. Similarly, Gruen *et al.* (2008), drawing on tenets of action-research, proposed that health programmes be viewed as complex ecosystems of social interaction between diverse stakeholders with different interests, where ongoing cycles of engagement, reflection, research and adaptive learning are needed to keep within equilibrium. Frost and Reich (2010) discussed how issues of acceptability, affordability, availability and organisational architecture shape the adoption process for health technologies in resource-poor settings. Lastly, Obrist *et al.* (2009) have emphasised the importance of including livelihood vulnerability and resilience in the study of access barriers among the poor. In regards to disease control programmes, all of these frameworks highlight the fact that implementation research should extend well beyond simple program evaluation to focus on the complexities of local contexts, issues of equity, stakeholder relationships and the particularities of health technologies.



Understanding the processes involved in moving interventions from international boardrooms into poor and remote rural villages has also become increasingly emphasised within the NTD community itself; for example, discussed at length in two recent think tank reports commissioned by the Special Programme for Research and Training in Tropical Diseases (TDR) based at the WHO: *Implementation Research for the Control of Infectious Diseases of Poverty* (WHO/TDR, 2011) and *The Global Report for Research on Infectious Diseases of Poverty* (WHO/TDR, 2012). The latter report was built explicitly on the conceptual integration of human, animal and ecosystem health as articulated by the “One World, One Health” movement. Furthermore, full of references to the social determinants of health and illness, the report also outlined a new “trans-disciplinary vision” that provides ample room for involvement of social inquiry (Manderson, 2012).

However despite the enthusiasm, funding for the NTDs is still heavily concentrated on biomedical research and pharmaceutical industry support for drug development (Pratt and Loff, 2012; Pokhrel *et al.*, 2011; Spiegel *et al.*, 2011). The capacity to conduct such implementation research is also low within the NTD community itself, especially by endemic country researchers (Gonzalez-Block *et al.*, 2011). Another problem is the relationship between research and policy and practice; simply because insightful research on gaps between programme strategies and intervention effectiveness are conducted does not mean that findings will be readily incorporated into the larger health system landscape or the operational practices of particular programmes. Lastly, and significantly for this thesis, there is limited direct “cross-fertilisation” between biomedical and social scientists, which was discussed in the last chapter (Allotey *et al.*, 2010; Spiegel, 2011; Allen and Parker, 2012). Although this is also reflective of a general disjunction between the biomedical establishment and the work of sociologists and anthropologists in health

research more generally (Napolitano and Jones, 2006; Albert *et al.*, 2008), the situation contrasts remarkably with the “big three” (HIV/AIDS, tuberculosis and malaria) which has arguably seen more scope for collaborative research and the uptake of social science research findings. However within the world of implementation research, social scientists possess a specific set of skills to sort through local specificities and unpack their nuances and variation.

### ***Applied Social Science Research***

The recognition that local contexts need to be understood to inform the design and implementation of disease control programmes has underpinned the growth of a new class of “applied anthropological studies” in public health (Kedia, and Van Willigen, 2005; Inhorn, 1995; Rylko-Bauer, Singer and Willigen, 2006). Traditionally, anthropological research, specifically ethnography (Greek, *writing culture*), has been based on long-term emersion in one geographical space. The goal is to avoid “artificial research situations” (Donge, 2006:180), to “see like the native without going native” (Wolcott, 1999) and to apply critical reflexivity during data collection and analysis (Hammersley and Atkinson, 1995:2). Ethnography can be succinctly summed up in the now classic words of Geertz (1973:5):

From one point of view, that of the textbook, doing ethnography is establishing rapport, selecting informants, transcribing texts, taking genealogies, mapping fields, keeping a diary, and so on. But it is not these things, techniques and received procedures that define the enterprise. What defines it is the kind of intellectual effort it is: an elaborate venture in, to borrow a notion from Gilbert Ryle, *thick descriptions*.

Ethnography, then, is a way of seeing – an orientation – that relates as much to analytical thought as to the capacity to relate, experience and feel (Wolcott, 1999). It is about going-on-and-on, a meandering into detail, illustrating local worlds and people’s experiences and meanings, a

continuous oscillation between the ethnographic context, social theory and the key issues of the researcher (Kleinman, 1995:194-195). However with the crisis of representation in anthropology and post-modernist thought more generally, the traditional ethnographies of isolated tribal cultures have given way to a more dynamic use as researchers engage in trans-local studies and multi-site (or “irregular”) ethnography (Hannerz, 2003). According to Prentice (2009), ethnographic research in the field of global health research has four main principles: it uses fieldwork to build theory, it emphasises meaning and classification, it explores the negotiated nature of reality, and it emphasises the central role of context.

To the biomedical establishment, however, “thick descriptions” are often viewed with some suspicion. Adams (2013:65) has argued that the hegemony of statistical reasoning, erases the local and specific where the “messy world of public health has begun to look, here and there, like a bench science laboratory.” There is, therefore, a fundamental tension in how research is conceptualised: what data counts, how research should be conducted and the style of interpretation and presentation of data. From a positivist standpoint, many anthropological studies are considered soft, whimsical, unscientific, verbose and lacking in rigour, reproducibility and generalizability (Napolitano and Jones, 2006; Albert *et al.*, 2008). Preference for the quantitative tends to misconstrue the often repeated maxim of anthropology that “contexts matter” into accusations that anthropologists are ambiguous. Ethnography, then, is regularly trivialised and made unimportant. However at the same time, recognising that social inquiry is still needed, there is a tendency for public health professionals to depend heavily on standardised questionnaires to “capture” local knowledge, attitudes and practices. This, in turn, has been heavily criticised for being methodologically naïve, problematic and reductionist by social scientists (see Launiala (2009) critique of KAP surveys).

There are a plethora of topics where anthropology, and related social science disciplines like sociology, can have a significant impact on global health programmes for NTDs. These range from, for example, illness categories, drug use patterns, community participation, gender dimensions and community perceptions and responses to individual programmes (Bardosh, 2014; Manderson *et al.*, 2009). Lambert and McKeivitt (2002:210), writing to a biomedical audience in the *British Medical Journal* (BMJ), argued that such research can “view the familiar afresh”, “highlight...the differences between what people say, think, and do” and “avoid inaccurate generalisations.” They can help reconfigure the boundaries of how problems are conceptualised and bring new perspectives, and new ways of acting and intervening.

However the ways in which social science research is generated, interpreted, framed, disseminated and used (as well as funded) has an important influence on its utilitarian value. In a recent commentary in *Social Science and Medicine*, Timmermans (2013) highlighted that most medical sociology publications (we can also include medical anthropology) overwhelmingly target empirical and theoretical contributions to scholarly audiences, perpetuating a divide between academic knowledge (and ways of framing problems) and the world of public health practitioners. The divergences of interests and norms between academic research and the demands of particular global health programmes, so Timmermans argues, drives academics towards insularity and, in large part, operational irrelevance. Finely crafted critiques and theoretically robust publications all-to-often find themselves outside the epistemic communities of mainstream global public health.

Speaking about scientific institutions, Gibbons *et al.* (1994) discussed this problems by proposing that there are two different “modes of knowledge”: the first involves discipline-based

knowledge production (traditionally found in the academia) while the second is aimed at problem solving, is tasked-orientated, multi-disciplinary and diffuses findings in more dynamic ways (i.e. not only reliant on academic publications). Public health institutions involved in programme operations tend to demand the latter form of social science knowledge.

Efforts to bridge the divide between research and action have a long genesis in the field of participatory development research. Drawing on the notion of intermediate technology proposed by Fritz Schumacher and the social justice philosophy of Paulo Freire, the work of Robert Chambers has been important in promoting research methodologies that aim to understand the perspectives, knowledge, needs and capabilities of the poor. Since the 1980s, a series of participatory research methodologies have been developed and used to this end, reflected in the titles of particular publications: *Putting the Last First* and *Farmer First* (Chambers *et al.*, 1983; 1989). Methodologies such as Participatory Rural Appraisal (PRA), and other associated approaches with their own acronyms, have been used to understand community dynamics over short periods of fieldwork. The purpose of such research is often to inform development intervention strategies. In response to past technocratic approaches, PRA aims to promote the agency, resourcefulness, and knowledge of poor farmers, and how such knowledge can be harnessed for rural development (Chamber *et al.*, 1989). These include the use of community mapping exercises, diagrams and flowcharts, as well as more traditional qualitative methods. PRA aims to bring a “new professionalism” where communities become co-researchers with development practitioners.

PRA techniques have proliferated over time, having undergone various transmutations as they have been used in many different types of developmental problems. With a varied genealogy, a

rich critical literature on PRA has emerged (Cornwall and Pratt, 2011). This has questioned premises of PRA as a research methodology as well as a strategy to plan and implement development interventions. In terms of methodology, the range of visual-participatory methods that form the core of much PRA has been criticized by anthropologists as unnatural, “quick-and-dirty” and in introducing bias' through the social encounters they (re)create; PRA becomes theatrical, reinforces established power dynamics and provides shallow interpretations of community dynamics (Cooke and Kothari, 2001). Developments within PRA itself acknowledged these complexities as practitioners and scholars critiqued the original idealisation of farmer capacity. This had clearly exaggerated the cohesiveness, rationality and systematisation of indigenous technical knowledge and skills and overlooked the various ways in which power relations and knowledge construction shape farming practices, the participatory research process and responses to interventions (Olivier de Sardan, 2005; Scoones and Thompson, 1994).

Throughout the evolution of PRA techniques in participatory development, one of the acknowledged dangers has been in the over-standardisation of rapid methodologies and their piecemeal application, which is often driven by NGOs and major development agencies. Research becomes formulaic, where certain information is solicited, others are strategically hidden, and where the more interpretative, iterative, self-reflexive and flexible ethos of traditional ethnographic fieldwork is lost – project goals and organisational culture appropriate “participation” for their own ends. For these reasons, critiques of PRA have called it a “new tyranny” of procedures, methods and power relations (Cooke and Kothari, 2001).

Interestingly, the rise of PRA in the 1990s coincided with the proliferation of applied “rapid” anthropological studies on public health – research informed by anthropological theory and using anthropological methods but carried out quickly and presented in accessible ways with immediate relevance to specific programmatic goals (Manderson and Abbey, 1992; Vlassoff and Tanner, 1992). While these research approaches had less lofty stated goals of bringing participation into the mainstream of development, their purpose was often similar to PRA: to understand local realities and voices in order to better design interventions. Since the 1990s a large body of rapid methodologies have been developed by UN agencies for HIV, diarrheal diseases, reproductive health and drug policy reforms, among many other areas (Gove and Pelto, 1994; Fitch *et al.*, 2000; Manderson, 1996). The proliferation of these approaches have borrowed from, and been developed in parallel to, the development of rapid appraisal techniques used in international development.

Similar to PRA, there have been many critiques of applied anthropology in public health, which is concerned with generating *practical* recommendations. This generates criticisms by anthropologists themselves that, as Van der Geest (2006:313-14) commented, “applied medical anthropology is...diluted anthropology...too subservient to policy and medical science.” Such studies are criticised for their lack of engagement with the underlining theoretical concepts that provide anthropology with its rich substantive knowledge and theory (Napolitano and Jones, 2006). Hence both PRA and applied anthropology are subject to criticisms about their lack of theoretical depth, reflexivity and critical engagement. In one of the most comprehensive reviews of rapid public health assessments, Fitch *et al.* (2004) argued that the potential of rapid assessments, as a varied and heterogeneous category of approaches and methodologies, are often not fulfilled as many studies are not published or critically reflected upon. There is a lack of

debate about the strategies used leading to a rather “inward-looking discipline” which does not learn from past experiences to generate methodological innovation.

As already mentioned in the last chapter, within the social sciences this debate is often framed by the differences inherent in instrumentalist and critical engagement – what Parker and Harper (2005) called the differences between an anthropology *in* public health based on a positivist “factoral model” of disease (and restricted largely to “social and cultural factors”) and an anthropology *of* public health, engaged in more nuanced interpretation of knowledge construction, structural dynamics and policy implementation. However this dichotomisation reinforces a notion that social scientists are either tied to the “establishment” where engagement is simply concentrated on determining how global actors can fix, manipulate and change the local *or* they are concerned with independent analysis, theoretical innovations and critical reflection on the disjunctions between policy, practice and local realities.

Such neat epistemological divisions are simplistic, reductionist and provide limited scope for the sort of mode 2 knowledge discussed above by Gibbons *et al.* (1994) and promoted by PRA. Similar to Padgett’s (2012) advocacy for a “pragmatic middle ground” between positivist, constructivist and feminist epistemologies, applied social science research on global health *can* be both critical and instrumental – recognising that reality is always complex and contradictory and that power relations are inherent to all social circumstances but that some things remain incontestably *factual* and that proposing solutions from *within* the establishment, although invariably requiring some degree of simplification, is required of social scientists as political actors. As noted by Kleinman (2010), there is a need to transcend the tendency in the social sciences to valorise attacking biomedicine and public health without “attempting to improve it.”



In extending their analysis to the world of public health interventions, applied social scientists need to become themselves political actors, and this demands changes in methods, framing devices and problem solving (Greene, 2000; Pelto *et al.*, 2013). As discussed more in the following sections of this chapter, this thesis is situated within these larger debates about the role, mechanics and contribution of applied social science research on global health interventions.

### **III. TRACING INTERVENTION EFFECTIVENESS DETERMINANTS**

The tensions within rapid assessments as they relate to the study of interventions can be addressed, at least partially, by situating applied social science research within the critical literature. Writing in the prestige biomedical journal *The Lancet*, Arthur Kleinman (2010) – a major figure in medical anthropology – discussed the relevance of four social theories for global health. The first included the concept proposed by the American sociologist Robert Merton that interventions can have “unintended consequences”, which highlights the complex and unpredictable processes involved in human action and social policy. Second, Kleinman discussed the social constructivist agenda (first promoted by Berger and Luckmann in the 1960s), which has become one of the foundations of the social sciences. Social constructivist perspectives on development interventions have gained increased focus since the 1980s through, among others, the actor-orientated approach of rural development sociologist Norman Long. Long emphasised the centrality of human agency and consciousness in experiencing, negotiating and transforming interventions and how social interactions, power dynamics, knowledge processes and network relations shape the course of events (Arce and Long, 2000; Long and Long, 1992; Long, 2001). When deconstructed according to this view, interventions are revealed to be “ongoing, socially-

constructed, negotiated, experimental and meaning-creating process, not simply the execution of an already-specified plan of action with expected behavioural outcomes” (Long, 2001:25).

An additional third major theory centres on the notion of social suffering and how larger socio-economic and political processes shape vulnerability to disease. Important here has been the concept, first proposed by Johan Galtung, of structural violence whereby social structures and institutions directly harm people by preventing access to basic human needs. Paul Farmer and others (2004) have promoted the importance of an “anthropology of structural violence” to explain how the poor continue to be denied the basics of health. This relates to the final major social theory advocated by Kleinman for global health research: Michael Foucault’s concept of biopower, which points to how the nation state influences the control of populations, their bodies and concepts of disease.

These broadly dominating social theories provide important perspectives to guide applied social research on interventions; they show that interventions are dynamic, can have unintended consequences, are socially constructed and hence negotiated and contested between different actors. They also reveal that interventions are typically conceived and enacted through particular framing narratives shaped by institutions and social structures. However, as discussed above, the demands placed on the applied social sciences by global health actors requires that research be easily digestible and appeal to more positivist audiences. Furthermore, the interest of public health officials and development actors towards any given intervention is typically concerned with the question of “delivery” and “adoption.” This is because the success or failure of a programme is most often determined by quantitative assessments of distribution, use and compliance.

The fact that global health programmes are so concerned with the dissemination of technologies provides a unique angle to frame the purpose and goal of critically-engaged social research on interventions. Science and Technology Studies (STS) focus on the social and technical construction of technology and science with strong post-positivist ontological and epistemological underpinnings. Breaking down the dichotomization of science and society, the technical and the social, works by actor-network theorists Latour (1993), Callon (1986) and Law (1986) on social networks propose that agency be extended to material objects since such objects are seen as essential network actors, configuring and organizing other actors in any given network. Technologies themselves, their characteristics and particularities, intimately configure social relationships and how they are used (or not used) as intended by intervention planners. The inclusion of STS within social science research has spurred a large interest in unpacking “global technoscience”: the context and consequences of the global circulation of technologies and how they are adopted, used or resisted in the global south (Janes and Corbett, 2009). Ong and Collier (2005) have termed such networks “global assemblages.”

The social constructivist agenda combined with the recognition that technologies have a form of agency in organising networks of relationships (albeit without their own intentionality) offers a fertile theoretical orientation to frame social research on global health by tracing the socio-technical lives of disease control interventions. This approach, which I use in this thesis, aims at tracing the network of relationships between human and non-human actors that mediate intervention outcomes. Stemming from Appadurai’s (1986) work on the social life of things, this borrows from work by Whyte, Van der Geest and Hardon (2002) who explored the multifaceted, entangled “biographies” of pharmaceuticals in developing countries. The approach that I take involves studying interventions by orientating my field research around the particular health

technologies promoted and used. This involved two main streams of research: first, there is a need to assess the actual coverage and adoption of the technology through some sort of quantification. This is then used to frame what I call “ethnographically-orientated” research unpacking the various processes that mediate this coverage based on a social constructivist perspective, which is centred on the particularities and specificities of technologies. As we will see, emphasis on the technologies themselves offers a way to place the consideration of local knowledge, agency and context into the forefront of understanding the effectiveness determinants of global health interventions.

#### **IV. A MULTIPLE CASE STUDY APPROACH**

In this thesis I am concerned with unpacking interventions, how they are experienced locally and the multiple factors that influence their effectiveness. To this end, I focus on the socio-technical dynamics of the health technologies promoted within their wider contextual factors. The thesis advances this social science approach through three detailed case studies. Yin (1994:46) defined a case study as an in-depth examination of a definable entity typically drawing on multiple perspectives and sources of data. This thesis presents an analysis using, as I discuss below, a number of different research methods, based largely in applied anthropology, to explore three interventions: Stamp out Sleeping Sickness (SOS) in Uganda, a WHO project to elimination rabies in Tanzania and Community-led Total Sanitation (CLTS) in Zambia.

Although Yin (1994) contends that each case should be viewed as a district experiment chosen with the same care as a laboratory investigator selects topics for investigation, the selection of my research sites have not been quite so measured. Instead, I agree with Hannerz (2003) that multi-site studies often combine elements of arbitrariness and yet “calculated decisions” in their

choice of sites. My case studies are three disease control projects that I became involved with over time through my relationship as a research assistant to the Integrated Control of Neglected Zoonoses (ICONZ) project funded by the European Union and based at of the Centre of Infectious Diseases, University of Edinburgh (<http://www.iconzafrica.org/>). This ambitious five-year project (2009-2014) involved 21 partner institutions in Europe and Africa, and aimed to address significant research gaps in the control of neglected zoonoses in Africa in order to mobilise political support for their control. I was tasked with helping to oversee socio-cultural studies (focused predominately on traditional knowledge, gender dimensions and educational strategies) across seven case-study countries in Morocco, Mali, Nigeria, Tanzania, Uganda, Zambia and Mozambique.

This proved to be a more challenging task than I initially anticipated for two reasons. First, I was the only social scientist (apart from one economist) on the project. Second, the division of work-streams across a large multi-partner project ensured challenges of organisation, planning and coordination. My attempts to get the seven in-country African institutions – all University veterinary departments – to collaborate with their anthropology, sociology and/or development studies departments proved fruitless. Furthermore, there were a number of delays in planned research schedules. My goal was to examine interventions and I had a short one-year opportunity (as part of a five year project) to do so given my doctoral scholarship funding. Some initial plans to be involved directly with research in Morocco, Nigeria and Mozambique fell through after my first year PhD report because of such delays. As my thesis was intimately tied to this particular project – which was to provide me with funding for all field expenses – right before my one-year of planned research was to commence, only my research in Uganda was confirmed. This was due to the fact that Professor Sue Welburn (the ICONZ coordinator), with decades of experience on

HAT in Uganda and as one of the initial partners of Stamp out Sleeping Sickness (SOS) from Edinburgh, had already supported my MSc research in Uganda as part of the SOS initiative in 2010. I flew to Uganda in September 2011 and set up house in Soroti town, north of Lake Kyoga, with my wife and two kids – my daughter Violet (who was two-and-a-half months old at the time) and son Teddy (four years). During the six months that I undertook my fieldwork in Soroti, I was constantly rearranging my thesis: Would I simply focus on Uganda and drop the idea of multiple case studies? What other ICONZ case studies could I logically incorporate into a thesis? Would these studies form a cohesive whole that simultaneously spoke to larger issues? How would I relate these disparate case studies?

During this time, I not only conducted the research that forms the core of my Ugandan thesis chapter but I also designed and carried out two other studies, including an analysis of the 2010 Stamp out Sleeping Sickness (SOS) mass cattle treatment, which involved me visiting 54 villages in Soroti and Serere districts (this research is not included in this thesis). However I continued to try and arrange additional case study interventions. Part of the drive to incorporate additional case studies was based on my desire to apply the same conceptual orientation (discussed above) and field approach (which I outline in more detail below) to different interventions. I wanted my thesis to draw on three case studies in order to explore the relationships between policy and practice, local and global and instrumental and critical perspectives from different problems, angles and perspectives.

My initial goal was to involve myself, as closely as possible, with the biomedical scientists involved with ICONZ designing and trialing disease control interventions in order that my research could be used to inform intervention plans. However, I quickly realised the difficulties of working in “multi-disciplinary” teams, the high transaction costs and confusion around what

was to be done and how. Despite my efforts, my research ended up being conducted in somewhat of a vacuum, detached from both the biomedical colleagues on these programmes and the “power brokers” who helped planned and manage them at the national or international levels. In short, I maintained my intellectual distance and independence with the only clear expectation to see “if things work or not” while I gave input into the other ICONZ country studies.

My two other case studies were arrived at through much networking from the often erratic internet connection in Uganda. There was even, at one point, the prospect of me including a study on rabies elimination in Bali, Indonesia – which somewhat ironically I ended up conducting as a consultant once I was back in Edinburgh. Already into 2012, I finalised a study in Zambia with ICONZ members. My family and I jumped into the land cruiser I was using for fieldwork (which belonged to Edinburgh’s Centre of Infectious Diseases) and drove through Kenya to Dar es Salaam where we boarded the TAZARA train (built by the Chinese when Mao was still around) and took a gruelling two-and-a-half day snails ride with two young kids arriving at Kapiri Mposhi two-hundred kilometres north of Lusaka in early March 2012. My Zambian case study on community-led total sanitation (CLTS) in Eastern Province was part of an ICONZ study involving the Veterinary Department at the University of Zambia (UNZA) where they were assessing the impact of CLTS on the prevalence of soil-transmitted helminths and porcine cysticercosis before and after the intervention. CLTS, however, was being implemented not by the UNZA team but through local government with support from UNICEF. Although my study ended up being conducted in the same district as theirs, there were suspicions that I would somehow “interfere” with the “natural course” of CLTS by poking around and asking people too many questions. I considered this obtuse given that the UNZA team was doing repeated human and pig blood sampling in these villages over the course of one year – did that

not also “interfere” with the “natural course” of village life?! Despite this, they finally agreed to my involvement as long as I did my research in areas that they were not directly working in.

During this time in Zambia, I was again in contact with various potential third intervention case study contacts. Nothing was certain. Katie Hampson, a rabies expert from the University of Glasgow, had been involved in a large-scale rabies elimination programme in Tanzania that I ended up incorporating as my third case study. The Tanzanian study was not part of the ICONZ project. Incidentally, the Bill and Melinda Gates Foundation (BMGF) and WHO project did not have a research component, meaning there was no funding to support the type of study I was proposing. Luckily (and graciously) the Edinburgh ICONZ team agreed to use funds for me to do my research, something that was undoubtedly related to the fact that Sokoine University of Agriculture (SUA), our Tanzanian partner, was conducting research in two districts covered by the BMGF/WHO project. This relationship sealed my district selection; the plan was for me to support SUA students designing interventions for brucellosis and bovine tuberculosis while I completed my research on rabies. Fortuitously, of the 28 districts in the BMGF/WHO project only these two districts had had two years of previous canine vaccinations, which made them ideal sites for studying how district team adapt over time (as discussed in the case study).

As this personal narrative of an ever-evolving thesis design shows, my three case studies involved much pushing and shoving – it was never guaranteed and at times I was worried about the cohesion of my thesis. While it reveals the challenges when PhD students rely on larger multi-partner collaborative projects for their field sites and the somewhat erratic nature of case study selection, it also shows how each thesis has a much messier and personal story behind it that is often hidden from view.



However despite the difficulties of securing these three case studies, their selection was also underpinned by specific and deliberate decisions on my part; I had a specific rationale for eventually picking these three interventions based both on their shared similarities and significant differences. There were five major similarities common to these interventions (spanning their nature, purpose and modality) that provide my case study selection with a strong comparative dimension. First, they were all “mass interventions” covering large geographies and socio-economic contexts that were financially supported by international donors and planned by technical experts. These projects represented “scaled-up” NTD interventions, aimed to target hundreds of thousands of cattle (Uganda), tens of thousands of dogs (Tanzania), and many hundreds of villages (Zambia). Second, these were projects with bold targets that aimed for big impact – they aimed to “eliminate rabies”, “stamp out sleeping sickness” and achieve “total sanitation.” Their internal logic to donors was built on the assumption that they would showcase the cost-effectiveness and feasibility of preventing NTDs in rural Africa.

Third, their introduction of health technologies to prevent NTDs relied on behaviour change and local adoption. These were, in turn, driven by specific justifications that framed this technology as “appropriate” for rural African contexts: rabies vaccination was free and has very minimal side-effects on dogs; CLTS was deemed superior to past subsidy-based approaches because it promised to be “community-led” and reliant on “locally appropriate” building materials; and SOS aimed to link profits to public health by creating a new system of veterinary drug delivery that built upon local motivations for animal production. These were all “low-cost” and “low-tech” health technologies, underpinning the justification by project actors that meeting targets could be achieved within short project cycles of a few years. Fourth, these three case study interventions all tasked the delivery of health technologies to district or sub-district actors: local

leaders, extension workers, volunteers and private businessmen. Fifth, specific incentive structures were used to mobilise these local actors and motivate them to deliver these health technologies with the idea that these approaches would be “locally-appropriate” and “sustainable.”

**Table 2: Importance Differences Between Case Studies**

<b>Important Differences</b>	<b>WHO Rabies Elimination</b>	<b>Community-led Total Sanitation (CLTS)</b>	<b>Stamp out Sleeping Sickness (SOS)</b>
1. Disease focus	Rabies	Sanitation-related diseases, including helminths	Zoonotic sleeping sickness (as well as bovine trypanosomiasis and tick-borne diseases)
2. Population targets	Dog-owners	Open defecators	Cattle owners
3. Countries and districts	Tanzania – Kilombero and Ulanga districts, Southern Region	Zambia – Katete district, Eastern Province	Uganda – Dokolo, Kaberamaido, Serere and Soroti districts, in Eastern and Northern Uganda
4. Approaches	Top-down	Community-based and Participatory	Public-Private Partnership (PPP)
5. Technology	Vaccination	Social mobilisation and locally-available pit latrine innovations	Veterinary insecticides and promotion of the restricted application protocol (RAP)
6. Incentives for communities	Rabies prevention	Improved sanitation and community empowerment	Improved animal production, veterinary services and prevention of sleeping sickness
7. Delivery strategy	Government veterinary extension workers	Community volunteers	Private veterinarians and animal health workers
8. Incentives for implementers	Per diems	Community service and small financial/material benefits	Business and profits
9. Governance	WHO country office and district veterinary officers (DVOs), funded by BMGF	District water and sanitation coordinators under local government and supervised by UNICEF	A consortium of public and private partners in Uganda and Europe, initially funded by DFID

However as I discussed in Chapter 1 when I outlined their particularities, these three case studies were also representative of important differences that provides this thesis with its analytical scope. They represented very different types of interventions, health technologies, governance arrangement and incentives structures at the local level, which, for sake of brevity, are outlined in Table 2 and discussed more in the empirical chapters themselves as well as in Chapter 6. In short, they were chosen to form a thesis that maximized variation in the types of preventative programmes common to the NTDs in Africa. Although the thesis was conceived as a study of three different problems and scenarios in order to understand the tensions inherent in global health practice for NTDs, this choice proved fruitful for a comparative analysis of how interventions are negotiated at the local level and the various areas where effectiveness is determined, as we will see in Chapter 6.

## **V. FIELDWORK AS PROCESS**

As already mentioned, my research methodology consisted of a social constructivist approach to interventions. This was focused on unpacking different intervention technologies, tracing the multitude of social, technological and environmental factors that influenced them. This structured the particular ways in which I conceptualised my research and positioned myself in relation to my objects of study. To this end, I used a mixed methods research strategy, which was informed by an “ethnographically-orientated” approach to my field sites, research participants and data. My research covered large geographical distances and involved interviewing a wide range people, ranging from poor farmers to ministers and district politicians, as well as quantifying the coverage and adoption of the health technologies promoted by each of three

interventions in Uganda, Zambia and Tanzania. Fieldwork itself involves many essential practicalities that shape data collection with important consequences: defining “the field”, picking research methods and sampling strategies, making use of research assistants and gaining access and building rapport. As Harrison (2001) reminds us, every stage of the research process involves the negotiation of complex social networks and relationships requiring a tacit sensitivity and reflexivity to circumstance. Fieldwork also involves more analytical dimensions: reflecting on my own positionality, navigating ethical concerns, interpreting data as research progresses, and considering the trustworthiness of data. Whilst the next section explains the specific methods that I used and why, in this section I first reflect more broadly on *how* I went about the research process.

### ***Entering the Field, Defining the Terrain***

The focus of much social science research, especially ethnography, has been defined largely by what researchers call “the field.” While this may have an amorphous geography (e.g. researching a multinational corporation), I defined the field primarily as both a geographical and cognitively bound unit. As I discussed above, decisions about my field sites were largely based around my own position within the ICONZ project where intervention areas were already, for the most part, prearranged. The field, therefore, included any relevant association or link to the particular problem I was investigating within these chosen districts. My own immersion in the field did not involve the classic prerequisites of traditional ethnography: I did not know the local language, reside with my research participants or build rapport over many months. I slept in the nearest major town with my family and visited rural villages using either a rented pick-up truck or a land cruiser during the day, sometimes with a number of research assistants. The field was a place I visited from 8 am to 5 or 6 pm in the evening as I balanced family responsibilities with the large

geographical distances of my field sites. This distance has parallels in the work of many donor staff and field assistants who operated the projects that I was exploring.

In qualitative research, not only does the researcher-as-instrument have subjective biases that shape data collection and analysis, but the ways in which researchers enter “the field”, ask questions, and smile, nod, laugh and dress (to name but a few of the behaviours that shape the research process) all invariably have an influence on how participants frame answers and the types of data that are revealed or, for that matter, hidden and not discussed. There was, of course, a major contradiction that I should first make explicit before we proceed: I was aiming to understand “local realities” and “local contexts” from an inherently “outsider” perspective. Although I explored my field sites through an extensive range of methods – itself a process of personal and iterative engagement – I gathered data over a relatively short period of time: 3 months in Zambia and Tanzania and 8 months in Uganda. Furthermore, I was always the white “*Muzungu*” who did not speak the local language and relied on translators, arrived in my land cruiser or truck over a few consecutive days and gathered people together to talk about “diseases.” I was almost always seen to be some kind of “official” related, in one way or another, to the very project I was studying, which was a justified inference on the part of these communities, and one I found futile to resist.

As an outsider, it was fundamental for me to enrol the support of disparate local actors both as key informants during interviews and as trusted local guides to help me orientate my studies. Given my own stance within the ICONZ project, it was easy for me to rationalize to district authorities my activities at the village-level, for my lengthy interviews with district officials and political leaders and to gain legitimacy and support. I entered my study districts associated, in some way, with a local partner organisation that had strong existing relationships with the key

actors involved in the implementation of these interventions. Introductions to district personnel were made through such references and my activities “made important” by framing my research as a “research evaluation” of the particular programme – a term well understood by government officials in Africa and elsewhere.

Whilst this relationship was fundamental to gaining the “green light” of being introduced to district commissioners and other high-ranking authorities and of conducting interviews with key informants from the district government (discussed below), it was not nearly as important as my own personal relationships with my research assistants. Throughout my research, I had many research assistants. Most helped with quantitative data collection, some assisted with focus group discussions and interview translations and a few even conducted their own interviews, which I used only small fragments of in my own analysis, due to their poor quality (discussed more below). As noted by Molony and Hammett (2007) in their analysis of the politics and social relationships of the researcher-assistant dynamic, I always employed research assistants that were resident within the area I was studying and based my decisions on their linguistic and problem solving skills. I made it clear that I was an “employer” and not a “friend” – I had to fire some assistants due to being persistently late or not entering data correctly.

One point of continuous contention was the mundane detail of who was to provide and pay for lunch. Despite my attempts to factor in the costs of lunch into their salaries, given that we were in remote villages this required my research assistants to plan ahead and bring food, they rarely did. I was always reminded that in Africa employers provide lunch in the field (I only ate an egg or two and groundnuts that I bought before hand) and had to find creative ways to avoid revolt! There were also many other areas of continuous negotiation, which, for the sake of brevity, I will leave out.

I provided my research assistants with some basic training in the form of daylong workshops, continuously inspected their work and engaged in lengthy casual and work-related conversations during the long travel times to individual villages. In Tanzania, I was fortunate enough to enlist the help of two researchers with good English language skills (which is rare in Tanzania) associated with the Ifakara Health Institute (IHI) who were employed on a parallel project with the University of Glasgow on rabies control; in Uganda, I relied heavily on two livestock extension workers in Soroti and Serere and two community development workers in Kaberamaido and Dokolo (due to language and ethnic differences); and in Zambia, I worked predominately with a mix: an agriculture extension officer, a community development worker, and a local volunteer who had worked extensively with World Vision. When they had official duties, I had to rearrange my schedule or rely on a few replacements that I had organised.

All my research assistants had participated in previous projects throughout my study districts beforehand and most had grown-up in the vicinity. Many knew the area like the back of their hands and some had cousins and friends in the villages we visited (which always ensured that a chicken was served for lunch!). My research assistants were instrumental for translating, mobilising research participants, gaining access to some key informants, conducting quantitative data collection and providing me with nuanced locally-relevant information, including on politics, culture and history. This added depth to my data collection and analysis in ways that would have otherwise been hidden from me.

### ***Entering the Village: Gatekeepers and the Ethics of Expectations***

In each of my three case studies, I sought out the appropriate level of formal ethical approval from International Review Boards (Tanzania and Zambia) and national authorities (Uganda).

This included ethical clearance obtained from Sokoine University of Agriculture in Tanzania (Ref: RPGS/R/8VOL XI) and ERES Converge in Zambia associated with the University of Zambia (IRB00005948) as well as the accepted channels of ethics review at the University of Edinburgh. The centrality of ethics to social research, however, goes far beyond these more accepted channels. To me, ethics predominately involves the day-to-day interactions of researchers in their personal encounters with participants. The idea of being more “ethical” during the research process has gained increased emphasis as researchers are encouraged to avoid “extractive” research that does not “give back” to the community (Brydon, 2006). Participatory action-research, for example, emphasises collaborating with participants throughout the whole research process (Mikkelsen, 2005). My own orientation was more traditional. In many ways it followed White (2009:50) who argued that the rhetoric of empowerment within the research process often hides implicit power relationships, creates unrealistic expectations and can even distort data; rather, the goal of my own social inquiry was to generate adequate and accurate information about marginalised groups in order to influence practice and policy.

I entered my field village sites in a relatively prescriptive way. First, there was a need to inform the village leader (or village office in the case of Tanzania) who we were and what we intended to do. To this end, I always had one of my research assistants (or myself) physically go to the village the day before we intended to conduct research. We informed the village leadership about the purpose of our research and asked if they consented to our activities, which was always received with interest. We then had them arrange for a certain number of participants to be present in the village at a certain time. Orientation of this manner was important since many people were busy tending to their agricultural fields, and without any prior arrangements it would have been difficult to carry out the sampling strategies I used (see below). This created an



ethical dilemma: in order for my research to be conducted in a timely manner, I relied on enrolling the support of the local leadership so that they would convince people that it was worthwhile to remain in the village to talk with the “*muzungu*” (white-man) about disease control, specifically the past intervention that I was studying. As is the common expectation in Africa where village leaders are not paid any salary, this demanded a small financial fee for their time in moving around the village informing people.

There were also clear demands that villagers had that required negotiation during the research process in order to avoid raising unrealistic expectations of my research. People were taking time out of their day and reorganising their time in the field to spend some hours in a focus group or answering a household questionnaire. To this effect, whenever I organised a focus group discussion I made sure of two things: i) that a drink and some biscuits were provided; ii) that the scope of my own work and my association with the district and/or aid organisations was made clear; and iii) that we spent adequate time answering people’s questions.

There were often many questions. While many had to do with the specific diseases we were talking about, others had to do with government policies more generally, other diseases and past programmes. In many instances, it was clear that people enjoyed talking about life in their village, what they perceived to be inadequate social services and corrupt district officials and the challenges of behaviour change to control disease – there was a social dimension to the gathering with much laughter and interest. There was clearly a value in having communities come together to discuss cattle diseases (Uganda), rabies (Tanzania) and sanitation (Zambia), have their questions answered, be reminded of the purpose behind past interventions and be able to express their opinions and thoughts about them and related issues.

Access to the villages that became the focus of my study involved visits of between three to seven days each (as discussed below, this was for the villages I visited for more in-depth analysis). This was enough time to identify key informants and carry out some participant observation. I was ever aware of my own outsider status given that it is well established in qualitative research that perceptions of the researcher have a large influence on how research is conducted. Certain types of knowledge, especially that of custom, tradition and esoteric cosmology, are hidden from outsiders (Lance, 1990). Additionally, to the unaware outsider local elites can appropriate research and provide a limited view of community realities with the hopes of gaining political or financial capital (Chilisa, 2005).

There were a number of instances where my outsider status certainly led to distortions in data. This was largely around the idea that, as a *Muzungu*, denying possession of an object (cattle, spray bottles, etc...) or ability to do something (the inability to dig a pit latrine) would benefit the community since I would then supply resources to address this. The expectation that white people gave “free-things” in rural Africa was one stereotype that was difficult to dispense with, and I spent much time before and during research clarifying this point. I often made it clear, in ways that resonated with many, that I did not have any resources myself and that I was there simply to evaluate the intervention as well as provide some encouragement to control such-and-such disease. Being honest, so I discussed, was the only way future programmes would be improved. To this end, I often told the story of how, in Uganda during a male FGD, I asked who in the group had cattle. No one raised their hands; however when I got around to talking about cattle diseases everyone was talking about their own experiences. At this point, I began laughing and asked them how they knew so much without having any cattle! People appreciated this story

and it helped break the ice, making it clear that I was not there to provide free “hand-out” but to learn from people about their experiences, opinions and practices.

Another way I tried to circumvent the outsider dilemma was by cultivating friendships with certain individuals in the village. Village leaders often delegated the task of organising villagers and of being our unofficial “chaperone” to a younger, often more educated, member of the village leadership. I spent much time walking around the village with these people, eating lunch in their homes and meeting their friends. We joked and they often asked me questions about “where you come from”, which revealed interesting stereotypes of Westerners acquired from Hollywood films. They laughed at my stories and these more casual interactions proved to be some of the most insightful. These guides became important key informants and were, during our many unstructured conversations, often very forthcoming with the nuances of the village, helping to explain trends that I saw in my data and even being quite critical of the village leadership itself.

My time in these villages, being a guest in people’s homes, asking question-after-question, scribbling in my notebook and collecting large amounts of data invariably drew my attention to the huge socio-economic gap between myself as-researcher and they as-participants. On a personal level, I was poignantly aware of the fact that I was collecting data for *my* PhD that, in an odd twist of logic, would end up benefiting myself more than the people I was speaking to. As Geissler (2005:178) noted, the very act of research itself reveals a “hierarchy of power, wealth, education and mobility” that spans from rural villages to my own university department, my publications and my academic credentials. After all, I was only indirectly tied to the planners who were organising these projects and my work would not directly guide any future intervention designs – I hoped it would but there was no certainty. Was I simply, to use

Chambers' words, a rural development tourist? On a more poignant level, Sardar (1999) argues that development research yields many hidden, unseen powers over local people that repeat the relationship of colonised and coloniser. Was I simply a neo-colonial development tourist?

These power dynamics were not easy for me to process psychologically. When I entered these villages, my interviews deal with some very personal matters that I, as a doctoral researcher, had no power or control to influence or direct. I was given insights into the daily lives of farmers struggling to grow enough food, having their only bulls for ploughing die unexpectedly from disease, avoid being physically assaulted by their husbands and trying to put shoes on the feet of their kids in order to get them into over-crowded state schools. I interviewed mothers next to their obviously malnourished children. I had elderly people ask me for \$0.50 to buy their grandchildren some malaria treatments since the local health centre had run out of anti-malarials. I spoke to the families of sleeping sickness and HIV/AIDS patients who had died because they could not afford the costs of transport to the treatment centre. In Zambia, a few of my study villages had had very poor harvests and many people were facing a year of insufficient maize, and hence hunger. People asked me if I could help them feed their children. In Uganda, whenever I asked questions about the LRA insurgency in the early 2000 people retold, with detailed names and circumstances, stories of brutal murders, rapes and even cannibalism – suffering was a part of daily life for these people in ways that were not completely accessible for me; however, I tried my best to understand how this context of impoverishment shaped understandings of the particular interventions I was studying. I also tried, whenever possible and appropriate, to contribute in small ways to some people's needs; for example, taking sick villagers to the local clinics on my way home and providing some small gifts here and there to very needy families. I also consistently spent time *with* people. I listened to people's stories and,

when appropriate, offered advice. I also allowed for space for questions about myself, my own life, why I was there and the actual potential benefits from my research. As much as I was a researcher, I also tried to simply be a human being and relate to people on a personal and frank level. In conclusion, the issue of ethics and gatekeepers were issues of continuous negotiation as the social drama of being an outsider trying to understand “local people” and their knowledge(s), attitudes, perceptions, behaviours and logics took different forms.

## **VI. THE MECHANICS OF MIXED-METHOD FIELDWORK**

These local encounters were very much mediated by the particularities of the research methods that I used. Deciding on methods can be difficult; however the full range of possibilities is always limited by the nature of the research: certain research questions are best answered by using certain methods. MacGaffey and Ganga (2000) make this point in studying informal (and often illegal) transnational trade systems between France and West Africa, noting that quantitative methods, while potentially useful, are inappropriate and impossible due to the sensitivity of the issues involved. Although choosing methods beforehand is pragmatic, fieldwork is a learning process where approaches should allow for some adaptation in the field. This thesis, as a collection of three diverse empirical studies, used a case study approach where fieldwork followed what is typically called a qualitative dominant concurrent design (Padgett, 2012). Here, both qualitative and quantitative research was being conducted in parallel but with a stronger focus on the qualitative data collection, which is used to interpret and explain the quantitative data.

The assumption that it is incompatible to integrate qualitative and quantitative methods within one study is reductionist (White, 2002). This is increasingly recognised by public health researchers, having emerged from the increased interest in qualitative research since the 1980s, especially due to the HIV/AIDS epidemic, and has been termed “the third methodological movement” in social research more generally (Tashakkori and Teddlie, 2010). My overarching concerns were directly related to the common preoccupations of qualitative research – seeing through the eyes of participants, an emphasis on context and process, flexibility of structure and grounding theory in data (Bryman, 2001). While mixed-methods studies are often framed as “offering the best of both worlds”, as being inherently pragmatic and able to meet the demands of the evidence-based practice movement (Clark, 2010; Johnson and Onwuegbuzie, 2004), some authors have expressed notes of caution. Such scholars argue that mixed methods approaches all-too-often become subservient to positivist tendencies, which tend to marginalise the strengths of qualitative approaches – what Giddings (2006) has called “positivism in drag.”

While there are various reasons why researchers desire to mix methods (including triangulation, complementarity and expansion), most have to do with adding rigour and credibility, which neutralize biases that are potentially inherent in one particular source of data (Johnstone, 2004). Such pluralism of method supports interdisciplinary research and depth of understanding (Oslen, 2004). In this thesis, I used a range of methods and sampling techniques. These are outlined in Table 3 with greater detail provided in Appendix 1. Although there are few guidelines for how to structure non-probability sampling (Guest, Bunce and Johnson, 2006), in each case study I combined a pre-defined number of villages with a need for flexibility to account for theoretical saturation. In this section, I discuss the particularities of the methods that I used and how I applied them in the field.

**Table 3: Thesis Methods by Case Study**

<b>Research method</b>	<b>Uganda</b>	<b>Tanzania</b>	<b>Zambia</b>
Survey	Acaricide use in 56 villages (n=495 HHs)	Vaccination coverage in 6 villages (n=6,157 HHs)	Latrine coverage in 8 villages (n=922 HHs)
Households questionnaire	N=94 HHs in 6 villages	N=113 HHs in 6 villages	N=219 HHS (done both pre- and post-intervention) in 8 villages
Service provider questionnaire	Veterinary shops (n=74) with follow-up validation by phone		
Focus group discussions on disease control	40 villages (both men and women groups)	16 villages (both men and women groups) and 6 additional FGDs with pastoralists	8 villages (both men and women groups and 5 children groups) and then 19 FGD post-intervention in 8 selected villages
Focus groups on livelihoods and social organisation	12 FGDs in 6 villages	6 FGDs in 6 villages	12 FGDs in 8 villages
Participant observation	At veterinary shops and in villages		In villages regarding environmental health
Transect walks and unstructured interviews	In 6 selected villages	In 6 selected villages	In 8 selected villages
Semi-structured interviews with service providers	26 community-based animal health workers and 8 health clinic staff	11 livestock field officers	6 environmental health technicians, 5 local counsellors, 6 CLTS volunteers, 4 traditional leaders, 6 health centre staff
Semi-structured interviews with government	6 DVOs, 3 vector control officers, 7 DHOs (District health officers), 8 politicians	3 DHOs, 2 DVOs, 3 MoA and 5 rabies researchers	11 provincial officials, 3 DHOs, 2 DVOs, 8 local politicians and 7 NGOs.
Other activities	National stakeholder meeting for Tsetse/Trypanosomiasis Control in Lira, 2011		Attendance at half-day CLTS training workshop

### ***Focus Group Discussions***

I began all of my case studies by first conducting interviews with district officials as well as focus group discussions (FGDs) in selected villages with both men and women groups. My first job was to choose particular villages to base my study. Looking over maps of the particular districts, I first realised the intrinsic variation found in any linearly defined geographical unit. Following Miles and Huberman (1994) who recommend that sampling in qualitative research be

based on conceptual and theoretical reasons, I aimed to maximise variations common to the particular districts in my three case studies: differences in environment, infrastructure, ethnicity, disease prevalence, population density and livelihoods. This purposive sampling strategy required, as Uprichard (2013) reminds us, knowledge of the population and the cases within it. Hence interviews with district officials and lengthy discussions with my research assistants were essential in establishing the criteria for my village selections. While community is often defined based on dualisms (rural vs. urban) and commonality between members (as a spatial or social unit with shared priorities and goals), my own research was informed by critical theorists who move away from branding single identities onto a community – they are rather concerned with the divergence of opinions and how local identities are shaped by gender, class, ethnicity, education, wealth and social status (Dakubo, 2010).

Unlike guidelines by Krueger (1988) who considers the need to bring together people who do *not* know each other, most of my FGDs were more akin to what Beckerleg *et al.* (1997) have called “natural groups” since participants often knew each other and group composition was not entirely within my control. As noted by Khan and Manderson (1992), FGDs are designed to gather information about beliefs, values, practices and understanding of a population. They are “somewhere between a meeting and a conversation” and elicit specific types of social interactions, and hence data (Agar and MacDonald, 1995). Many researchers have expressed concerns in only using focus groups for these specific reasons, emphasising the need to triangulate FGDs with other sources of data, such as interviews and ethnography (Kidd and Parshall, 2000).



In total, I conducted 157 FGDs (of between 6 to 15 people) in 68 villages during the course of my research (Table 3 and Appendix 1). Approximately half of these were done by my research assistants due to the fact that, arriving in a village, we would almost always have arranged for a male and female group and it was difficult to conduct one and then the other. People were busy and we found that, as I attempted to do in all case studies, not conducting these two FGDs in parallel ensured that the second group was dispersed and often left or simply joined the first group informally. This was a practicality of the fieldwork strategy I had adopted. Having trained my research assistants, I would conduct one group and have two assistants conduct the other group discussion. I would rotate my translator in order to ensure that each assistant had time to understand the importance of the moderator and how their social relations with the group shaped outcomes. After the discussion, we would sit together and discuss the emerging data, the parallels between my own FGD and theirs and how this information would shape further data collection. In the actual analysis of my case studies, I draw only informally on the FGDs conducted by my research assistants. The value of their work was found largely in iteratively informing my own data collection in the field.

It was important that FGDs were conducted in the most natural way possible to create rapport with participants, especially as I followed my initial FGDs with interviews and additional FGDs used to clarify emerging themes. For this reason, audiotapes were avoided (they were found to create unnatural social atmospheres) and note taking was done. I generally adapted the format of the group depending on who was around. Some groups took the spontaneous form of a large village gathering of 50 people (which were often some of the most insightful and animated groups!), others became shouting matches between different groups in the village, some were

dominated by one or two respected elders or leaders, others were vibrant convergences of opinions and honest self-criticisms and others trailed off into a point-by-point question-and-answer “group interview”, especially when lunch time was approaching. My aim was never to abide by the purity of method handbooks but to seek honest and natural human interaction with people, seeking out their opinions and perspectives on a given issue. Although there were many tangents, I always ensured that the major focus of the FGD was approached from two or even three angles. Smiles, laughter and stories were always encouraged and essential to creating a natural dialogue.

My first set of FGDs was always on the particularities of the disease control programme I was studying: diseases perceptions/experiences, understandings/experiences of the intervention, reasons for (non-) adoption/compliance and existing community practices around prevention. After re-visiting select villages for more in-depth analysis, I then undertook a series of FGDs on more broader topics that, directly or indirectly, related to these interventions but within the wider context of local livelihoods: questions of social organisation, past development/state projects in the village, demographics, history and change over time and farming systems. The composition of these groups always had some people who had attended the previous FGDs and I always managed to sneak in some questions for clarification from the intervention-specific FGDs. This built rapport with people and I found that many more nuanced aspects of *why* and *how* people responded to the intervention as they did were revealed here. I always conducted these FGDs myself with a translator: in Uganda they included both men and women groups in 6 villages, in Tanzania they included one FGDs each in 6 villages with remote pastoralists/farming sub-villages and in Zambia they included 12 FGDs in 8 villages with mixed-gender groups (Appendix 1). As an inherently flexible method (Barbour, 2010), the variety of settings and

group compositions encountered provided me with ample room to hone my moderator skills and with more nuanced ability to conduct FGDs, better and sharper data emerged.

### ***Interviews: Planners, Implementers and Recipients***

Interviews demand the tacit ability to guide the “rhythm of directivity” of the interview and to allow the flow of a conversation without actually being a conversation (Padgett, 2012). All interviews, whether with elites or peasant farmers, have a performative nature. Structural factors that shape the social dynamics of the interview process need to be cognitively navigated (Manderson *et al.*, 2006). Like conversations, such socially-embedded processes are context and people-specific and their implicit dynamics are tacitly learned through experience. In this way, interviews aim to “gain access to the knowledge, experience and perspectives of research subjects, rather than organizing...[them] into preset categories” (Kelly, 2010). Following this, in my interviews I sought to position myself in an empathetic relationship with those I interviewed, allowing them to, as much as possible, “define the terms of the exchange, of what is spoken about, in what ways, and to what extent” (Manderson *et al.*, 2006). Although my sampling strategies for interviews depended on the purpose and actor perspectives I wished to understand, most were either snowball sampling (being introduced to someone from a previous interview) or purposive (aiming to highlight some variation in characteristics).

If I had depended solely on FGDs for my qualitative data, much nuance would have been missed at the village-level. Rather, I relied on in-depth and casual interviews with a range of village households to gain more in-depth knowledge of why people did (or did not) adopt a given health technology. I aimed to interview a range of households in each village selected for further study,

where I focused predominately on 6 villages in Uganda, 6 in Tanzania and 8 in Zambia, although FGDs were conducted in many more villages (see Appendix 1). This typically involved selecting a poor, middle and wealthier household and visiting them for interviews. I also conducted many casual interviews as I went about inspecting latrines, visiting farmer fields and walking around cattle crawls – these more casual conversations, as already mentioned, were important as they were often away from the ears of the elders in the village.

More formal semi-structured interviews were also done with those I call the “planners” – national policymakers, district/regional authorities, NGO workers and academics. These interviews required copious planning and reflexive engagement given that many of these actors, especially national, regional and district officials were often busy and were sometimes suspicious of what I was doing. Elite and expert interviews always require a tacit sensitivity and probing of detail (Richards, 1996). Many of the higher-ranking interviews I did were done in government offices – for example, the commissioner of livestock in Uganda and the head of the water and sanitation unit of Eastern Province in Zambia. Similarly, I conducted many key informant interviews in district offices, often two or even three with the same individuals, which allowed me to clarify or even challenge previous information given the emerging data from my study villages. In total, I conducted 21 such key informant interviews in Uganda, 13 in Tanzania and 31 in Zambia (see Table 3 and Appendix 1) – a number that excludes repeat interviews with the same individual. These interviews involved questions of policy and the drivers and outcomes of the particular problems and programmes I was investigating.

Aside from interviews with informants from formal organisations (government or NGOs), I also conducted semi-structured interviews with those I call the “implementers” – that is the main

actors who interfaced between district authorities and villagers. These included: 26 interviews with community-based animal health workers (arranged through discussions with veterinary drugs shops, discussed below) and 8 medical clinic staff in Uganda; 11 livestock field officers in Tanzania; and environmental health technicians (6), local counsellors (5), CLTS champions (6), traditional leaders (4) and health centre staff (6) in Zambia (See Appendix 1 for more details). These interviews involved learning about the particular service delivery practices of these actors as well as their opinions and perceptions of the project. Many such interviews involved a candid criticism of government and programme policy and practices that was invaluable. In short, these interviews, often conducted after FGDs and interviews with both villagers and planners, played a major role in clarifying disparate opinions between those who drove policy and those who experienced it.

### ***Surveys and questionnaires***

In many ways, I could have restricted my analysis purely to qualitative methods with many of the overall key findings of my case studies intact. However as I have argued previously, there is a need for including quantitative estimates in programme assessments to reframe qualitative findings for biomedical audiences, policymakers and practitioners. Numbers speak volumes and provide useful devices for presenting nuanced qualitative data. With estimates of district-wide coverage data, it is much easier to confidently present qualitative data as representative of larger trends.

While I entered the field with a clear aim to generate some quantitative data, the exact form of my surveys and questionnaires were informed by my qualitative data. In Tanzania, for example, I had originally hoped for more robust data from the district offices regarding the number of dogs

and the coverage achieved by the vaccination campaigns; however, given the questionable nature of the available data and the disparate opinions of villagers and district officials, I needed to generate my own estimates of vaccination coverage; this pointed to larger questions about how these programmes were being evaluated in the first place, which I discuss more in Chapter 6. Similarly in Uganda, while qualitative data showed that many people were not using insecticides (or else using non-tsetse effective products), there was a need to estimate actual sales and use patterns in order to better understand market dynamic trends. In Zambia, providing qualitative data on why people did not construct pit latrines without actually counting the number of latrines both pre- and post- intervention would not tell the whole story. In these ways, numbers formed an integral part of my assessments.

I conducted both surveys and household questionnaires. While I designed and managed these data collection tools and did some data collection myself, much of this work was done by my research assistants in parallel to me conducting FGDs, interviews and observations in these same villages. There was often a need to ensure quality of this data and to avoid response biases. This is best shown in my veterinary drug shop questions in Uganda.

To estimate the amount and type of insecticide products sold in four districts as well as to understand retailer practices, all veterinary shops across my four study districts were identified and visited (n = 74) in November 2011. While I visited about 20 of these shops myself following a much less prescriptive question guide, my research assistants conducted the remaining. This included a detailed questionnaire with both open-ended and closed-ended questions conducted with either the owner or attendant. Lasting between one to two hours, the questionnaire was divided into five sections: shop characteristics, sales information, customers and decision-making, knowledge of disease and shop linkages. While interviewees were asked to provide

sales data on acaricides (veterinary insecticide products sprayed onto cattle to prevent tick-borne diseases and sleeping sickness), in most cases records were unavailable and estimates for both the rainy and dry seasons had to be provided. This involved estimating the average amount and type of acaricide sold each month from December 2010 to March 2011 (dry season) as well as the months of September and November 2011 (two of nine months during the year with over 90 mm of rain).

To verify the accuracy of the drug sale estimates a second short questionnaire was conducted with all shops either by telephone or in person between December 2011 and January 2012 (two of three months in 2011 with the lowest rainfall), which allowed for more accurate estimates for dry season sales. In the event of discrepancies between these estimates, an average from the two was then taken. Conducting questionnaires during business hours allowed for participant observation involving the interaction and level of information exchange between shop owners, attendants and livestock keepers. Unstructured and semi-structured interviews were also undertaken with these various groups in and outside of the veterinary shops.

At this point, I realised that it would be useful to triangulate this sales data with how livestock-keepers reported to use insecticide, which would then provide me with an actual district-level estimate of monthly coverage. So I conducted a livestock-keeper survey on acaricide use to estimate the number of cattle sprayed each month, during the rainy season (October to November) in 56 villages across the four districts, purposely selected for geographical variation (I visited these 56 villages as part of an additional study, not discussed here, on the social dynamics of the last SOS mass cattle treatments). Participants were asked when they last sprayed their cattle with acaricide, the interval period between the most recent treatment and the treatment prior to that, the type of drug used and the reason for treatment. Dry season treatment

interval estimates were considered unreliable and were excluded. In total, this included 495 livestock-keepers.

The level of detail for the other case studies regarding the rationale and mechanics of surveys and questionnaires were similar. In Zambia, I myself physically entered and examined all pit latrines in 8 villages of Katete district (selected based on my discussion above of maximising local variations), both before and after CLTS – a total of 285 pit latrines in the post-CLTS survey. I assessed the physical structure of the latrine as well as the level of smell and flies, sometimes taking a photo of the inside of the pit, since with my flash I could detect if it was actually used or not. People thought it was amusing that a *muzungu* was taking photos of their shit! Again, this survey allowed me to ask casual questions to the owner of the latrine if he or she was present (which was frequent) as well as to my guides about particular building materials. Whilst I was doing the “latrine inspection” and qualitative data collection, in Zambia my research assistants were conducting detailed household questionnaires with roughly 10% of households in each village, which touched on disease knowledge, sanitation/water/hygiene practices and responses to CLTS. They revisited the same households (n=219) both pre- and post- CLTS.

This same data collection strategy was used in Tanzania. Here research involved conducting FGDs in 16 villages and then selecting six of these villages for more in-depth study. Careful attention was given to maximising common variations that emerged from the focus group data, including differences in coverage, rabies cases, livelihood patterns, social characteristics, geography and dog density and management. Due to continued divergences between district and local estimates of vaccination coverage and the lack of robust data, a population-based survey was then conducted in these villages where enumerators visited every household to gather data



on the human and dog population as well as vaccination status of dogs and reasons for non-compliance. A total of 6,157 households were found and spot checks of 20 households per village were conducted to verify the accuracy of this data.

This was conducted in parallel to a detailed household questionnaire (HHQ) with both open and closed ended questions done with approximately 20 dog owners in each of these six villages (n = 113). Most rural villages were large and dispersed, upwards of 10–20 km in diameter and composed of four to eight sub-villages; hence questionnaire administration was divided equally between the different sub-villages (ranging from four to eight) of each village. An effort was made to seek out households in the most remote and dispersed settlement areas. This questionnaire explored livelihood characteristics, dog management, disease knowledge and attitudes towards vaccination. Since residents from remote sub-villages were often few in the initial focus groups, clarification of their experiences was necessary and one focus group was then done with community members (half were male, and half were mixed gender groups) in the most remote areas of each of the six villages on similar topics to those described above. This shows the iterative nature of my fieldwork strategy.

### ***Participant Observations and Field Reflections***

As can be appreciated by the above discussion, I spent a lot of time in rural villages and along dusty, difficult remote roads. The fact that I had the help of research assistants to collect much of my survey and questionnaire data allowed me to spend more casual time in these villages where I conducted participant observations, where the mundane itself becomes a source of analysis and orientation (Allen, 2010). In the main selected study villages in Uganda (6), Zambia (8) and Tanzania (6), I drew maps of the village with local leaders, did transect walks (based on PRA

techniques), visited individual farmer fields and visited other areas of interest (schools, churches, mosques, etc...). I was often invited for lunch and drank tea with a range of different types of households. Observing social interactions and spending time with people allowed for some intimate and insightful moments. Observation became invaluable not only as a source of data – observing pit latrines, seeing cattle sprayed and managed, watching people bring their dogs to their fields and seeing children defecating in the open (which I witnessed on a number of occasions in Zambia) – but also as a strategy for critical reflection and interpretation. It allowed me to ask people if what others were telling me was, in fact, correct and to point directly at some object or action and ask questions about it. Hence my participation in the physicality of these villages over time allowed for important observations about daily life that enriched how I went about my interviews, the sorts of questions I asked and how I integrated things. This was most visibly part of my analysis of pit latrines and sanitation in Zambia.

Keeping with more standard ethnography, I also kept a field notebook that served as my original mode of reflection, allowing me to flesh-out my thoughts on many of my emerging themes. Driving to the village (which sometimes took up to 2 hours, depending where we were going, from my more comfortable flat in the nearest major town), I consistently engaged with my data and re-orientated the question guides to fit with my emerging data. This was often done, not at home after dinner, but as I drove to and from the field each day. It was done consistently and formed the basis for much discussion with my research assistants within the vehicle, as well as in my notebook. It was in the vehicle that most of my major conclusions were drawn, scribbled into my notebook in sometimes nearly illegible script. Luckily, I do not get carsick.

It is important here to mention that, like many researchers using mixed methods, to a certain degree I mixed epistemological assumptions between my quantitative (positivistic) and

qualitative (constructivist) data collection. In my surveys and questionnaires, I was more concerned with fitting data into prearranged categories, despite the inherent messiness of actual social experiences and interactions. The aim was to overcome ambiguities as a methodological problem. In contrast, my qualitative research aimed to access local concepts, understandings and practices in relation to a given issue by exploring how people thought about, experienced and behaved in their daily lives. In both accounts, language was essential. However I was removed from many of my respondents' accounts since I do not speak Kiswahili (Tanzania), Chewa (Zambia) or Lango, Kumam and Ateso (Uganda). At this level, I relied on my research assistants while also using two important triangulation strategies: i) asking important questions more than once at different times in an interview/focus group using different words and emphasis; and ii) going over important terms and opinions with assistants that were repeatedly expressed in order to understand their nuances. In order to test whether I was missing some important nuances, in Zambia I had ten of my FGDs audio-recorded and then translated and transcribed. However they added very little to my analysis. This was simply due to the fact that, in all my three case studies, I ensured that I approached the social dynamics of my study objects (the three interventions) from as many angles as possible, repeating questions to a variety of local actors to ensure theoretical saturation.

## **VII. INTERPRETING; OR TRANSFORMING DATA INTO TEXT**

Fieldwork, especially when involved in using multiple data collection methods and the assistance of research assistants, involves masses of raw data that need to be transformed into an interpretation – in my case, an analysis of how the interventions I was studying were translated from the global to the local and the various ways that the promoted health technologies were

adopted or resisted, and why. However from an ethnographic perspective, engaging with data and forming interpretations is something that, cognitively, is part and parcel of the field research process itself and not a mechanical task beginning once the researcher is back at home. Qualitative data analysis is not merely a technical task; rather it involves creativity and subjectivity in interpretation that is both one of its strengths and yet paradoxically one of the major accusations against it from the biomedical establishment. As I already mentioned, much of my own engagement with my data occurred while I was going to and from my field sites, which was scribbled into my notebooks and formed annotated questions and sequences of questions for that particular day's interviews or focus groups. In this way, I was following the clarion call of ethnography: to be adaptive, iterative, reflexive and self-critical.

My own process of thinking abstractly and staying close to my data continued more formally once I returned to Edinburgh from Eastern Africa. While cognisant of more structured and intensive data analysis techniques such as grounded theory (Charmaz, 2014), I followed a less prescriptive approach based on reading, coding and displaying my data to form dominant interpretations and to eventually reduce my data into text. I read through the many pages of FGDs, interviews, observations, field notes and emerging hypothesis collected in the field, transcribed them into Word documents and then, once printed, began to code them in the margins, creating “conceptual bins that form pools of meaning...like a map to navigate around [my] data” (Ulin *et al.*, 2005). For my survey and questionnaire data, I spent days entering data sheets into Excel sheets – I am still suffering from severe tendonitis of my two wrists one year after having entered the data from the Tanzanian rabies population-based survey of 6,157 households!

I did all my analysis manually and by hand, often relying on visual drawings of the categories I was forming. These codes then formed the basis for my broader conceptualisations. I developed a list of codes for each study and kept a separate notebook for my own memo-writing – the documentation of my thoughts and ideas about what was emerging from my data. Unlike other researchers who have found contradictions between methods (Padgett, 2012), I had very little difficulty integrating my quantitative and qualitative data sets as no major contradictions or tensions were found. Rather, their synergies helped strengthen my own interpretation. At this point in my analysis, I would often question the categories I was developing (or had developed when I was in the field) as I began forming my main themes and sub-themes. Boyatzis (1998) separates analysis as latent (surface descriptions) and manifest (an interpretation of the underlying meanings that go beyond pure description). In my own analysis, I remained at the descriptive level for quite some time; in fact, the first empirical chapter drafts of all three case studies were all over 20,000 words – they were essentially lengthy and fragmented descriptions of the viewpoints of planners, implementers and recipients separated into discrete sections, all overseen by a separate section for my survey data. Overwhelmed by the amount of data I had collected, these first drafts were not unlike consultancy reports.

The process of emersion into my data was overwhelming, partially because I simply had too much of it. I realised that I had attempted to associate my analysis of the particular projects I was investigating into every facet of life in these rural districts that I could and that, to form an interpretation that was compelling and theoretical, I would need to leave much by the roadside. What was the most important? I began to cut out fascinating and very cleverly worded quotes. I tried to orientate my analysis only towards the aim of each case study: the socio-technical

associations that mediated effectiveness. I attempted to build up my analysis through immersion in my multiple sources of data.

After my first chapter drafts, I realised that I had been overwhelmed with description and had provided very little interpretation. At this point, I re-read many of my own field notes and spent two weeks re-reading some of the earlier anthropological literature that I had cited in my first year PhD report. I went back to the drawing board and thought about how each case study spoke to larger theoretical trends in global health. I then situated each case study within a broader context that spoke to larger social processes in global health and attempted to refine my results given that, in the end, my months and months of field research would be reduced to a few thousand words on paper – the end product of research is always text!

Although Morse (2007) argues that qualitative researchers “don’t count” because they cannot make inferences from the sample to the population due to a “sampling problem” (given that qualitative sampling is for *meaning* not generalizability), my efforts were always to represent the varied experiences of people in relation to the intervention. It was here, in many ways, that the problem of generalizability was encountered; I needed to reduce thousands of hours of interviews from people with divergent opinions acquired by translation on topics as mundane as defecation, cattle management, gender roles, community leadership, disease perceptions, etcetera...into a cogent narrative about the multiple factors and processes that influenced the effectiveness of a large-scale intervention. This required creative interpretations.

My use of theory has been more to implicitly orientate than to frame; in agreement with Giacomini (2010:128) the importance of theory to my fieldwork was “as the assumptions that

underpin expectations, methods and analyses” rather than an explicit subscription to one school of thought or another. As discussed above when I outlined my theoretical approach, my own orientation was a bricolage of different social constructivist perspectives. Most directly, I borrowed from development sociology, medical anthropology and science and technology studies. As Clarke (2005:28) remarks, “most social science research has relentlessly sought commonalities of various kinds in social life while evading and avoiding representations of the complications, messiness, and denseness of actual situations and differences.” While I tried to capture this messiness in my analysis, I was also cognisant that I had not conducted a formal ethnographic study concerned with “the fine grained daily interactions which constitute the lifeblood of the data produced” (Falzon, 2009). Rather my analysis attempted to gain ethnographic understandings rapidly and at a distance of language, time and positionality. For this reason, I have called my study an “ethnographically-informed” approach – using the general ethos of ethnography to understand how contemporary NTD control programmes intersect with local realities.

In the end, the analysis of my data and its extension into larger theoretical discussions about the nature of global health were strongly built up through the iterative, personal engagement I had with my data over a two year period in Edinburgh, punctuated by small research consultancies in Laos, Indonesia and Morocco and a couple of months in retreat from the Scottish winter rains in Spain. As an exercise in creative analysis and presentation, it required balancing description with interpretation, using rhetorical devices, metaphors and shaping the flow of my empirical chapters (Padgett, 2012). Important here were the continued validation of my subjective interpretations through my reading of current social science literature, particularly anthropological literature on

global health and development sociology (much of it cited in this thesis). Discussions with other scholars at conferences in South Africa, Thailand, China and the UK and helpful comments from my supervisors were also essential to me during this period. Hence, transforming data into text involved an evolutionary process whereby the underpinning meaning of my data had to be moulded over time, reworked and looked at afresh.

To return to the above discussion about the need for a pragmatic but critical social science of global health, did my fieldwork and analysis address key criticisms typical of biomedicine? The increase in “evidence based” policy in global health demands “credible, acceptable and actionable evidence for change in the public interest” (Leibow *et al.*, 2013); can my interpretations stand-up to such scrutiny? The overall aim of my thesis was to trace the multitude of relationships that mediated the effectiveness of large-scale preventative NTD interventions in Eastern Africa. Through three case studies, I explored the complex relationships between policy, practice and local realities by orientating my analysis around the particularities of intervention technologies. Although criteria for assessing the quality of mixed-methods studies is rather difficult to nail down (Mella, 2010), I hope to show in this thesis that my interpretations are robust, that they reveal the shortcomings of contemporary NTDs interventions in clear and accessible ways, and that they point to important embedded challenges to controlling NTDs in Africa that need to be more explicitly engaged.

Biomedical enthusiasts may be quick to claim, as is common with anthropological research, that my findings are subjective, impressionistic, difficult to replicate and not generalizable. I would disagree and point to my engagement in the field, application of reflexivity and, more



specifically, my sampling techniques and use of methods. Such criticisms against social science research, often directed at anthropology being “subjective” and “biased”, misses the point.

All human agency and perspective – even the most eloquent and trustworthy – is inherently subjective. While there are rough guidelines for how to assess quality in qualitative data (producing credible, dependable, confirmable and transferable interpretations) with their own quantitative counterparts, the major focus of such criteria should be, as Silverman (2006:237) succinctly summarised as a uniform standard for both the natural and social sciences: “Have the researchers demonstrated successfully why we should believe them? And does the research problem tackled have theoretical and/or practical significance?” In the next three chapters, this will be my emphasis. As Flyvbjerg (2001:166) also noted, effectively communicating one’s research results through compelling narratives and stories that animate the subject matter and speak to larger human concerns is essential in moving social science from a sterile academic activity into an activity done “in the public for the public.”

## **CONCLUSION**

This chapter has discussed the mechanics of my fieldwork in relation to wider debates about the role of the social sciences in implementation research for NTDs in Africa. Given the relative lack of social science research into the complexities of NTD interventions and the multiple tensions and dichotomies that define global public health practice as outlined in the previous chapter, it shows that social scientists need to think carefully about methodology, methods and the research process in applied research. To this end, the chapter discussed the rationale behind my three case

study approach, outlining the important similarities and divergences between my case studies that provide my thesis, as a collection of three interventions, with its analytical terrain.

Cognisant of the value placed on quantitative data by biomedical and development actors and yet the need for in-depth qualitative research, the chapter discussed why a mixed methods approach that was “ethnographically-orientated” was most appropriate. To move beyond quick-and-dirty rapid assessments, I argued that there is a need to locate applied social science studies within a more conceptually robust framework. Hence the chapter outlined the particular methodological approach that I took in my fieldwork – focused on tracing the multiple social, technical and environmental associations that mediated the use of intervention technologies. This was informed by social constructivist perspectives in anthropology, development sociology and science and technology studies.

Finally, the chapter reflected on the fieldwork process, including issues of access, ethics and research assistants. It highlighted the specificities of the methods that I used, how I went about collecting data in the field and the challenges of interpretation and writing research-as-text. To this end, the chapter highlighted the strength of a critical social science approach in unpacking the various factors that mediate intervention effectiveness. Now let us turn from the mechanics of fieldwork to the three case studies that form the core of this thesis.

## CHAPTER 3

# Eliminating Rabies in Tanzania? Local Understandings and Responses to Mass Dog Vaccination in Kilombero and Ulanga Districts

“Rabies is very frightful. It is a dreadful disease. I fear it...at that time [in 2007] the dog just jumped at [my sister] and tore off her arm. First the right one and then the left one. There was blood everywhere. I was screaming “someone help, someone help!” But then the dog looked up. It was like he was daemon possessed. His eyes were like evil spirits. He started running towards me and I thought I was going to die...but in the end I was saved but others, like my sister, were not so fortunate that day.”

*The sister of a rabies victim in the Kilombero Valley, Tanzania*

### I. INTRODUCTION

Rabies has been known since antiquity as one of the most feared human diseases (Brown, 2011; Pemberton and Worboys, 2007). Today, it remains a significant albeit neglected disease, causing some 55,000 deaths each year, predominately among children and the rural poor in Asia and Africa (Knobel *et al.*, 2005). Transmitted by saliva from the bite of an infected animal, the rabies virus invades the central nervous system and, in the absence of post-exposure prophylaxis (PEP), is fatal once clinical signs appear. Symptoms can be nonspecific but often include hydrophobia, hypersalivation, respiratory difficulties, biting and aggression. Although all mammals can be infected, the vast majority of human rabies cases are caused by domestic dogs (Lembo *et al.*, 2010).

Canine rabies has been eliminated from most industrial economies. In Great Britain, this was achieved in 1902 through a combination of dog licensing, muzzling, culling, tracing movements of rabid dogs and their contacts, and strict quarantine, which continues to be upheld by “pet

passports” (Pemberton and Worboys, 2007). However, dog vaccination is now regarded as the most effective control strategy combined with secondary roles for population control, movement regulations and the promotion of responsible dog ownership (Davlin and VonVille, 2012). There is a strong economic argument for dog vaccination, as eliminating infection from dogs should reduce the demand for costly PEP (Cleaveland *et al.*, 2003; Zinsstag *et al.*, 2009). Yet dog vaccination remains under-prioritised by most developing countries with competing health issues and limited resources. Perceptions held by policymakers are that operational constraints (a lack of knowledge about the dog population, inadequate resources and wildlife transmission) are barriers to vaccination (Lembo *et al.*, 2010). These perceived barriers may be “overstated and erroneous” as a number of successful initiatives have been implemented (Davlin and VonVille, 2012). Since the 1980s, for example, a combination of intensive canine vaccination and surveillance efforts in Latin America has shown dramatic progress (Vigilato *et al.*, 2013). However rabies has been increasing in parts of Asia and Africa and remains widespread in over 80 countries (WHO, 2004). Recently, a number of initiatives have been undertaken (Lembo *et al.*, 2011; Lembo, 2012), bolstered by new elimination targets set by the World Health Organisation [19].

Rabies is endemic in Tanzania with an estimated 1,500 deaths each year (Cleaveland *et al.*, 2002). Two decades of research in northern Tanzania has generated important epidemiological insights while demonstrating that the disease can be controlled (Hampson *et al.*, 2008; Cleaveland *et al.*, 2003). Tanzania was among three countries selected by the WHO for large-scale rabies elimination demonstration trials between 2009 and 2013 funded by the Bill and Melinda Gates Foundation (BMGF) (see: [http://www.who.int/rabies/bmgf\\_who\\_project/en/index.html](http://www.who.int/rabies/bmgf_who_project/en/index.html)). This represented a shift from a localised research project towards an integrated

government programme managed by the WHO country office and implemented by government ministries. This ongoing project stretches over 28 districts in Dar es Salaam, Lindi, Morogoro, Mtwara, Pwani and Pemba regions with a diverse population of over 6 million people and an original estimate of 400,000 dogs. The project comprised annual free dog vaccination campaigns, free supplies of PEP to rural health clinics, and improved surveillance for five years in each district. After the project, dog vaccination was to be institutionalised within the Tanzanian government, who would then pay for maintaining successes and scaling-up activities to other areas of the country as part of a sustainable country-wide programme. The project aimed to demonstrate the feasibility of rabies elimination in a sub-Saharan African context with a strong focus on country ownership, envisioned to help catalyse the development of national programmes in other countries.

To successfully eliminate rabies, vaccination must reach at least 70% of a dog population over consecutive years (WHO, 2004). Vaccination rates lower than 30% are considered a “waste of resources” (Lembo *et al.*, 2010). Vaccination coverage declines rapidly in dog populations with high turnover rates (Hampson *et al.*, 2009). Most dogs in Africa are owned by a family but are free-roaming and generally quite young; some studies show that half of dogs are less than one year of age (Knobel *et al.*, 2008; Gsell *et al.*, 2012; Kitala *et al.*, 2001). Validated estimates of dog populations are mostly lacking; a recent study in Iringa district, Tanzania showed that the dog population was six times larger than official estimates (Gsell *et al.*, 2012). However, such estimates are essential for planning successful mass dog vaccinations.

Despite the feasibility of rabies elimination, most vaccination efforts in Africa have failed to achieve high levels of coverage (Lembo *et al.*, 2010). Interventions are clearly influenced by

local dog ownership practices. For example, attitudes towards dogs and the ability and willingness of owners to handle their dogs; the location of vaccination points; and the extent of information dissemination and knowledge of rabies have all been shown to influence compliance (Durr *et al.*, 2008; Kayali *et al.*, 2003; Knobel *et al.*, 2008). Dog owners have not been willing to pay the full costs of vaccination, indicating that rabies control should be considered a public good (Durr *et al.*, 2009). Central points are not sufficient in some settings; despite higher costs, house-to-house strategies were needed to achieve 70% coverage in more dispersed pastoralist communities in Northern Tanzania (Kaare *et al.*, 2009). Whilst dog-owner characteristics are important in understanding project outcomes, the capacity and working norms of implementing organizations also play central mediating roles. Although planned at the central level, most campaigns are delivered through (sub-) district-level livestock field officers who mobilise dog owners to attend central vaccination points. Due to the legacy of structural adjustment on the veterinary sector, the state's capacity in animal health is generally limited in much of Africa (Leonard, 2000). Large and remote geographical areas together with low salaries, insufficient resources and rigid bureaucratic norms can further inhibit such campaigns which depend, to a large degree, on adapting strategies to fit community needs (Rifkin, 1996).

Hence there are risks that new large-scale rabies control programmes in Africa will encounter fairly stereotypical challenges of “top-down” public health interventions in developing countries. Exploring the relationships between dogs, ecology, society and project implementation, this chapter casts a wide lens onto the WHO project in two southern districts of Tanzania. As an example of a top-down implementation strategy for the prevention of NTDs, the chapter explores why the campaign achieved low coverage and to this end focuses on local understandings, livelihood patterns and dog ownership practices as well as campaign mobilisation, timing, the

location of central points, equipment and staff, and project organisation and government bureaucracy.

## **II. STUDY AREA**

Research was conducted in Kilombero (14,918 km<sup>2</sup>) and Ulanga (24,560 km<sup>2</sup>) districts in Morogoro region, Southern Tanzania, during the dry season from May-August 2012. These districts are surrounded by the Udzungwa Mountains National Park and the Selous Game Reserve and are roughly divided by one of the largest wetland areas in Africa, the Kilombero Valley ecosystem. The rainy season begins in early November and ends in May. Occasional dry spells from December to March ameliorate flooding that disrupts road transport in the Kilombero Valley during the rainy season. A large diversity of ethnic groups have come to inhabit the area during several historical migrations, include the Ndamba, Pogoro, Mbunga, Bena, Ngoni, Ngindo and Hehe, who speak their local languages as well as Kiswahili (Jatzold and Baum, 1968). People depend heavily on the natural environment for water, wood, pasture, bush-meat and farming.

The economy of the Kilombero Valley is structured around the farming of rice and maize, livestock keeping, small business, fishing and casual labour. There are also a few large plantations of sugarcane, rice and teak and other formal employment in urban areas, including the district centres Ifakara and Mahenge. Religious affiliation is roughly 40% Muslim and 60% Christian. In 2006 some 657,899 people resided throughout 146 villages within the two districts, with a much higher population density in Kilombero than Ulanga (Malocho, 1997). The area lacks tarmac roads outside the district capitals as well as easy access to a national highway (travel to Ulanga requires the use of a motorised ferry connected to Kilombero), which has

certainly helped maintain the area's relative economic and political marginalisation, despite its abundant natural resources.

Importantly, dog vaccinations had been conducted in Kilombero and Ulanga for two years prior to the WHO/BMGF project by local researchers following a rabies outbreak in 2007. This was unique among the 28 WHO/BMGF project districts, which had only commenced district-wide vaccinations in 2010; hence our two study districts offered an opportunity to learn lessons about how district teams adapted over time to vaccination campaigns. Implicitly, I assumed that this would translate into improved planning, education, engagement with community need and understanding of the local dog population, as compared to other districts in the project.

### **III. VACCINATION COVERAGE IN KILOMBERO AND ULANGA**

As an intervention, 70% coverage of the dog population is needed over consecutive years for rabies vaccination to be successful; making knowledge of the dog population essential to planning and estimating coverage. Interviews with the District Veterinary Officers (DVOs) of the two districts showed that the dog population was not well documented. Available data from Kilombero included the 2002 census that reported 21,941 dogs and an informal estimate given by the DVO that this had *“now gone up to about 29,000 dogs.”* For Ulanga, this included a 2009 census that showed 7,385 dogs. Based on estimates for the 2006 human population, this would give a human-dog ratio of 12.3:1 in Kilombero and 28.7:1 in Ulanga. These are both relatively low estimates compared to other published studies (Davlin and VonVille, 2012). Other studies in Tanzania, in both coastal and inland regions, estimated a human-dog ratio of 14:1, albeit inland rural areas (like Ulanga and Kilombero) had a much higher ratio (Knobel *et al.*, 2008). Work in



the Serengeti among pastoralist and agro-pastoralists showed a ratio of 6.3:1 and 7.3:1, while a recent study in a Tanzanian city (Iringa) found a 14:1 ratio, six times larger than the official district records (Gsell *et al.*, 2012; Kaare *et al.*, 2009; Cleaveland *et al.*, 2003).

Dog registers kept in the DVOs office indicated the name of the owner of each vaccinated dog, allowing for tentative estimates of coverage. For the DVOs, this contributed to estimates of coverage that were far higher than was likely the case: the DVO of Kilombero cited 75% then reduced it to “*at least more than 50% for sure*” with some reluctance, while the DVO of Ulanga stated that “*at least 90% of the dogs in the district were vaccinated, certainly not less!*” That rabies was still present (discussed below), albeit reduced from the 2007 outbreak level, should have been indicative of a much lower coverage, at least for Ulanga. This is especially the case given that rabies oscillates between endemic and outbreak scenarios (Hampson *et al.*, 2007). Using the official dog population estimates provided by the DVOs and the 2011 vaccination data from their offices, vaccination coverage for 2011 was 40.5% in Kilombero and 102% for Ulanga, with lower figures for 2009 and 2010 (see Table 4). Unlike with Kilombero where routine vaccination was also done, dogs were only vaccinated in Ulanga during the campaign as the district lacks the necessary cold chain outside the district capital.

**Table 4: Official Vaccination Coverage**

District	Dogs vaccinated 2008	Dogs vaccinated 2009	Dogs vaccinated 2010	Dogs vaccinated 2011
Ulanga	31% (2,278)	100% (7,385)	50% (3,676)	102% (7,555)
Kilombero	None	18% (5,178)	31% (9,073 <sup>1</sup> )	40.5% (11,746 <sup>2</sup> )

Source: District veterinary office, Kilombero and Ulanga districts.

<sup>1</sup> In 2010, the campaign lasted 11 days in Kilombero and vaccinated 7,639 dogs while 1,434 dogs were then vaccinated during routine vaccination.

<sup>2</sup> In 2011, this included 9,194 dogs vaccinated in Kilombero during a five day campaign and 2,552 dogs vaccinated during routine vaccination.

In discussions with government officials and villagers it became clear that there were very different assessments of how successful the vaccination campaigns had been. Apart from the low coverage in Ulanga in 2010 (explained below), government perceptions emphasised that coverage had been increasing in parallel with the experience of the extension officers, the addition of more central points, the involvement of teachers, nurses and doctors during the campaign, and greater practice and trust with dog-owners. The high coverage reported by DVOs was reiterated by the 11 interviewed livestock field officers (LFOs), most of who had been involved in all three or four campaigns. Despite some scepticism that 70% of dogs had been vaccinated, not one believed less than 50% had been vaccinated with most placing the estimate at 60%, and some more than 80%. In contrast, focus groups and interviews with community members emphasised the small proportion of vaccinated dogs, placing their own unofficial estimates between 25 to 50% coverage.

#### **IV. LIVELIHOODS AND DOGS**

Understanding vaccination coverage requires considering the various links between livelihoods and dogs in Kilombero and Ulanga, which varied greatly between social groups with important implications. While there were other common uses for dogs (hunting, companionship, symbols of wealth, to ward off spiritual forces and act as capital assets when selling puppies) by far the most important involved security – 97% of questionnaire respondents stated so. However, the particularities of how dogs were used for security, the human-dog relationship and how dogs were managed differed between cattle keepers (both agro-pastoralists and pastoralists), rural farmers and town residents.

For farmers (the majority of the rural population), dogs represented a “line of defence” between crops and certain destructive wildlife. For example, 86% (n=97/113) of questionnaire

respondents claimed to suffer from varying degrees of wildlife encroachment on their farms. While elephants and buffalo could cause major damage, these were rare and monkeys and baboons were the major problems where they, in the words of one angry woman, “*finish off a large portion of my crop in one day and enjoy harassing our maize the most.*” This was further impacted by the geography of the farm relative to the homestead, forests and wetlands. Following the villagization programme of the post-independence era in Tanzania (Green, 2003) as well as the need to cultivate rice in the wetlands, homesteads were often far away from farms. During the growing season, farmers either migrated from the village to a small makeshift hut for a few months or commuted daily from their homes, with many taking their dogs with them. Wildcats, mongooses and jackals were known as thieves of chickens and chicken eggs, and dogs were also commonly kept to protect them.

Reasons for keeping dogs were different for livestock keepers. For Masai and Mang’ati pastoralists and the agro-pastoralist Sukuma ethnic group, dogs were used to guard cows, goats and other livestock during grazing and in the cowshed at night from thieves as well as wild dogs, jackals, hyenas and the occasional lion and leopard. In small groups sometimes with hundreds of cattle, young men migrated between the village outskirts and the wetlands and forests following pasture and waterholes during the dry season. These were generally either a short one or two hour walk away from the home (if routes did not infringe on farmland) or large distances of upwards of 20 km or more. Women, children and elders would remain resident in the village during these migrations, most often in remote and dispersed sub-villages far from main access routes. Pastoralists were considered (and observed) to own many more dogs than farmers and their dogs were also bigger, more aggressive and more loyal and alert. Long migration routes as well as cultural determinants (i.e. emphasising a “warrior” attitude, common to these pastoralist

groups) cultivated closer bonds between dogs and male (agro)-pastoralists than with most sedentary farmers.

This contrasted with the small or large town centres dispersed throughout the area where thieves were the main rationale for dog ownership. There were a number of reasons given for why dog populations were considered far smaller in more densely populated areas: land owners not permitting the keeping of dogs; the higher chance that town dogs would cause conflict by biting people in the street; an idea that urban residents were more “educated” and would keep fewer dogs; and urban residents reporting that they practiced “proper” Islam that restricted the keeping or touching of dogs. According to certain Koranic rules, these groups emphasised that physical contact with a dog (saliva and fur) would make someone spiritually unclean (especially before prayers). For these reasons, Muslims in towns stressed that, although they could keep dogs, they had to *“treat them well as Mohammed said...and have them only for a specific purpose.”* Regardless of religion, urban dogs were believed to be better cared for and more likely to be vaccinated than dogs in rural areas, with a few confined to their household (unlike the vast majority of dogs that were free roaming).

Therefore, differences in livelihood patterns (and their culturally-embedded dynamics) between town, farmland and pastoralist systems influenced the human-dog relationship and the spatial distribution of dogs in Kilombero and Ulanga. Utilitarian value tended to mediate and dictate dog management rather than purely culturally-defined beliefs and practices. This clearly impacted vaccination coverage rates: villages that believed vaccination coverage was highest were from more urban areas situated along main roads but with fewer dogs, whilst lower coverage estimates were given in those villages in more remote areas, known to have higher dog populations.

## V. LOCAL KNOWLEDGE OF *KICHAA CHA MBWA*

Local knowledge of rabies also revealed a general perception of low vaccination coverage, reflected in understandings of rabies epidemiology, experiences of rabies cases and attempts by village leaders to institutionalise “village laws” in order to address non-compliance with vaccination. Rabies was linked to its Kiswahili name, *Kichaa cha Mbwa* (madness of dogs), and widely known as a fatal disease of dogs and humans that affected the brain, was transmitted by animal bites and prevented by dog vaccination, similar to a recent large-scale questionnaire study in Tanzania (Sambo, 2012).

Aside from this basic knowledge, rabies was considered an “outbreak disease”, understood in relation to four interrelated beliefs. First, it was a disease of “dirty dogs” caused by neglected (but owned) free roaming dogs that spread the disease due to poor animal welfare and poverty. This narrative emphasised that although most farmers and town residents claimed to own dogs for security, this was often an assumed rather than actual use. Many dogs were considered lazy, not aggressive enough, unable to be trained and always away from home looking for food or a dog of the opposite sex. They lacked a clear utilitarian value, which in turn fostered “negligent owners” who did not care for their animals and, therefore, facilitated the spread of rabies. In the words of one village leader, *“living as we are in this farming environment [as poor farmers], dog owners keep dogs without a purpose and do not care about them so they move all over the place...and this is how they catch rabies.”*

The second common narrative involved the idea that rabies had never been a problem in the Kilombero Valley until the migration of Masai and Sukuma from northern Tanzania imported rabies as they moved into the area in the late 1990s, which strengthened animosity between

farmers and (agro-) pastoralists in certain areas (Benjaminsen *et al.*, 2009). Third, rabies was believed to spread from wildlife to dogs, facilitated by farmers, hunters and pastoralists living near game reserves and national parks and influenced by seasonal changes in rainfall affecting the movement of carnivores. Lastly, rabies incidence was considered to increase during the harvest period in June and July, corresponding with the dog-mating season.

The majority of people approved and understood the role of canine vaccination. Differences between biomedical and local understandings, known to lead to community resistance to other human and animal vaccination programmes (Yayha, 2007; Waller and Homewood, 1997), were largely absent. Although rumours that the vaccines were killing dogs and that the campaign was a government dog culling programme had been widely disseminated during the 2008 and 2009 campaigns (before the WHO project), these concerns had abated with time and side effects to vaccines (real or perceived) were rarely mentioned.

Part of this had to do with the high level of awareness about rabies, underpinned by local experiences of human cases. Although open to error, focus group participants and village leaders identified (with detailed symptoms and related circumstances) a total of 59 suspected rabies death cases in the 16 study villages within memory, most (45) reportedly from 1995 to 2008, but with four deaths identified in 2012 (the year of field research). While most were from dogs, there were a few attacks from jackals and wild dogs. This would give an average of 3.2 cases per year (1995-2008) in these 16 villages (population 30,143), implying 10.7 cases/100,000 people; much higher than the 4.9/100,000 estimated for the country as a whole based on active surveillance in Northern Tanzania (this difference can be attributed to the fact that my selected villages included those most affected by the outbreak between 2007-2008) (Cleaveland *et al.*, 2002). Contact tracing as part of a related research project (where researchers follow up all reported suspected

rabies bite cases) showed 30 deaths in the two districts since 2007, with most prior to 2009; in turn, hospital records between 2009 to mid-2012 showed 478 bite victims of suspected rabid animals divided equally between the two districts, with only 2 reported deaths (Unpublished data).

These local accounts of having neighbours and relatives die from rabies or have to seek treatment after being bitten by a dog generated a significant degree of fear and apprehension. This clearly motivated many households to comply with vaccination. Asked if they would prefer acquiring HIV/AIDS or rabies, 33% of questionnaire respondents picked HIV/AIDS while 14% could not choose between the two. While people mentioned hydrophobia, muscle spasms and nervous twitches, they stressed that respiratory symptoms made victims “*bark*” like the animal that had transmitted the disease: rabies made people “*act like wild animals*” and “*die like mad dogs*.” They became “*demon-possessed*”, started to “*bite everything*” and became “*so strong like the animal that bit them*.” Furthermore, access barriers to treatment (high costs and inadequate access to medicines and health services more generally) drove community fears. As one woman stated in a focus group, “*For rabies, if you are bitten today and cannot get treatment, which is so common here, tomorrow you die like an animal.*”

This level of fear drove communities to attempt to institutionalise two different “village laws” in order to increase compliance with vaccination and deal with suspected rabid dogs and bite victims. In response to the 2007 outbreak and recent vaccination campaigns, most villages had established local bylaws indicating that dog bite victims should be financially compensated for medical costs by the dog owner if the dog was not vaccinated; albeit compensation was never guaranteed. Some never pressed their neighbours for payment, others were not able to identify the dog owner, and others were not able to prove (in the village court) that the accused dog

actually belonged to the owner (given the lack of records) or was not vaccinated (certificates could be used interchangeably between dogs). Second, there were various endogenous attempts to standardise dog culling after vaccination, considered an ethical and effective method of rabies control at the village-level (but in no way promoted by the WHO project). In many villages killing unvaccinated dogs was considered a “district law” with support from livestock field officers; albeit the passing of the Animal Welfare Act (2008) made this law ambiguous. The most common suggestion to improve coverage was for the village office to require dog owners to register their dogs so that after a vaccination campaign, a grassroots “local committee” could move house-to-house eliminating unvaccinated dogs (evident by the lack of a new collar and the vaccination certificate). This was often done by villagers themselves in haphazard ways that led to protests from dog-owners. Similarly, responses to dog bites (despite many caused by aggressive dogs, bitches with puppies, dogs defending their homestead from strangers or provocation) were always treated as suspected rabid cases and involved quickly killing the dog, and these often provoked a spontaneous dog culling spree.

The importance of strengthening these two endogenous attempts to enforce dog vaccination was ubiquitously emphasised, reflecting local perceptions that the rabies control project was achieving low-levels of coverage. During focus groups and interviews, the relationship of rabies to “negligent” dog owners, pastoralists, wildlife and seasonal variation quickly veered into discussions about how vaccination campaigns had not sufficiently addressed what were considered key points for controlling the virus; there was a need to better prioritise targeting households bordering wildlife populations, synchronise vaccination with the farming season and pastoralist migrations, and motivate the many “negligent dog owners” through recourse to



village laws and punishments, supported by district authorities more systematically. But how many dogs were truly being vaccinated?

## **VI. ESTIMATING COVERAGE: POPULATION-BASED SURVEY**

Given the divergent views of government officials and villagers, there was a need to generate more robust estimates of the dog population and vaccination coverage; hence, we carried out a population-based survey in six selected villages. The survey showed that out of a total of 6,157 households and 30,143 people, there were 1,311 dog-owning households (21% of households) and 3,056 dogs (Table 5). This included 2,414 dogs older than one year and 642 dogs less than one year. While this gave a total human-to-dog ratio of 9.86:1, this was highly skewed following local knowledge that the dog population was predominately in rural and remote areas. The more urban villages (or towns) of Mwaya and Chikwera had a human-to-dog ratio of 31.4:1 and 64:1 while the rural villages of Mofu and Namhanga had ratios of 6.9:1 and 5.8:1. However the low population in Mwaya was also a consequence of mass dog culling campaigns that had taken place in 2008 and 2010 in response to human rabies cases. This variation was equally pronounced within each of these villages. For example, sub-villages bordering forests in Machipi and Mwaya had a much higher human-to-dog ratio than other areas. Likewise, the sub-villages with pastoralists in Namhanga and Signali had double, and in Mofu village more than 10 times, more dogs compared to other sub-villages but with relatively equivalent human populations. This showed that the dog population was highly skewed even within individual villages, based on surrounding ecological characteristics that influenced dog utility.

**Table 5: Vaccination Coverage in Six Villages<sup>1</sup>**

District	Village	People	Households	Households with dogs	Dogs	Vaccinated dogs	Dogs not vaccinated	Dogs less than one year	Vaccination coverage <sup>2</sup>
Kilombero	Signali	4508	606	132	390	116	274	122	30 - 43%
	Machipi	1955	461	116	233	117	116	37	50 - 60%
	Mofu	8375	1550	640	1433	265	1164	186	19 - 21%
Ulanga	Mwaya	6055	1491	98	193	34	159	66	18 - 27%
	Namhanga	5125	912	297	742	208	534	213	28 - 39%
	Chikwera	4125	1137	28	65	29	34	18	45 - 62%
	<b>TOTAL</b>	<b>30,143</b>	<b>6,157</b>	<b>1,311</b>	<b>3,056</b>	<b>769</b>	<b>2,287</b>	<b>642</b>	<b>25 - 32%</b>

<sup>1</sup> Village specific coverage data was only available from Kilombero. This showed 123 dogs vaccinated in Signali, 284 in Mofu and 72 in Machipi. The small discrepancy between these figures and the survey data can be attributed to death of vaccinated dogs, poor record keeping, changes in dog ownership, vaccination of dogs from other villages as well as response bias in the survey.

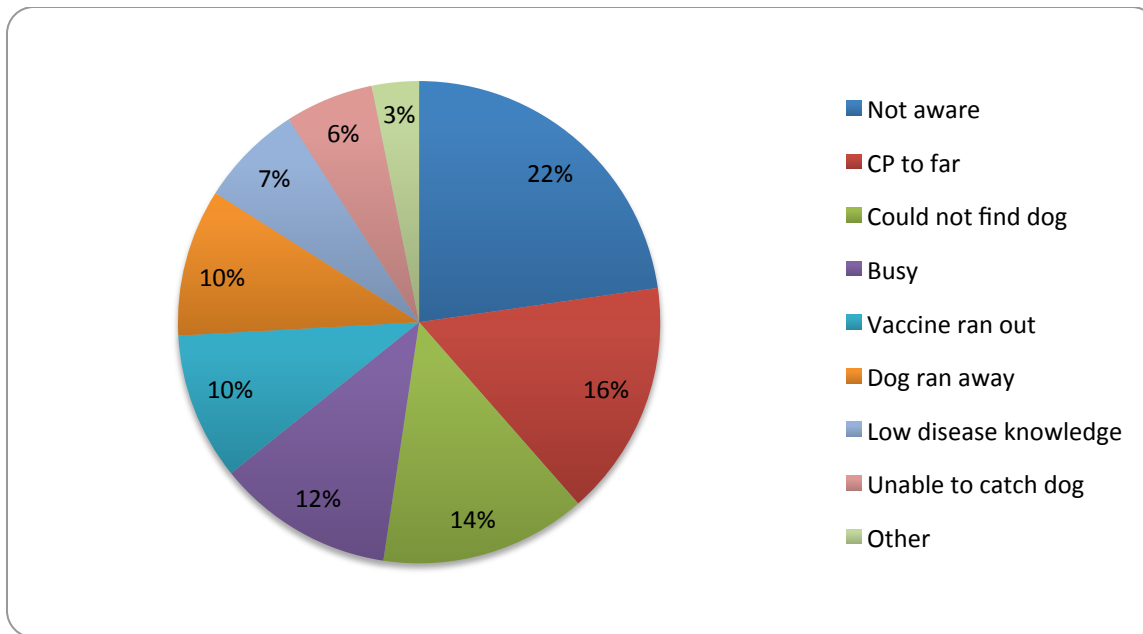
<sup>2</sup> Coverage range that includes all dogs at the time of the survey (lower estimate) and excludes all dogs acquired after the 2011 campaign (higher estimate).

Furthermore, the population-based survey also confirmed the low coverage emphasised by community members. In total, only 769 dogs (25% of the canine population) had been vaccinated in 2011, whereas 2,287 dogs (belonging to 923/1,311 households) had not been vaccinated. If the 642 dogs born since the vaccination campaign (21% of the dog population) are excluded, coverage rises to 32% of the mature dog population. The immunised population is slightly lower given the small percentage of stray dogs; however, this is a relatively negligible population given scarce food resources, estimated at 3-5% in rural northern Tanzania and 1% in urban areas of Iringa, Tanzania (Cleaveland *et al.*, 2003; Kaare *et al.*, 2009; Gsell *et al.*, 2012).

As with dog density, vaccination coverage also varied between villages (Table 5) with the highest coverage in both Machipi and Chikwera villages and lower coverage in Mofu and Mwaya. Importantly, dogs in the low coverage villages of Mofu and Namhanga together accounted for 71% of the total dog population of the six villages (with 2,175/3,056 dogs) due to pastoralist settlements and remote farmers in a number of sub-villages, which were far from main access roads. In contrast, the two villages with highest coverage rates included a large town with only 65 dogs (Chikwera) and a village (Machipi) relatively close to the district capital in Kilombero.

## **VII. BARRIERS TO CANINE VACCINATION**

While most people understood the role of canine vaccination, interrelated geographic, social and operational factors created a number of important access barriers. In the population-based survey, reasons given by the 750 dog-owning households (with dogs born before the 2011 campaign and considered eligible for vaccination) for non-compliance included (in descending order of importance): not being aware that the campaign was taking place (23%), having a central point too far from their homestead (16%), not being able to find their dog (14%), not being available that day (12%), the vaccine having run out (10%), having the dog run away during transport or at the central point (10%), not being aware of the importance of vaccination (7%), not being able to catch the dog (6%), having a young puppy or pregnant female (2%), a perception that the vaccine has side effects (1%) and having just recently moved to the area (0.2%) (see Figure 1). However, understanding how and why these various barriers existed requires triangulating this with qualitative data.



**Figure 1: Reasons Given for Non-compliance with Vaccination (N=750)**

### ***Mobilisation and Information Dissemination***

Contact between district officials and villages began with mobilisation: disseminating information about the time, place and purpose of the campaign. Letters were sent to village offices, radio announcements made and posters put up one or two weeks prior. In some areas, meetings were held between LFOs and villagers and announcements made in schools, churches, mosques and public areas. The day before the campaign, announcements were also commonly made with drums or a loudspeaker mounted on a car.

Opinions differed dramatically over the extent, timing and impact of these efforts. The village officers, who were sometimes given “*some little money*” for motivation by LFOs, were tasked with much of the mobilisation. However, villages were often large and composed of a number of sub-villages far from the village office and most formal announcements were focused solely around access routes, shops and the village office. LFOs relied on the village office to use sub-

village leaders (as well as schools, mosques and churches) to reach other areas but without any financial incentives and an often short notice provided either by the LFO or the village office (many times given the night before) mobilisation was done poorly. This explains, to some degree, why “not being aware that the campaign was taking place” was responsible for 23% of dog owners not participating in the 2011 campaign.

### ***The Timing of the Intervention***

It was a common complaint by community members that, in the words of one local leader, “*We find that the LFOs structure the day of the intervention around district officials and not the recipients.*” While it was natural that some households were busy, there were a few villages where local markets were not accounted for by the LFOs. Furthermore, vaccination often ended either before or just after school finished, creating challenges for children in vaccinating the household dog.

The most significant aspect of timing, however, involved the month of vaccination in relation to bureaucratic norms and the migration patterns of pastoralists and some farmers. Pastoralist herders (together with most of their dogs) were often away from the village during the dry season from July/August to November/December, depending on the rains. Some farmers, in turn, had been busy preparing their farms for the approaching rains at the beginning of October (just before the 2011 campaign) having already migrated to their farmland. Hence there was a clear divergence between the needs of pastoralists (who tended to recommend June as the ideal month for vaccination) and farmers (who recommended August or September). Despite this, district officials had a difficult balancing act since much of Kilombero Valley is flooded from December to May or even June, making numerous areas inaccessible. This was further compounded by the

budgetary requirements of the district government whose financial year ends in July. District funds received in one financial year could not be used in the next. In the words of one official from Ulanga:

“This does not allow us to receive money in June and then plan for the vaccination in September...sometimes we don't even know when the money will be coming so that in 2010 it arrived in June and we had to do the vaccination as fast as we could, even though some areas were still flooded.”

The fact that the 2011 campaign had been done in mid-October (other campaigns had been done between September and early October) meant that many pastoralists (and some farmers) were away from their village with their dogs.

### ***The Placement of the Central Point***

Having a central point (CP) too far from the homestead was found to be the principal reason why 16% of households reportedly did not vaccinate their dogs. Community members accused the LFOs of “*not consulting the people*” and wanting “*somewhere comfortable to have [CPs] since they don't want to use fuel to come deep to us in the remote areas.*” Despite the insistence of district officials that vaccination points had been “*chosen by villagers*” most were located at the village office, typically in the centre of the village near roads and shops; others included football pitches, schools and large fields. While this was sometimes sensible, local leaders had clearly chosen the area used for most village activities, despite not always being the most appropriate and well beyond the 500 m or 10 minute walk recommended by the WHO (WHO, 2004).

Some were chosen by considering the number of dogs: of the 16 villages visited for focus groups, eight reported one CP in 2011 while eight had two. Those villages with only one site

were more densely populated, such as towns or smaller villages. In villages with two CPs, one was typically the village office while the remaining CP was situated in a remote area. Over successive campaigns since 2008, LFOs emphasised they had improved their ability to target remote sub-villages. One of the reasons why Machipi village in Kilombero had 50% coverage (the highest in the population-based survey) was that the LFO, who lived nearby, located a CP in the most remote sub-village despite requiring crossing a river on a dugout canoe! This clearly shows the importance of having LFOs consult with the village office and sub-village leaders and be willing to adapt strategies to meet local needs. However, there were two difficulties found with this strategy: (i) in a few villages with two central points, the day was merely divided between the two locations limiting the time dog owners in one site could bring their animals; (ii) in others, LFOs demanded a small fee for each vaccination to “*cover fuel charges*”, which significantly reduced compliance.

### ***Bringing Dogs to the Vaccination Point***

A total of 10% of surveyed households reported that their dog ran away either on the way to, or at, the central point; a further 6% reported that they could not catch the dog. Most dogs were brought to the CP by the father or son. If the dog was considered “*the property*” of the father, a son had to ask permission before vaccinating it – problematic if he could not be reached. Some men (with unvaccinated dogs) believed that taking a dog to a vaccination point was embarrassing and were ashamed to since it was considered “*a child’s duty*.” Most dogs were free roaming making catching a dog and leashing it difficult, and most relied on having their dog(s) follow them without a leash; however many dogs did not listen to their masters. Remote households (especially pastoralists) reported to only take some dogs to the CP since they were not able to handle all of them over long distances crossing densely populated areas (and entering, from a

dog's perspective, into "*foreign territory*"). Additionally, the result of having so many free roaming dogs at the CPs invariably led to some dogs fighting and others running away before they could be vaccinated.

### ***The "Mindset of the People"***

The survey showed 7% of households with unvaccinated dogs were "not aware of the importance of vaccination" while 14% "could not find their dog." This was related not so much to lacking basic knowledge about vaccination but rather to not having *sufficient* motivation to act on it. This was discussed in two interrelated ways. The first emphasised that variations in the human-dog relationship within individual villages, as shown in a recent study in Ethiopia (Ortolani, Vemooji and Coppinger, 2009) were heavily influenced by livelihood utility rather than "culture." Owners who did not have a concrete purpose for a dog were believed to "neglect them" (i.e. lack an incentive to care for the animal and have less of a bond with it) and be less willing and able to vaccinate them regardless of ethnicity. Many of these dogs were acquired by children without parental consent and it was common for such dogs to obtain food from multiple households (and be known as local "*thieves*") where they were sometimes not seen by their "owners" for a number of days at a time. In contrast, hunters, farmers in need of protection from wildlife and most (agro)-pastoralists had more affectionate feelings towards their dogs and considered participating in vaccination one manifestation of this positive relationship.

The second narrative emphasised the link between dog-owners' motivation to participate in rabies control, risk perceptions and wider socio-developmental issues (i.e. poverty, education and social solidarity). According to district staff, poverty and low education were the main reasons for non-compliance; for example, "*if the government was announcing free maize...everyone*



would come running [but since rabies was an] *outbreak disease it requires educated people* [a wealthier and more educated population] *to make everyone act together.*” Some dog-owners candidly admitted that they did not believe rabies was a major problem in their communities and that, since the likelihood of their being bitten by a rabid dog was small, they could not be bothered to take the time to vaccinate their dog(s). To others, this lack of motivation was interpreted as a *“lack of community spirit”* and representative of *“being a disorganised person,”* considered antithetical to community cooperation and development. People generally believed there were more *“negligent”* dog owners than *“organised”* ones, and that this greatly reduced coverage. This was reflected in the prevalent view that more effort needed to be made in strengthening *“village laws”* on vaccination, the killing of unvaccinated dogs and the mandatory payment of treatment costs to bite victims paid by dog owners (discussed above).

### ***Problems of Equipment and Staff***

Although community involvement was believed to be lacking, there were important operational difficulties surrounding equipment and staff that were perceived and experienced in different ways. Sometimes tasked with both livestock and crop extension services, community perceptions of LFOs echoed frustrations with government services more generally, as they were believed to *“not give any of their time in educating the people about proper dog management”*, were *“lazy and not helpful”* and *“preferred staying in their offices than helping the people in the village.”* Villagers felt *“voiceless for our right to have a field officer helping us”* for animal diseases more generally since many areas had no LFO or were part of a very large catchment area. Many had negative perceptions of their local LFOs who, according to one village leader, *“do nothing to register dogs and ensure all dogs are vaccinated, they don’t come deep and don’t communicate*

*well with the village about when things will take place...those people are useless!*” As one key informant described this in historical context:

“The project had capacity problems due to the structural adjustment policies since before in the 1970s you had an LFO in every village in Tanzania and they were involved directly with the people but then everything was removed and fell apart. Only now are we trying to improve things but in some areas the communities still do not have much contact with them...they are moving forward but for the rabies project they had no staff, not enough people on the ground.” (Key informant, Tanzania)

This echoed complaints by livestock officers about shortages of fuel, staff, vaccines and other equipment. Shortages of fuel were seen as limiting the placement of CPs in more remote places and the provision of sufficient mobilisation. In many instances, community members complained that the lack of staff required them to wait in long lines. Without dog catching equipment, LFOs found it hard to restrain some dogs. As one stated:

“Sometimes you find that you are only one at the site and rely on a local teacher to be the recorder. The village people don’t follow instructions to tie a dog with a rope...handling the pastoralist dogs is very tough...you don’t have enough fuel to reach deep into the village and sometimes you even run out of vaccines since you can only carry so much at one time.” (Interview, livestock field office, Kilombero)

Running out of vaccines was relatively common – 10% of households claimed this was why they did not vaccinate their dog(s). Tenuously scheduled follow-up times were sometimes not followed through on by the LFOs themselves which clearly reduced trust with community members. For the LFOs, however, issues of vaccines, fuel and staff shortages were related to a shortage of field funds more generally. This also impacted their own allowances, apparently paid at half of what was initially promised, which clearly de-motivated them.

### ***Budget Flexibility and Project Organisation***

For the district officials in charge of the vaccination campaign resources like fuel and more staff was something that they believed was beyond their control. Rather, this was related to operational budgets determined by the central government and the WHO country office. As one official stated:

“The WHO rarely involves us in planning or arranging things. In 2009, we prepared budgets but they were rejected since they were too expensive...these people just sit in Dar and pilot things from their desks! But this district is so much larger than other districts in the project, but they do not budget for these differences. They just give the same allocated budget to each district...everything is so fixed...I have no power on the budget, it just comes to me and I am helpless.” (Interview, key informant, Kilombero)

These officials understood that most dogs were in isolated places (near forests and in pastoralist areas) but felt that they could not budget the appropriate resources to reach them. This lack of flexibility was contrasted with the first round of vaccination in the two districts supported by a research team. Here, according to the same informant quoted above, “*there was adjusting of the budget to address certain problems on the ground.*” Similarly, the low coverage of the 2010 vaccination in Ulanga related to the annual fiscal year ending in July (discussed above), reflected issues with budgetary rules and regulations in Tanzania more generally:

“Once the funds are in the country, you can’t access them and there is a lot of bureaucracy...strict rules about how to use funds in relation to the DVO and LFOs. In an NGO setting things are more simple...you give the field staff the money they budget for and if things come up, you adjust it to deal with the problem, but reporting in the government system, you can’t do this...if you budget for 2,000 dogs you get vaccines and supplies for 2,000 dogs, nothing more...there are tight budgets and organised procedures.” (Key informant, International)

In northern Tanzania, rabies research and dog vaccination was “managed like an NGO” based on the ability to be flexible and respond to changing conditions on the ground. It was through this work that the evidence-base for rabies elimination in the Tanzanian context was generated. It was not that the WHO project lacked a budget but rather that the budget had been largely used to supplement the lack of veterinary capacity and institutional infrastructure in the country. Key informants estimated that upwards of 80% of the budget had been directed towards the per-diems of officials and allowances of field staff since, in the shadows of structural adjustment, field activities required supplementing existing base salaries with additional funds. This was the main reason why the first vaccination campaign in 2008 (done by a research team) had excluded Kilombero district: the district had refused to pay the per-diems of livestock field officers despite freely available vaccines while Ulanga district had managed to find funds.

## VIII. DISCUSSION

The feasibility and cost-effectiveness of rabies control and elimination through canine vaccination has been well documented, with some noted successes from developing country contexts (Cleaveland *et al.*, 2003; Lembo *et al.*, 2011; Vigilato *et al.*, 2013). However there are clearly challenges in mobilising resources for canine vaccination as well as operational barriers that inhibit success in many contexts. With renewed global attention to rabies following advocacy efforts by the NTD community, there is a need to think critically about how local realities intersect with technical solutions; how should we think about the challenges of dog vaccination for rabies and, importantly, how can large-scale canine vaccination projects navigate local social and ecological complexities in resource-limited settings?

Much recent work in the field of sustainable development and global health (including that of many anthropologists) has emphasised the importance of understanding interventions from the perspective of community-equity effectiveness and using transdisciplinary approaches rather than narrowly emphasising the efficacy of scientific tools and strategies (Hirsch et al., 2008; Wiesmann and Hurni, 2011). Effectiveness has been conceptualised as a “step ladder” where different variables (at multiple levels) have lesser or more impact on outcomes depending on social, cultural, biological, economic, political and ecological contextual factors (Tugwell *et al.*, 2006). Analytically investigating these “effectiveness determinants” is deemed essential to understand their multiplicative effects. Intervention planners, therefore, are encouraged to identify and engage with high-level determinants, enabling factors and local capacities (that act as essential nodes) in order to move away from managing risk to building resilience and understanding interventions as “complex systems.”

Exploring the implementation and community response to a WHO-coordinated canine rabies elimination project in two southern districts of Tanzania, this chapter has presented the first mixed methods study of a contemporary dog vaccination programme in a resource-poor country. In the absence of credible estimates, a population-based survey in six selected villages showed that 25% of the dog population had been vaccinated in 2011. The survey quantified what was general knowledge among the village population – that the campaign had achieved coverage well below the 70% target due to a number of interrelated social processes, geographical characteristics and challenges in project implementation. Furthermore, while it is difficult to extrapolate the findings of this study to the wider WHO project area, many key informants believed that Kilombero and Ulanga, due to its prior experience with mass dog vaccinations, achieved relatively high levels of vaccination coverage, suggesting that the difficulties

encountered here were not unique. But what were the most important bottlenecks to the canine vaccination project in these two rural districts that had the greatest leverage on mediating intervention effectiveness, and therefore should be most emphasised and reflected on for future vaccination campaigns in Tanzania and elsewhere?

At the community level, there were clear spatial differences in dog distribution driven by the variable dog keeping practices of rural farmers, town residents and (agro-) pastoralists. While dogs played important roles that were embedded within local livelihoods, there were differences between conceived uses and actual ones. Many dogs used “for security” were actually poorly fed and maltreated with little or no clear role in the household. Awareness of rabies, at least on a basic level, motivated people to participate in rabies control out of fear of “*dying like a mad dog*” as well as, to varying degrees, having their dog culled and being held responsible to pay for someone’s medical treatment. Equally important were broader notions of social responsibility that reflected much broader divisions within these communities about the willingness to control diseases that were perceived to be relatively rare. Some people in these predominately rural geographies themselves under-prioritised (or neglected) the importance of rabies control given the multitude of other challenges in their daily lives. The widespread emphasis on the need for local bylaws to punish dog owners who did not vaccinate their dogs and monitoring of vaccination status by the village office was a general expression of a desire to motivate (and coerce) non-compliant “negligent” dog owners. Given the difficulties of behavioural change in resource-limited settings (Panter-Brick *et al.*, 2006), there is surely an important role to sustain education campaigns to help increase and facilitate prioritisation at the village-level over the long-term, with a possible role for dog registration.

However, barriers to vaccination did not rest solely, or predominately for that matter, with communities. The rabies elimination project suffered from stereotypical challenges of “top-down” public health programmes. There were critical gaps in communication between central government authorities, district officials, field staff and the target population that were structured by existing bureaucratic procedures, social norms and an over-emphasis on technical solutions. In both districts, an underestimation of the dog population increased what was found to be an erroneous perception of success. The dog population was not geographically uniform but heavily skewed, found largely in more remote areas bordering forests and the outskirts of pastoralist villages, than the more accessible towns or areas with easy access routes. These relationships found expression in local understandings of rabies epidemiology – related to pastoralist migration and wildlife interaction – which were not well incorporated into project planning.

These operational challenges were exacerbated by the long-term effects of structural adjustment policies in the veterinary sector in Tanzania that have significantly reduced the capacity of the state to deal with animal health (Leonard, 2000). This found expression in the negative attitudes of most villagers towards their local livestock field officers; the lack of sufficient fuel, vaccines, staff and “promised” salaries; and the perceived inability of district officials to adjust budgets to address local challenges, such as the large geographical area and the need to adapt the timing of vaccination campaigns to fit seasonal specificities (rainfall and migration). A mixture of lack of funds, planning and capacity as well as the government’s financial distribution system prevented flexible, context-specific strategies. As a result, the effectiveness of mobilisation, the location of vaccination points and the timing of the intervention were not optimal. Efforts to increase involvement of community members in mobilisation or to adapt vaccination points based on local recommendations were generally limited by capacity and funds. It was not that local district

officials were necessarily oblivious to these challenges; rather they felt unable to communicate effectively with those in Dar es Salaam with sufficient power to enable flexibility. Communication channels were top-down and learning from past shortcomings, or putting this learning into practice, was generally limited. Some of these challenges contrast with rabies research programmes (i.e. work in the Serengeti) where more capacity and flexibility were believed to have allowed for better targeted campaigns and more community involvement.

Between these different geographical, community and organisational dimensions to the vaccination project, this study shows that, despite many endogenous challenges at the level of the dog-owner, issues of capacity, finances and managerial shortcomings severely lowered coverage by preventing field strategies to be adapted to local realities. The major bottlenecks were not with “community compliance” per se but with how intervention strategies navigated the various structural and behavioural factors that mediated access. This shows the need for a more trans-disciplinary and participatory approach in planning, implementing, managing and monitoring and evaluating rabies control programmes. The findings presented here do not suggest that rabies elimination in Tanzania is unachievable; rather, it points to the need to investigate, consider and take seriously local variations and challenges within the project planning cycle. Robust quantitative data on dog populations and vaccination coverage as well as qualitative implementation research are essential for ensuring that project coordinators have a sound understanding of challenges on the ground.

These issues, however, are not unique to rabies but rather part of a much larger debate about the nature of vertical health programmes in developing countries, top-down strategies and the relationship between expert knowledge, donor-led development projects and poor populations (as discussed in Chapter 1 of this thesis). Policy narratives and donor-funded projects are often



shaped by presenting “quick-fix” technical strategies that can be easily “scaled-up” from local successes within short time periods (Crewe and Harrison, 1998). Donors demand results that showcase quick-wins, large impacts and “value-for-money.” However, there is a tendency to sideline or overlook the scale of capacity building needed as well as the larger bureaucratic challenges involved in fostering “country ownership” and institutionalising equitable and effective interventions within government ministries. Without sound project management that creates feedback loops and adaptive mechanisms between different actors (paying attention to embedded infrastructure, capacity and community participation issues), public health interventions like canine rabies vaccination will have difficulties in navigating local access barriers.

Addressing this requires time, leadership, resources, vision and institutional learning to effectively address the legacy of structural adjustment on the health and veterinary systems in developing countries and strengthen the relationship between the central government, district officials, extension workers and communities. Critical gaps between project planners, implementers and communities have also been noted, for example, in other recent studies on Neglected Tropical Disease control in Tanzania (Madon et al., 2014; Mubyazi et al., 2004; Parker and Allen, 2013). Understanding the context of success and failure, therefore, should be more encouraged by the NTD community if we are to learn from past experiences, propose future strategies and ultimately create more resilient and sustainable programmes, and more healthy communities.

An interesting example of how things can change on the ground and the need for flexibility and foresight in implementing a successful rabies elimination programme involves recent changes in dog populations in Kilombero and Ulanga since the end of field research. With the threat of

environmental degradation in the fragile Kilombero Valley ecosystem, the government (with police support) forcibly evicted over 380,000 cattle in late 2012, likely the majority of pastoralists. As these cattle keepers now migrate to new districts, vaccination coverage in Kilombero and Ulanga will likely increase dramatically, but planning for future campaigns in the wider WHO elimination area will require consideration about where these livestock keepers, and their many dogs, have gone.

## **CONCLUSION**

This chapter has explored the top-down implementation process and community response to a large-scale rabies elimination programme in Tanzania. Through a mixed methods approach, the chapter showed that the ability of top-down vaccination programmes in resource-limited settings to consider geographical and livelihood diversity is limited by a combination of financial, managerial and capacity constraints at the project planning level that maintain top-down information flows and limited responsiveness to local need. Such processes are major embedded challenges to NTD programmes and are also common critiques of most top-down global health interventions, which maintain significant disjunctions between the global and local and policy and practice, reducing their overall effectiveness.

Hence the rabies vaccination case study reflects fairly standard limitations to the working norms of elimination-orientated programmes. As discussed in Chapter 1, these have come to represent stereotypical problems in moving global interventions into local contexts that, in many ways, defines global health practice for social scientists, as well as many public health experts. The increasing recognition that such approaches lead to ineffective programmes, like the WHO rabies

project discussed in this chapter, has precipitated a continued search within the global health landscape for new organisational arrangements and delivery strategies to address this. Critiques brought about by continued top-down interventions have spurred a large demand for new approaches in order to discover, as it were, the ingredients of success. In contradistinction to top-down strategies, a proliferation of participatory “bottom-up” interventions have ensured, increasingly important for NTDs in Africa. These promise to overcome the various shortcomings of top-down programmes by empowering communities to become actively involved in disease control through locally-acceptable pathways, through dialogue, community volunteers and consideration of local contexts. One such intervention – community-led total sanitation (CLTS) – has specifically positioned itself in contradistinction to past top-down sanitation programmes in Africa, promising to revolutionise sanitation and prevent multiple NTDs. But what are the strengths and challenges of such approaches and how successful are they at moving beyond, and overcoming, the multiple challenges common to top-down programmes? To answer this question, we now turn to the second case study of this thesis focused on the implementation of CLTS in rural Zambia.

## CHAPTER 4

### **Grand Narrative, Local Realities: Poverty, Participation and Pit Latrines in Eastern Zambia**

“In today’s world more people have access to mobile phones than to sanitation...this is crazy! We need to start talking about *shit* in the open.... people do not want to be eating each others’ *shit*. CLTS empowers them to do this ...people can take sanitation into their own hands! I have seen it.”

*Kamal Kar, the originator of CLTS at a WHO conference in 2010*

#### **I. INTRODUCTION**

With his Indian accent, Kamal Kar, the originator of community-led total sanitation (CLTS), is a mesmerising and provocative speaker. Using the power of laughter (the word *shit* elicits amusement even from senior bureaucrats) and the importance of addressing “the forgotten foundations of health” (Bartram and Cairncross, 2010), he travels the world spreading a gospel of sanitation transformation. This is a noble pursuit; one made urgent by the impending Millennium Development Goals (MDG), including: to halve the number of those without access to improved sanitation by 2015. One decade into the 21<sup>st</sup> century, a staggering 2.6 billion lack improved sanitation – 1.1 billion of which practice open defecation – underpinning a “silent epidemic” among the world’s poor, responsible for the death of one-and-a-half million children annually (WHO and UNICEF, 2013). While diarrhoeal diseases are the main culprit, an endless list of other pathogens exists, including NTDs like soil-transmitted helminths and cysticercosis estimated to infect one billion people worldwide with a significant effect of the cognitive

development of children. Global inequalities are reflected in how and where a person defecates – what Cohen (2010) has termed “Second-Class Shitizens” – and open defecation serves as a key indicator for socio-economic marginalisation (Jewitt, 2011). The association of open defecation with dirt, filth and social inferiority continues to (re)produce inequities, as it did in the colonial period (Inglis, 2002).

Despite the significance of the European sanitary revolution (Ferriman, 2007) until recently this “worldwide sanitation crisis” had become something of a development taboo – it was only added to the MDGs as an afterthought in 2002 (Black and Fawcett, 2008). A historic tendency to lump “water and sanitation” together helped under-prioritise and neglect sanitation. This was caused, at least partially, by the fact that sanitation programmes engage both “hardware” (toilet technologies) and “software” (socio-cultural behaviours) (Black and Fawcett 2007). Furthermore, sanitation targets are considered expensive and difficult to meet. Donor paradigms have emphasised providing free high-quality toilets and subsidised inputs to foster market structures and behavioural change. Critics argue that selectively distributed inputs have had negligible impacts since they drive a “handout mentality” that engages little with the challenges of behavioural change (Mehta and Movik, 2011).

Community-led total sanitation (CLTS) is a new grassroots approach based on community participation and social mobilisation. CLTS has recently been emphasised by a number of NTD-specific publications as an appropriate “community-based” intervention model to address critiques of the over-emphasis on top-down interventions for helminths, including many mass drug administration (MDA) programmes. The approach is presented as an alternative to biomedical vertical interventions: it is participatory, community-based, empowerment orientated and aimed at controlling a number of NTDs simultaneously (Molyneux *et al.*, 2011).

The assumption of CLTS, as Mehta (2011:3) states, is that “once people are convinced about the need for sanitation, they construct their own toilets according to resources available.” The goal, then, is to facilitate community analysis of open defecation and the consequences on health and dignity in order to empower communities to build (and use) locally-made latrines (Kar and Pasteur, 2005). CLTS is adapted from participatory rural appraisal (PRA) techniques and includes: transect walks of defecation areas, mapping exercises (household locations, resources, defecation areas and water points), stool volume and medical expenses calculations, and visual aids to show faecal-oral pathways. This process of “community self-realisation” is driven by trained facilitators using “local and crude words for ‘shit’ and ‘shitting’...rather than polite terms” (Mehta, 2011:4). Disgust, shame and fear are provoked to drive the community towards an “ignition moment”: the point when community members are moved to collective action by realising that their environment is contaminated – that they are “eating each others’ shit” (Kar and Chambers, 2008). Basic information on latrine construction is then provided (ideally from other “triggered” communities) and facilitators guide “natural leaders” to form sanitation committees to guide the planning process and set a date for the declaration of open defecation free (ODF) status, commonly three weeks to three months after triggering (Kar, 2010). Innovations in low-cost latrine designs as well as social solidarity, leadership and indigenous forms of penalty (for non-compliers) are all considered important (Kar and Chambers, 2008).

With much excitement, research has shown impressive results achieved quickly and with minimal costs (Bongartz et al., 2011; Harvey, 2011; Mehta and Movik, 2011). Albeit in other quarters, notes of caution and scepticism predominate. In reviewing WaterAid projects in Nigeria, Bangladesh and Nepal, Evans et al. (2009) noted that many ODF declared villages abandoned it over time while others never achieved it. In Indonesia, Jamasy and Shatifan (2011)

showed how different context-specific barriers are not always addressed by CLTS techniques alone. Others have questioned the effectiveness of using a few meetings to catalyse behavioural change (Whaley and Webster, 2011); the ability for the poorest and most vulnerable to participate (Haq and Bode, 2011); the tendency for government agencies to promote reward systems for ODF status that pervert community motivation (Sanan, 2011); the poor quality of many constructed latrines (Wells and Sijbesma, 2012); and the potential for shaming techniques to mimic colonial public health policies based on derogatory labelling and punitive practices (Engel and Susilo, 2014). Kar and Chambers (2008) have conceded that certain “favourable” conditions at the community-level are needed for success, which range from the quality of facilitation, local social and cultural conditions, and physical characteristics. Similarly, Harvey (2011) has argued that “pure” theoretical CLTS principles lead “not to humiliation, coercion or external reward but a strong sense of pride and realization of self-potential...self-determination and on communal responsibility.”

CLTS has the airs of a development success story. Implemented both by NGOs and through state agencies as part of government policy, the approach has spread to dozens of countries in Africa and Asia (Mehta, 2011). To some, this may seem remarkable given top-down institutional structures and past emphasis on subsidies (Chambers, 2011). However, as Roe (1991) and others have shown, development success stories habitually frame solutions in simplified narratives that marginalise other perspectives and reduce complexities to enrol support and resources. With a charismatic leader, CLTS’s popularity has been driven by an attractive policy narrative combining provocative language, quick results, low-cost and the potential for self-help among the poor. This is an appealing combination for donors, including neoliberal institutions like the World Bank (Engel and Susilo, 2014). With the approaching MDG sanitation targets unlikely to

be met – especially in Africa (Galan et al. 2013) – and the sanitation sector in need of rejuvenation, there is a real danger that, once accepted, CLTS will become a “magic bullet, a mass solution to be introduced instantly” instead of being adapted to the circumstances and needs of communities (Chambers, 2011:252). These concerns are well-grounded. Empowerment-oriented donor projects have often become subsumed by narrow, technical, top-down and targeted-obsessed operational practices (Cooke and Kothari, 2001; Cleaver, 1999; Botes and Rensburg, 2000; Harrison, 2002; Botchway, 2001). While the CLTS literature provides guidelines emphasising the need for careful policy development, national and local ownership, good quality champions, flexibility, learning, and robust monitoring and evaluation (Chambers, 2009; Kar, 2006; Kar and Chambers, 2008; Kar, 2010), once institutional “buy-in” has been achieved (perhaps because of promises for big but cheap impact) gaps between theory and practice may run the scaling-up process afoul. This may even led to CLTS being discredited before it has been properly implemented and assessed.

This chapter reflects on the tensions between CLTS theory, policy, practice and rural African geographies. Using a case study of the rapid scaling-up of CLTS in Katete district, Eastern Zambia, between 2012 and 2013, it explores the context of open defecation and sanitation improvement in geographically and socio-economically marginalised rural villages as well as the operational practices of district actors and stakeholders. The study is based on three months of research focused predominately on eight villages (selected purposively for social and geographical variation) in three zonal health catchment areas (Chimtende, Mthunya and



Volumkoko, northern Katete, covering 240 villages and 58,601 people) as well as 58 key informant interviews involving village, district and provincial actors.<sup>3</sup>

## **II. TRANSLATING INTERVENTIONS: FROM CHOMA TO KATETE**

The Zambian CLTS story began with the “serendipitous encounter” in 2007 between Kamal Kar and Chief Macha in Choma district, Southern Province, where a pilot programme proved “a miracle...every household now has a toilet.” This garnered the chief’s support and he then chaired a multi-stakeholder district committee to scale-up relying on politicians, traditional leaders and health staff as facilitators as well as media attention (Harvey, 2011). Over two years, coverage increased from 27% to 67%: 635 of 814 villages were triggered, 25,000 new latrines constructed and 551 villages became ODF (Zulu et al. 2010). Costs were also low, estimated at \$400 per ODF village. Given success, donors and the WASH sector were eager to scale-up. In 2012, the UK Department for International Development (DfID) provided \$30 million dollars to support Zambia’s WASH programme (2012 – 2016) coordinated by UNICEF, including the scaling-up of CLTS over 32 districts by the Ministry of Local Government and Housing (MLGH). CLTS was scaled-up with ambition targets in all eight districts of Eastern Province simultaneously in 2012, including Katete.<sup>4</sup> Records showed 67% of Katete’s mostly rural population did not have improved sanitation prior to CLTS and 42% lacked clean water, roughly

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<sup>3</sup> This included 2.5 months before CLTS and two weeks of research one year after implementation. Prior to CLTS, fieldwork included five days in each village where participant observation and semi-structured and un-structured interviews were used alongside a latrine survey, a village census, two focus groups each with men, women and children groups and a household questionnaire (equal number with and without latrines – 219 households total). These methods were then replicated in the post-CLTS study. Ethical clearance was granted by ERES Converge (IRB00005948). Several research assistants helped with translation from Chewa and quantitative data collection.

<sup>4</sup> Like most other districts in the province, Katete is sparsely populated, culturally Chewa and, outside the district capital, a subsistence-level economy mainly of cotton and maize, also the food staple.

equivalent to the national average (WHO and UNICEF, 2013). The district council planned to trigger 500 of the 1,400 villages beginning in mid-2012; however, one year later not a single village had become ODF and despite the 500 target, only 150 had actually been triggered.

### ***The “Projectification” of Sanitation in Katete***

Understanding past sanitation programmes in Katete helps us appreciate how and why CLTS was unsuccessful. Similar to Rheinlander et al. (2012) in Vietnam, weak state support, poor cross-sectoral collaboration and dependence on inconsistent donor-funding defined the sanitation sector. This included the “*donation*” of high-quality ventilated pit latrines (known as VIPs) and distribution of cement slabs (known as “sanplats”) in the early 2000s by UNICEF. Restricted to a few influential leaders in select villages, many VIPs (with iron roofs, cement and wooden doors in contrast to the bamboo/brick superstructures, grass roofs, mud floors and logs found in most latrines) had been converted into maize storage containers amidst rumours of the project being “Satanist” (given that faeces can be used for ritualistic purposes) and the fact that few latrines were outside Katete town at the time. Similarly, many sanplats, distributed to households who had dug pits and provided sand/stones to mix, were used as bathmats or left unused.

Organised by Environmental Health Technicians (EHTs) attached to local health centres, a participatory approach was then followed. Networks of volunteer-based Neighbourhood Health Committees (NHCs) and Village Health Committees (VHCs), tasked with promoting sanitation and other health issues at the village-level were established. Similar to other health-related programmes in Africa (Emukah et al. 2008), in practice volunteers were difficult to manage, quickly abandoning sanitation after inputs (bicycles, money and food during meetings) dried up. Volunteers remained only in water supply and childhood health outreach where small “*benefits*”

ensured and free distribution of services increased social status in opposition to, as one stated, *“preaching about defecation which no one wants to hear about...without anything to give people.”*

Despite near breakdown of the volunteer-networks, EHTs (educated and from different parts of the country) were formally (according to their job description) tasked with promoting sanitation, and reported to the district medical office. Since the UNICEF project, sanitation had been largely *“abandoned into the pit”* – lack of motorcycles/fuel for outreach, absence of targets/pressure from the district, personal dislikes of inspecting latrines, and staff shortages predominated. This reflected general trends in Zambia where qualified labour shortages are rampant, driven by neoliberal policies, corruption and budgetary shortfalls especially in what are considered unattractive rural postings (Ferrinho *et al.*, 2011). In clinics in Katete, such shortages were severe (i.e. cleaners often acting as nurses) requiring EHTs to limit outreach to vaccinations, deworming and water management to act as clinic nurses. According to the district medical office, this was problematic: *“the problem with these projects is they come and go...what you need is something continuous to remind people of the need for latrines and push them over a long-term.”*

Prompted by the state as part of UNICEF’s “Make Zambia Clean and Healthy” campaign, between 2008 and 2010 the two chiefs in Katete had attempted to do just that, establishing bylaws for the mandatory ownership of a pit latrine, dish rack, rubbish pit and bathroom by threat of being summoned to the palace and/or paying a chicken. With significant powers in Eastern Zambia, chiefs rule through village committees led by *indunas* (chief assistants) and

village headmen, the only form of administration at the village-level.<sup>5</sup> Although difficult to assess the exact impact, this punitive system facilitated the fear and respect required to drive large-scale compliance as almost every household reported to have had a (half-) finished latrine. However, motivation quickly waned when “*the chief became quiet*” and “*the inspectors never came.*” Key informants related this to the bylaws having been pushed by UNICEF as well as the whimsical interests of chiefs in Zambia more generally who, as Gould (2010) states, are more interested in economic and political spoils than helping the rural populace they claimed to represent. Whatever the cause, without further pressure, most households only dug pits, partially finished the superstructure or poorly constructed latrines that swiftly broke.

### ***Different Actors, Different Interests: The Failure of CLTS Explained?***

Despite shortcomings, these sanitation interventions had important lessons for CLTS showing, among other things, the importance of long-term engagement and the involvement of different stakeholders. In Eastern Zambia, funds from UNICEF were given to the Rural Water and Sanitation Units (RWSU) of the MLGH to implement CLTS over a one year project cycle. According to the district-focal person in Katete (a young, well-dressed and educated urbanite Zambian), previous RWSU activities had involved drilling and managing water points, with little focus on sanitation. The council emphasised the need to “*change the minds of these farmers ...we need to make it clear 100% that villagers are alone on sanitation without help from the district.*” However, this emphasis on self-help quickly turned to a laissez-faire management style that came to define CLTS in Katete.

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<sup>5</sup> Although “*the owners of the place*”, Chewa chiefs (in Malawi, Zambia and Mozambique) are under the Paramount Chief, who resides in Katete district but spends little time there. Chiefs are paid a state salary, given various “*bonuses*” and have immense power within their territory.

After a short workshop to train the district team on CLTS in the provincial capital, two identical trainings in different parts of Katete were conducted engaging, in accordance with CLTS principles, EHTs, elected counsellors, the two district chiefs, senior officials and 50 “village champions.” At these workshops, the role of these champions was emphasised in a conscious effort to “*revitalise the Neighbourhood Health Committees from UNICEF to get to the grassroots.*” These “*local people*” were, according to the plan, to trigger villages with chiefs, counsellors and EHTs. Nominated from each Ward Development Committee (WDC) – a local volunteer network similar to NHCs but with links to the MLGH – the criteria for these champions were only that they possessed a grade six education, most of which had participated in an earlier sanitation census. They were then given a bicycle, a stipend for attending the training and encouraged to work on a volunteer-basis until achieving 10 ODF villages, when a “*bonus for their volunteer work*” of 1,000 Kwacha (\$200) would be given.<sup>6</sup>

The MLGH had subsequently acknowledged that many champions were “*not the right people*” since they were reluctant to use “*tuvi*” (shit) in front of elders, improperly entered data (the number of latrines prior to, and after, CLTS), had minimal understandings of the CLTS approach and conducted little follow-ups to triggered villages. This helped to explain why 150 villages and not the target of 500 had been triggered. According to a local politician, this was caused by the champions being “*selected by their friends in the WDCs...where everything is always political*” and so “*abandoned the work once they saw nothing [monetarily] was coming to them.*” Two interviewed champions had sold their bikes after triggering only a few villages, one of which candidly admitted to not having a latrine himself! Even when champions were hardworking (as

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<sup>6</sup>This incentive was only implemented after the national coordinators went around and saw little progress in Eastern Province.

one stated, with the “*spirit of volunteerism and a heart for change in our communities*”), they were given no material, technical or managerial support. They were expected to cover large distances with frequent follow-ups but without any subsequent meetings, incentives or contact with the district team. Showing me well-organised paperwork, one champion, who had never received his promised bicycle, had triggered a reported 18 villages using his own transport, pens, paper and airtime. He was motivated by a sense of altruism as well as rumours of a tiered salary at the end of the project. According to the MLGH, this lack of support had been caused by the “*key people*” (i.e. chiefs, politicians and EHTs) not “*owning the project...they are just sitting on the sidelines even though we have trained them in CLTS!*”

This accusation revealed existing power relations widely considered to structure political and institutional processes in the sanitation sector more generally (Gutierrez, 2007). In contrast, one EHT ascribed the failure of CLTS to “*the poor work culture of the council...nothing ever gets done with those people...they are only focused on paper-pushing!*” Another reflected: “*The local council is not close to the people. They just stay in the Boma and plan water projects. What do they know about sanitation?!...they don’t even know where these villages are located!*” This was also the case with the most significant chief in Katete, Chief Mbangombe: “*I asked about the results afterwards and they said bicycles were given to people and they did the work, but I have never seen any bicycles or heard of any work.*” Although both groups participated in CLTS trainings, none were involved in triggering, saw reporting sheets or did follow-ups with champions since no clear expectations and responsibilities were assigned to them.

The essential organisational and institutional environment so amenable to CLTS in Choma district was seen in reverse. From the start, centralising financial disbursement and planning within the RWSU and MLGH marginalised other actors. Instead of being pushed by a character

like Chief Macha, CLTS had been driven by a few recent graduates from Lusaka and other urban areas that were seen, derogatorily by others, as *“too smart for that CLTS work.”* In turn, the lack of coordination with the traditional leadership structure was built on the distrust and suspicion between local government (both at the district and in rural constituencies under the local counsellors) and the chiefs, driven by wider gulfs in local politics, reflected in ongoing disagreements over land ownership in Katete, among other things. Similarly, the EHTs, who receive funds directly from Lusaka through the Ministry of Health, were perplexed about why CLTS had not been implemented through the medical sector, given sanitation being in their job description. According to provincial officials, this involved political ramblings in Lusaka as well as the desire of UNICEF to build capacity and support the LGMH’s new National Rural Water and Sanitation Programme as part of wider governance reforms centred on decentralisation. As one stated, CLTS was *“pushed by a vision for big but cheap impact to correspond with the MDGs and the LGMH sanitation plan.”*

Provincial officials were quick to emphasise that these challenges were not unique but reflected widespread challenges in institutionalising CLTS in the LGMH throughout Eastern Province; similar to those found in India and Indonesia (Joshi, 2011). Often viewed as a weak institution with poor performance, high staff turnover rates and a record for corruption in Africa (Bratton, 2012), throughout Eastern Province the capacity of the local council was severely lacking: there were shortages of staff and transport (districts having only one water coordinator without anyone assigned to sanitation, as in Katete), no strategic plan at the district-level (incorporating school sanitation, EHTs, traditional leaders and the council) and poor quality data (understandable when we consider that it was up to the local champions to provide this, who often lacked the forms in

Katete). Without a reporting structure in place and confusion over basic operational structures,<sup>7</sup> a cycle of bureaucratic ineptitude predominated, which included the tendency for false reporting. A UNICEF newsletter from January 2013 stated that over 1,641 villages in Zambia had been certified ODF with Katete ranked seventh with 46 ODF villages (UNICEF, 2013). While champions and district officials certainly wanted to “*look good*”, a lack of understanding of the reporting process and the guidelines for ODF status (which required that a dish rack, hand washing facility and bath be present as well as a latrine) also contributed to genuine confusion.

There were, however, successes reported in some districts of Eastern Province, ascribed to active focal persons, dedicated chiefs and work by international NGOs. With disappointing results, CLTS in Eastern Province was moving away from the district to International NGOs like PLAN and World Vision (originally involved in CLTS in Bangladesh) who were considered to be able to implement the approach, in the words of one provincial official, “*according to its real essence on empowerment and not in the piecemeal fashion of what has taken place under the LGMH.*” Despite this shift, one year after CLTS there remained no short- or long-term plan for sanitation in Katete. When asked, officials at the district simply shrugged their shoulders: “*we are not sure what the next step will be...we will have to ask for funds from the donors.*” CLTS had quickly come and gone, continuing the “projectification” of the sanitation sector and engaging little with the real constraints faced by villagers in moving up the sanitation ladder.

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<sup>7</sup> For example, the RWSU in Katete received money in December 2012 for follow-ups with the champions but interpreted the guidelines as only supporting a project end review and hence “*sat*” on the money until the end of the project in May 2013 in order to inspect villages.



### III. THE BUSH: A METAPHOR FOR MARGINALISATION

Although persuasive, bureaucracy and mismanagement alone cannot explain the outcome of CLTS in Katete. Rather, multiple embedded factors drove the social acceptability of open defecation, most unlikely to be addressed through CLTS techniques. Villages in Katete are densely populated (most with less than 100 homesteads) but sparsely dotted between miombo woodlands, savannah grasslands and agricultural fields.<sup>8</sup> Between villages and crop fields (often separated by a perimeter fence), “*the bush*” referred to an area used for open defecation and grazing cattle. In my eight study villages, this area served as a “*communal toilet*” since only 17% (n=148/898) of households had a latrine before CLTS. However, the rural landscape had a double meaning, and the bush was a place both for defecation and a metaphor for social and economic underdevelopment. As with other geographically-oriented representations of people and places – for example, Eurocentric representations of the “Dark Continent” (Jarosz, 1992) – this had political overtones. To district officials and others, “*bushiness*” was related to social inferiority (primitivism and backwardness) while modernity was associated with a “*taming of the bush*.” To villagers, however, “*the bush*” was used to describe socio-economic inequalities; notably, lack of public services (schools, roads and clinics) and unequal terms of trade in agricultural commodities (discussed below). Hence when people expressed a willingness to “*use this vast bush*” for defecation, they were implicitly connecting the difficulties of their living conditions to their sanitation practices, which normalised open defecation in a number of ways.

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<sup>8</sup> Interestingly, Vail (1977) discussed this settlement pattern as the direct consequences of draconian agricultural policies that led to widespread impoverishment in Eastern Province during the colonial period.

First, despite much faecal matter, there was a lack of visible filth in the village. Free roaming pigs, numerous throughout Eastern Province and important for local livelihoods, acted “*as our sanitation counsellors*” by consuming human excrement, considered an essential part of their diet. As one woman commented, “...*you have a feeling like [open defecation] it is dirty, nasty and you feel shy but the pigs eat it so you forget about it.*” While graveyards, ritual areas and directly next to homesteads were “*off-limits*”, this “*quick clean-up*” allowed children up to eight and some adults (during rain or night) to defecate next to the homestead, or inside using a container.

Faeces were, however, considered disease-causing agents; notions of “*proper hygiene*” emphasised latrine use; faeces were never used to fertilise crops; and latrines were constructed away from buildings to avoid “*bad odours.*” Although pigs spread diseases by “*moving faeces from the bush to the dinner plate*”, in agreement with Green (1999), local aetiologies of sanitation-related diseases (cholera, bilharzia, soil-transmitted helminths, porcine cysticercosis and diarrheal diseases) followed naturalist perspectives through multiple pathways involving food, water, air, insects and animals. Their impacts were well appreciated; for example, 64% of households reported at least one member with severe diarrhoea and 11% with intestinal worms within the last six months, equivalent to a recent parasitological survey (Mwape et al. 2012). Diarrhoea was responsible, in the words a headman, “*for killing many children here...also it causes so much sickness among adults...each and every day someone in the village is not moving due to diarrhoea.*” Although people could explain aspects of biomedical models acquired through health centres and outreach programmes, they were rarely fully understood, selectively interpreted or ignored. For example, despite a faecal-based diet, *masese meat* (cyst-infected pork responsible for causing human taeniasis) was still widely consumed. This was linked both to the

association of pig cysts to the consumption of the remains of locally fermented maize beer – due to its physical resemblance – and only a vague suspicion that it could cause “human *masese*” which was often subsumed by the lack of meat availability – *masese* was, after all, consumed as “*hunger meat*.” Hence, uncertainties about causation, multiple transmission pathways and poverty tended to trivialise any one factor (such as open defecation), helping to maintain discontinuities between local perceptions of sanitation disease risk and actual practices.

Second, farming patterns drove seasonally-defined movement between the village and fields that embedded a laissez-faire attitude towards sanitation. During the unimodal rainy season (from November to April), few daylight hours were spent in the village; rather, households were busy cultivating their fields (and, for some, streambed gardens) between 15 minutes and two, or more, hours walk away. A reported 62 percent of questionnaire respondents defecated more in their fields than the village during an average year, reflected in low levels of smell and flies assessed in the latrine surveys.<sup>9</sup> Furthermore, latrines that collapsed during the rains were not repaired until the dry season, regardless of wealth. One of the wealthiest households – owner of a car, television, four solar panels, over 40 cattle and three high school diploma holders – had not repaired their iron-roof latrine for seven months because: “*the bush [in the rainy season] is so high [easy to hide and defecate] and we were busy in the field. We forgot about it.*” With people eating, defecating, playing and drinking in the field for most of the year, disease transmission was considered equally, even more likely, to take place in fields than the village.<sup>10</sup> Given that

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<sup>9</sup> Out of 148 latrines in the pre-CLTS survey, 76% had little/no smell and 74% had little/no flies, despite poor maintenance.

<sup>10</sup> Although borehole water available in all villages, it was rarely brought to the field especially in the rainy season.

almost all latrine-owners still defecated in the open at their fields, local livelihoods reinforced the notion that having a latrine in the village *“only solves half of your sanitation problem.”*

Notions of privacy also served to encourage the use of the bush. Being seen entering a latrine was considered *“disrespectful”* if witnessed by parents-in-law and children. Excuses were given for venturing to the bush such as *“pretending”* to cut firewood or *“look”* for herbal medicines. A person’s level of *“shyness”*, as it was called, was related to education and geographical mobility; if you had *“lived in towns”* or *“gone to school”*, having people see you in the bush provoked the most embarrassment. However, if you *“only knew the village”* then it was the other way around. Individual preferences also varied by age and gender. For example, both educated and non-educated young adults, in their pursuit to *“look smart”* and avoid an embarrassing scene with their peers, preferred the bush despite latrines been recognised as a *“modern thing.”* Most men claimed that privacy and repose were found in open defecating – a place where *“no one can see me”* and *“the surroundings can be enjoyed”* – whereas latrines, situated within the village, allowed people to *“hear our sounds”* and *“count the time you have been inside to laugh at you.”* In contrast, however, married women, burdened with domestic work and childcare, emphasised the nuisances of open defecation: the potential for disease transmission; annoyances of walking far for privacy (especially in the dry season when bushes were reduced); the occasional harassment of being *“spied on by men”*; the snakes, thorns and rain; the embarrassment of telling visitors (especially relatives from an urban area) to use the bush; and the unpleasant experience of spending all day *“alone in the bush”* if suffering from severe diarrhoea or dysentery.

Lastly, poor construction techniques (discussed below) reinforced the idea that latrines were uncomfortable, smelly, dirty and unhygienic – a fact that is often neglected by state planners (Rheinlander et al. 2010). As the most common type was made of bamboo, mud, logs and a

grass-thatched roof, they were often cumbersome to enter and use and deteriorated after a few years, or less. For example, 32% of respondents without a latrine reported that they had previously had one but it had become full or collapsed – often ascribed to hard rains and soft soils linked to environmental change. If not well constructed and maintained, latrines could attract large amounts of flies that “*move from the latrine to the dinner plate*”; act as a breeding places for insects, including mosquitoes and hence malaria; contaminate water sources if constructed too close to a borehole; and be a hazard for young children and animals if it collapsed or when it became full. With dense settlements, such fears led to villages having a defined “*latrine geography*”, according to one EHT, as they were almost solely built by households on the outskirts of the village away from the centre and the borehole, which was supported, in a few instances, by local bylaws.

#### **IV. PREACHING A SANITATION GOSPEL TO THE POOR**

Despite the ubiquity of open defecation, most were not content with “*servicing the bush*” and stressed the link between latrines and *Kuzipasa ulemu* (“*giving myself self-respect*”). A total of 92% without latrines in the household questionnaire claimed so – revealing a gap between desire, intentions and practices. The latrine survey showed that coverage increased from 17% (n=148/898 households) to 31% (n=286/922) in eight villages over the one-year period, if we include those under construction.<sup>11</sup> In some villages CLTS had no impact while noticeable improvements were observed in three (Table 6). Chaata village even showed the potential of

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<sup>11</sup> Although only 23% had finished latrines, the 31% figure (63 new latrines and 75 under construction) is more accurate. Despite assured by the RWSU, a mid-year survey showed 4/8 study villages had not been triggered, reflecting the organisational challenges described above. Funds were then sent directly to an EHT who coordinated local champions to trigger these villages and conduct follow-ups.

achieving ODF status – if sufficient follow-up support was provided, given triggering only three months before.<sup>12</sup> In the context of fragile livelihoods, understanding these different responses requires appreciating latrine construction as a process of “*thriving for development*” where social, economic and technological obstacles had to be overcome, bridging the gap between wanting and having a latrine

**Table 6: Impact of CLTS on Latrine Coverage**

<b>Triggering period before post-CLTS survey</b>	<b>Village</b>	<b>Households<sup>13</sup></b>	<b>Latrine coverage before CLTS</b>	<b>Latrine coverage after CLTS<sup>14</sup></b>
Three months	Chaata	91	18%	84%
	Mpole	137	18%	34%
	Mtulula	93	27%	33%
	Samuel	122	7%	6.5%
One year	Chingwawes	136	6%	25%
	Kalililo	128	33%	33.5%
	Mlozela	103	16%	17%
	Zemba	111	20%	28%
<b>Total</b>		<b>922</b>	<b>17%</b>	<b>31%</b>

<sup>12</sup> During the follow-up survey in Chaata, 27% (n=25/91) had finished latrines while 84% (n=76/91) had latrines under construction: 19 with finished brick superstructures, 20 with logs in place and 12 with only pits. It is unlikely that ODF was ever achieved given the end of the CLTS project.

<sup>13</sup> The number of households given here is based on the post-CLTS survey, which typically increased between 1 to 5 households from the pre-CLTS survey.

<sup>14</sup> This includes those under construction at the time of the post-CLTS study in order to account for the fact that half of these villages had only been triggered three months ago.

### ***The Technical: Wealth and Hardware***

Symbols of modernity, latrines are often the remit of a “village elite” in rural Africa, motivated less by health than privacy, personal cleanliness and prestige (Jenkins and Curtis, 2005; Jenkins and Scott, 2007) and influenced by lifestyles and exposure to latrines over time (Jenkins and Cairncross, 2010). This was true in Katete: latrine ownership was linked to greater access to government inputs, geographical mobility, social support and agricultural productivity.<sup>15</sup> Most had been adopters for some time. Different designs reflected socio-economic differences at the village-level (see Table 7 and Figure 2). This ranged from a connected bath/latrine made of cement walls, iron roof (bought in town), solid door and lock – even a seat out of bricks to allow the owner to “*sit like a wealthy person from Lusaka*” – to derelict buildings, ready to collapse. Although more durable structures required finances, well-designed latrines could be constructed without money; only 45% of owners paid for materials and/or labour, often \$2 to \$20.<sup>16</sup> Not solely related to wealth – a survey in one village showed 75% had solar panels compared to 28% with latrines – barriers in latrine construction were more easily overcome in wealthier households.

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<sup>15</sup> Besides confirmed extensively in qualitative data, the pre-CLTS household questionnaire (n=219) showed latrine owners obtained more fertiliser subsidies (70%/37%), were more likely to have lived in towns (37%/20%), did less piecemeal (27%/74%), participated more in social/income generation groups (62%/40%), were more food secure (76%/43%), and were more likely to own iron roof houses (38%/27%).

<sup>16</sup> An average for the full construction of a grass-thatched latrine made of bricks was 175 Kwacha (\$35): \$70 for the pit, \$30 for the slab, \$50 for laying the bricks and \$25 for the roof.

**Table 7: Latrine Building Material**

	Bamboo	Bricks	Mud	Cement	Wood	Iron	Grass	None	Bags	TOTAL
<b>Superstructure</b>	43%	42%	7%	4%	4%					100%
<b>Pit and floor</b>		30%	40%	30%						100%
<b>Roof</b>						13%	66%	21%		100%
<b>Door</b>	27%				27%		2%	24%	20%	100%







**Figure 2: Latrine pictures from top to bottom:** i) typical bamboo and mud designs; ii) a recently built brick latrine lacking a roof next to a photo of a latrine pit; iii) a boy making bricks for a latrine; a VIP latrine built by UNICEF; and a sanplat also given by UNICEF but left unused next to the homestead.

Where CLTS had least impact, access to durable materials, particularly strong logs, were considered the main obstacle. In the words of one headman, “*after it collapses for the second time you think “why waste my time?!” I would rather use the bush!*” The past UNICEF subsidy programme, which provided “*durable material that lasts long, instead of local things that easily fall apart*”, stuck in people’s minds.<sup>17</sup> Found in 72% of latrines, without subsidies for a cement slab (or a local market), access to *Mbangu* trees (termite and water resistant logs used as slabs that lasted more than a decade, compared to less than three years for others) was essential to avoid collapsing pits. These heavy logs had to be moved by ox-cart sometimes from many miles, given increased deforestation.<sup>18</sup> There were, however, a number of local strategies to strengthen pits: latrine covers (found in 18% of latrines); smearing bamboo superstructures with mud to prevent against termites and weather damage; placing logs horizontally over the pit rather than vertically; applying ashes, battery acid, diesel, and herbicides to reduce the level of faeces (also noted by Rheinlander et al. (2013)); using a lock to prevent unwanted use; building a brick superstructure; and the use of “*local cement*” - mixing mud, sand and loam soil on the floor (done by 5%). Although these reduced smell, flies, and enhance longevity, they were used by few households.

Access to durable material such as *Mbangu* related in dynamic ways to wealth discrepancies. Most villagers claimed that, at the time of the chief’s latrine bylaw, they had constructed a latrine, although it had collapsed or fallen into disuse because of poor construction (most used bamboo without *Mbangu*). In three villages, the consensus of CLTS-created Sanitation Action

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<sup>17</sup> Only eight remaining VIPs existed in the eight villages. Most of the 23% of latrines built with cement slabs used those provided by UNICEF or other NGOs.

<sup>18</sup> This was similarly the case with bamboo, also increasingly hard to find in close proximity to many villages.

Groups (SAGs) was that without better access to *Mbangu* logs (not available within 5 to 10 km radius) ownership would not increase beyond wealthier families, who had two advantages: they owned ox-carts (or had family members with them) and they had larger social networks allowing them access to *Mbangu* from other villages. In the context of village inequalities, the very poor had less opportunity. Land distribution and access to agricultural inputs and markets were carefully negotiated, strongly associated with the corruption and cronyism of hybrid maize seed and fertiliser subsidies (Jayne et al. 2002). Poorer families were allocated smaller pieces of land, cultivated rocky soils, and used inferior farming techniques that produced lower yields and had little surplus to sell. This required year-round piecework or *ganyu* – manual agricultural labour of others’ fields for a small payment or, more often, in exchange for maize (Whiteside, 2000; Cole and Hoon, 2013). As one woman put it, “*you find that you work so hard your own field becomes nothing. You end up living in that poverty with no way out.*” Another quickly added, “*Where can there be sanitation in that!?*”

The impact of socio-economic inequality and poverty did not only extend to select households. In those villages with the lowest sanitation coverage after CLTS, food insecurity took precedence. Inadequate rains led to poor harvests and a delay in payment for last year’s maize crop from the Food Reserve Agency (FRA) – a parastatal and the major buyer of maize – caused many to enter into debt, having taken out 100% interest loans. Households in two villages had just received payment for crops collected nine months previously! Additionally, with input loans driven the previous season by private cotton companies, the price of cotton had also recently dropped further reducing income-levels<sup>19</sup> and there were few private buyers (known as

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<sup>19</sup>The year before fieldwork, cotton prices had been very high due to low supply. Replacing maize fields with cotton, many farmers took out seed and fertiliser loans with private cotton companies who would subsequently

“*briefcase men*” due to their tendency to buy at very low prices) due to rumours of a coming shift in government maize policy. These concerns not only overshadowed sanitation improvements, but instilled a disempowered ethos that resonated little with CLTS principles of community self-help.

Compared to others (and despite *Mbangu* being hard to find), the increase in Chaata’s sanitation coverage were largely the result of greater food security, wealth, mobility patterns as well as improved building techniques. In other villages, bamboo was the most widely used superstructure but in Chaata and Mpole (with the second largest increase after CLTS) the absence of available bamboo precipitated the need for brick structures for all buildings, including latrines. This supported the growth of better building techniques that prevent poorly constructed latrines collapsing after a few years (which de-motivated people) and a noticeable link between well constructed buildings, a sense of pride, and greater availability of bricklayers, whose services could be obtained through a system of barter.<sup>20</sup>

### ***The Social: Gender Inequality and Village Leadership***

CLTS was further influenced by social dynamics at the village-level. An important factor, discussed at length in the literature, involved the quality of triggering. In Katete, this involved village meetings organised by the champions through the village leadership during the beginning or end of the farming season, which meant people were busy at their farms. Although the

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collect the harvest, but the high supply then led to a substantial drop in price in 2013 and many struggled with repaying the loan and meeting other financial and food needs.

<sup>20</sup> While brick structures were the most durable, and most people knew how to burn/make bricks (only possible in the dry season), it required payment to a bricklayer since without the necessary skill, buildings were prone to collapse.

repeated use of the word *shit* and the quantity of human faeces produced in one year impressed many, others emphasised that, having attended sensitisation meetings before organised by the EHTs, NHCs and VHCs, “*this programme just repeated things we already knew.*” In the household questionnaire, 41% reported to have not attended the triggering and, of those who did, only 66% reported that they increased their knowledge and motivation for improved sanitation. This issue was discussed at length by EHTs who felt that, having “*preached behavioural change*” during and after the UNICEF project, many simply “*do not value such motivational talks.*” People were difficult to gather; the walk of shame seldom revealed open defecation sites given the pig population; follow-ups were tricky to arrange with headmen; and lack of technical knowledge on building techniques lowered the status of the champions substantially. Of the different champions involved in triggering, two of three villages with any sanitation improvement (Chaata and Mpole) had been triggered by an EHT and a local champion together, organised by myself (as explained above). In two other villages, respect for elders and the low status of the champion, known derogatorily as “*a local person without any knowledge*”, sidelined aspects of shame altogether as the less provocative term “*he had done toilet*” was used.

Translating shame, fear and community analysis into more latrines requires “peer-to-peer” persuasion driven by village leadership (Dyalchand et al., 2011). Out of eight villages, five established SAGs, as per CLTS guidelines, and set dates for ODF status; others simply relied on the headmen for a plan. Most SAGs had infrequent and poorly attended follow-up meetings. Sanitation bylaws and punishments were drawn up: latrine owners were encouraged to “*lock latrine doors*” to pressure others and fines were threatened. Although significant in Indonesia (Engel and Susilo, 2014), as with the chief’s edicts these were rarely followed, reflecting a wider gulf in the commitment of village headmen, some of which were accused of “*being drunkards*”

*who never do anything for us!*” Some geographically connected settlements were divided into upwards of five separate villages with their own headmen. Previously one village, triggered together, and geographically connected, I considered them village “units.” To villagers, there were clear administrative differences: any action in one required consulting the particular headmen. So, for example, in Kalililo (with no improvement in sanitation), a total of six headman had to be involved in organising CLTS for only 128 households! The granting of village status to small hamlets by the chief fostered poor leadership and petty feuds that made organisation difficult (i.e. searching out the headman from his field). Tellingly, after CLTS, half of interviewed headmen did not themselves have latrines – as one informant commented: *“with headmen without latrines, total sanitation will be a far away.”*

More subtle social relationships and norms were also significant: villages with positive outcomes also had more community volunteers, active and empowered women and support to vulnerable social groups such as widows and the elderly. This was well shown in Chaata where motivations to improve health were not driven by the headman – a quiet, unassuming and ill-kept man who had *“owned the village”* for two decades but himself had no latrine – rather, a young group of men associated with the local school across the road and involved with the NHC since the UNICEF programme in 2005 were the main catalysts. It also became apparent that women in Chaata were more expressive, animated and involved in leadership than other villages.

Similar to Soderback and Uden (2009) in Mozambique, poor sanitation reflected multiple levels of gender inequality. Women desired latrines more than men but it was socially unacceptable to

construct them.<sup>21</sup> Gender roles were clearly divided where husbands had “*complete power*”; in the words of one, “[*men*] own a wife like you own an ox-cart here in this village since I picked her from her village and brought her here.” Community development workers stressed the “*epidemic*” state of marital unfaithfulness, domestic violence and early pregnancies. After CLTS, women would often advocate constructing a latrine, but delay on the husband’s part was the norm.<sup>22</sup> In villages with no improvements, women emphasised their disempowered role in the village and their fear of “*nagging the husband.*” This lack of social solidarity within families also extended to widows, the elderly and the very poor who required assistance if villages were to become ODF. In most cases, however, such groups stressed the difficulties of engaging their social networks to construct latrines. Although indigenous associations existed (village banks, churches, women groups, village committees, co-ops for loans and farming, drama groups and soccer clubs), none helped members with latrines, or were involved in CLTS. In villages with positive outcomes social assistance was stronger, albeit still dependent on family and neighbour cooperation based largely on Christian ethics. As with access to hardware, the level of social solidarity, volunteerism, leadership and gender equality tended to increase with wealth. Achieving ODF status, therefore, would likely involve a final process of motivating the very poor, involving both social support and, perhaps more likely, threats of punishment and taunting, which showed the challenges of maintaining rapid sanitation gains.

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<sup>21</sup> Women were tasked with cleaning and maintain the latrine and cutting grass for thatching, helping make bricks, and smear bamboo with mud. Finding big strong logs or cement for a slab, digging a pit, and moulding bricks or finding and weaving bamboo as a superstructure were “*a man’s work.*”

<sup>22</sup> Some married women “*acted with authority and did a man’s work*”, constructing their own latrine but these were progressive and outspoken women who did piecework and paid another man to construct it

## V. DISCUSSION: LESSONS FOR POLICY AND PRACTICE

Sanitation remains a pungent reminder of global inequity: the fact that, one decade into the 21<sup>st</sup> century, 1.1 billion people practice open defecation. This has significant impacts on the epidemiology and burden of Neglected Tropical Diseases, including soil-transmitted helminths and cysticercosis. Policymakers and practitioners stress the impacts on health, nutrition, education, gender equality, dignity and poverty and the need for more people-centric approaches that link appropriate technologies with sustainable behavioural change. Despite its sceptics, CLTS has emerged as one of the most comprehensive strategies, theoretically grounded in social mobilisation and community empowerment. It offers a particular explanation for past failures and a defined roadmap for how to fix them, framing solutions according to a set of guidelines and manuals easily disseminated, taught and implemented throughout the world. While standardisation is essential for any large-scale intervention, CLTS's popularity – driven by provocative language, the potential for community self-help and promises of quick results and low-cost in the run-up to the MDGs – makes it particularly amenable to being “rendered technical” (Engel and Susilo, 2014). Despite the sanitation crisis demanding action – deadlines have been set; little progress has been made; people are becoming sick and dying – there are multiple perils of rapidly scaling-up behavioural change approaches, and few successful examples (Panter-Brick et al. 2006). Development policy itself, a process of mobilising resources and support, has a precarious influence on operational practices, shaped more by organisational demands, norms and relationships at the local-level (Mosse, 2005). In this context, CLTS risks presenting a façade of “quick-wins” that fosters a “new tyranny” of procedures, methods and power relations with little tangible long-term impact (Cooke and Kothari, 2001). As Chambers



(2011:257) notes, in the process of being translated between theory, policy and practice, CLTS could “...run into the sand, lose momentum, be diluted, distorted, discredited and abandoned...[or] capture the imagination and commitment of thousands...and spread like wildfire.”

Part of a small but growing literature (Bongartz et al., 2011; Harvey, 2011; Mehta and Movik, 2011; Whaley and Webster, 2011; Wells and Sijbesma, 2012; Engel and Susilo, 2014), this chapter has important lessons for CLTS policy and practice in the context of rural African geographies. First, it has shown the nuanced, multifaceted and embedded relationships between open defecation and the social and physical landscape in Katete district. With both a symbolic and geographic quality, “*the bush*” was both a site for defecation –isolated shrubland at the fringes of the village and field – and a metaphor for the socio-economic exclusion of the rural populace, the mass of most Zambians, from the institutions, organisations and economy of the modern state (Gould, 2010). On one level, this drove the social acceptability of open defecation: the ubiquity of pigs acting as “*sanitation counsellors*”; ambiguities in disease causation; perceptions of latrines as unhygienic and prone to collapse; and daily and seasonal movements between the village and fields. These de-motivated households in the context of fragile livelihoods, who had to overcome social, economic and technical barriers to become latrine owners. As a striving for modernity, this involved deliberate effort to seek out durable material, constrained by barriers based on wealth, social networks, food insecurity and unequal terms of trade. Sanitation coverage in Katete was as much a result of structural inequalities – what Farmer (1999) has famously called “structural violence” – as misguided projects focused on subsidies and a lack of awareness among villagers, as emphasised by CLTS. It is questionable, then, whether rapid sanitation improvements can be achieved or sustained in the absence of larger

societal change (McFarlane, 2012). In bold letters, a mural in the district medical office in Katete alluded to this: “*The primary determinants of disease are mainly economic and social; therefore its remedies must be economic and social.*” Indeed, shifts in demography, economy, technology, infrastructure and statecraft were largely responsible for the European sanitation revolution in the 19<sup>th</sup> century, where targeted behaviour campaigns played only nominal roles (Porter, 1999).

It would appear that positive outcomes from CLTS are driven by certain conditions at the community-level and may not work, without adaptation, in many communities or among the poorest. This was also true in Choma district (more socio-economically developed compared to Katete) where Zulu et al. (2010:138) reported that despite huge ODF successes, 20% of villages were not triggered because they were “the furthest from the Choma district administration...[which] may take more years and require more funding to become open defecation free.” Reflecting the wider literature (Mehta and Movik, 2011), the Zambian CLTS Manual emphasised favourable conditions: small settlements, lack of bush cover, unprotected water sources, stable soils, high diarrhoea and no previous subsidy programmes. This research shows that equally, if not more, essential in Katete were access to durable material, technical knowledge, village leadership, more equitable gender relationships and greater socio-economic development. Significant variations exist between and within villages that need to be taken seriously by district-level planners. Targeting communities with these pre-existing characteristics could showcase successes, build confidence in the programme, and provide valuable knowledge about technical and social innovations and barriers. In Katete, numerous local organisations together with important social dynamics (i.e. gender equality, leadership and social solidarity) were not engaged with during the triggering and follow-up process. Technical innovations (the benefits of brick superstructures, the regular plastering of bamboo, the use of loam soil and

*Mbangu* logs, among others) were not engaged with, emphasised or disseminated. The emphasis on behavioural change through village meetings overshadowed other pathways and issues. In some circumstances, shown for example in the lack of access to *Mbangu* logs, re-considering the “no-subsidy” approach may be necessary.

Furthermore, outside a clearly defined budget to engage government officials and others in the triggering process, rapidly scaled-up projects will likely make use of community volunteers, which presents a host of difficulties in an intervention dependent on personalities, working norms, support and incentives. As with other volunteer-based programmes for NTDs, such as the ongoing onchocerciasis control programme in West Africa, there is a need to carefully negotiate incentive systems (Emukah et al. 2008). Using self-interested intermediates and relying on donor-funding such networks can be fluid and short-lived. Participatory interventions more generally have been shown to suffer from multiple challenges: facilitators dominating the process, piecemeal application, elite capture, marginalisation of sub-groups, a pressure for quick results, and inadequate follow-up and support (Rifkin, 1996; Cleaver, 1999; Botes and Rensburg, 2000; Botchway, 2001; Harrison, 2002). The experience with past volunteers in Katete predicted some of these shortcomings, showing the need to engage traditional leaders and EHTs to foster feedback, monitoring, learning and engagement between champions and others. However, historical amnesia predominated.

Clearly, the commitment of organisations and planners are essential to success. However, reflecting the weak capacity of the sanitation sector (Esteban and Heller, 2009; Rheinlander et al. 2012; Mosler, 2012), CLTS in Katete became a narrowly conceived and implemented project, poorly managed and enmeshed in local politics. In the absence of financial incentives, poor relationships and suspicions between stakeholders cemented a lack of cooperation. It continued a

long line of short projects, without any long-term strategic plan to address technical constraints and existing institutional shortcomings. Within this context, an intervention like CLTS is caught in a conundrum of legitimacy. Initially driven by international NGOs, many countries have now implemented it through local government and the medical sector, which have very different working norms and conditioning factors. This study would agree with Mehta (2011) that the medical sector is likely the most appropriate government institution – although locating funds in one department restricts others from gaining access to financial incentives to participate. Arguably, the most appropriate institutional structure for CLTS is to allow initial pilot programmes to be conducted by experienced NGOs, who can then foster collaboration with government departments to scale-up and promote the development of district-level sanitation plans (see Samson, 2011).

A tension between empowerment and quick fixes defines the CLTS policy narrative. Good at mobilising resources, this fosters a reductionism in operational practices and limits adaptation to local constraints and needs, especially over the long-term. Alternative pathways that emphasise sustainability and the complexities of the sanitation sector are likely to become sidelined as programmes move from theory to scale-up. This chapter has shown that in rural African geographies, socio-economic realities hamper idealised promises that disgust and shame, provoked through a few community meetings, will catalyze total sanitation. Rather, changes in state, civil society and citizen relationships together with socio-economic development are required to address the many embedded processes that drive open defecation. Rather than focus on open defecators, there is a need to adapt the CLTS narrative to engage the capacity of the sanitation sector more explicitly, helping to draw together local stakeholders and gatekeepers into new forms of relationships – what Gould (2010), speaking about the alienation of the rural

populace from the modern Zambian state, has called a “new politics of inclusion.” However, as Marsland (2014) discussed in rural Tanzania, the very existence of a public – composed of actively engaged citizens – are often left to the wayside by public health and local government officials in rural Africa, in favour of the more abstract categorisation of local people as crowds and populations in need of behaviour change. Moving from narrow projects to more nuanced interventions adapted to local contexts requires the focus of behavioural change to shift from open defecators to district planners and implementers. There is no “quick-fix” to bridge the gap between theory, policy, practice and improved sanitation for the poor in rural Zambia.

## **CONCLUSION**

While many NTD interventions continue to be implemented through top-down approaches, new organisational arrangements and intervention strategies promise to over-come past shortcomings. This chapter has explored the implementation of an innovative participatory sanitation intervention called community-led total sanitation (CLTS) in Katete district, Eastern Zambia. Crafted through a particular intervention narrative that emphasises community empowerment, appropriate technology and quick results, CLTS has been discussed by the NTD community as a counter-weight to the shortcomings of top-down and disease-specific interventions. In this way, CLTS is presented as an innovative way to transcend the tendency for narrow technocratic approaches to global health for NTDs, and is illustrative of the growth of attention in participation, behaviour change and local ownership of interventions.

Although CLTS aimed to address these challenges, this chapter has shown the tendency for such participatory interventions to easily replicate the same disjunctions between policy, practice and local realities. As discussed in the chapter, sanitation practices, so important to the transmission

and control of NTDs, are deeply rooted and demand a long-term approach to engage with, among other areas, the working norms and capacity of the district teams responsible for implementation. However quickly scaled-up programmes like CLTS in Eastern Zambia, despite the emphasis on community participation and behaviour change, easily overlook these capacity constraints and needs in order to satisfy preconceived targets set by international and national organisations. The case study clearly showed the tendency for global health practice to render societal problems that underpin and drive NTD transmission, such as open defecation, into technical problems that need easily definable technical solutions. The need to engage in wider societal, organisational and structural change is put into the margins, despite the fact that it is precisely such processes that need to be understood and engaged.

While the CLTS narrative claimed to be based on community empowerment, in practice it remained technocratic, subject to local politics and bound by poor management and oversight. Part of the problem with CLTS in Katete, as well as the rabies elimination programme in Tanzania discussed in the previous chapter, involved capacity constraints, the incentives put in place to motivate implementers in the field as well as existing expertise in management. Recent trends in public-private partnerships and market-based solutions promise to transcend these issues and promote sustainability in disease control through new forms of expertise and social forms. But what are the promises and perils of this new focus on the private sector for NTD control in the poor and marginalizes places where NTD transmission occurs? To explore this question, we now turn to the final case study of this thesis.

## CHAPTER 5

# Deadly Flies, Poor Profits and Veterinary Pharmaceuticals: Sustaining the Control of Rhodesian Sleeping Sickness North of Lake Kyoga, Uganda

### I. INTRODUCTION

“We are all going to banish the tsetse fly from Uganda/ By spraying animals every Sunday/ So that they die religiously/ Tsetse and trypanosomiasis are no more/ And we become healthy and wealthy.”

- National stakeholder meeting for Tsetse/Trypanosomiasis Control, Lira, Uganda 2011.

Bursting unexpectedly into song and dance in a room filled with senior politicians from the northern Lango and Acholi regions, the Ugandan Minister of Health (MoH) drew attention to the importance of farmers using veterinary pharmaceuticals, purchased at agro-veterinary drug shops, as a method for community-based vector control. Spread through the bite of an infected tsetse fly, trypanosomiasis refers to both a livestock disease (bovine trypanosomiasis) as well as a deadly (and neglected) parasitic disease – Human African Trypanosomiasis (HAT) or sleeping sickness. Central to colonial and post-colonial agriculture and public health policies – well represented by the title of John McKelvey’s book, *Man against tsetse: struggle for Africa* (1973) – figures portray the magnitude of the problem: an estimated three million cattle die annually, cattle production losses equal some \$4.5 billion dollars and nearly 200,000 people were diagnosed and treated between 2000 and 2009 (Shaw, 2004; Simarro *et al.*, 2010). HAT is actually caused by two geographically separated but morphologically indistinguishable parasites: *T. b. gambiense*, in western and central Africa, and *T. b. rhodesiense* (a zoonosis) found in

eastern and southern Africa where, in Uganda, cattle act as the primary reservoir host. It was the threat of *T. b. rhodesiense* spreading further northwards and having the two forms of HAT geographically merge – a uniquely Ugandan problem which would complicate diagnosis, treatment and control – that brought together stakeholders in finance, health, agriculture and development to Lira district, northern Uganda in the middle of 2011.

Away from the bureaucrats and political advocacy, later that week I found myself interviewing the father of a five year old boy – a “*peasant farmer*” as he called himself – who had just died of zoonotic sleeping sickness in Kole district; a new focus with about a dozen reported cases an hour’s drive along a nearly impassible road from where the MoH delivered his impassioned speech. As people made clear, there were many more unreported deaths; typically the case given similarities with malaria and HIV/AIDS and limited access to healthcare in most rural Ugandan villages (Odiit *et al.*, 2004). Having explained how he sold major livelihood assets (bicycle, sunflower, maize and his only two bulls) for futile medical treatments, the father abruptly stood up. He was angry and, with arms outstretched as if praying, shouted at me: “*But where is the government?! You have this disease and it has just come like a storm! We don’t know about this sickness and no one is here to help us! We are left abandoned and alone...we don’t know what to do!*” Sitting outside his mud grass-thatched house, he pointed to his son’s freshly dug grave and I was struck by the human experience of this complex but deadly parasite, which (re-) produced poverty, misfortune and bereavement among people whose lives are already full of difficulties.

I explained some quick facts, as a crowd had now gathered. First, I clarified how a disease could “*come as a storm.*” Cattle trading and restocking after decades of military conflict in the northern and eastern regions – cattle rustling by the Karamojong (the major ethnic pastoralist group in north-eastern Uganda) that devastated the local economy in the late-1980s, an armed



rebellion against the central government known as the Teso War (1986-1992), and the movement of the infamous Lord's Resistance Army (LRA) into the area from 2003 to 2006 – had helped increase the geographical range of *T. b. rhodesiense* (previously found only in the Lake Victoria Basin) from some 13,820 km<sup>2</sup> to over 34,843 km<sup>2</sup> (Jones, 2009; Picozzi *et al.*, 2005). I then discussed symptoms and urged the need for medical diagnosis and treatment, given that the arsenic-based drug melarsoprol, used in the late stage, causes encephalophic reactions in 5 to 10 percent of patients – being a neglected disease, the pharmaceutical industry has lacked incentives to develop new therapies and the drug dates back to the colonial era (Fèvre *et al.*, 2006). As the villagers made clear, however, the closest treatment centre (where the boy ended up dying) was a few hours' drive south, in close proximity to where some 1,300 cases of zoonotic sleeping sickness had been *reported* since 1998. Such journeys, with their high expense, were taken only after other treatments had failed; the death of an elderly woman “*from that same disease*” not two weeks previously was held up as an example.

With life and death in the balance, I remembered the verses sung by the Ugandan Minister of Health. I then addressed the last comment of the boy's father – “*we don't know what to do!*” – and detailed the differences between bovine and human trypanosomiasis (given that *T. b. rhodesiense* is asymptomatic in cattle) and explained how, as a village adjacent to tsetse-infested swampland, the community itself did not have to wait for the government, which they clearly had little faith in. Rather, I joined in the MoH's song and told them that to become “*healthy and wealthy*” (so to speak) they should organise and pay a community-based animal health worker (CAHW) to treat all their cattle with trypanocidal drugs and then require cattle owners to regularly use insecticides, which also prevent against tick-borne diseases – major causes of cattle mortality in Uganda. This could prevent deaths like the boy and old women, I said. It only takes

some community willingness and coordination. People seemed convinced, and I wished them well and left.

This recipe for community-based disease control had become widely circulated in the Teso and Lango regions – home to the mostly Christian Lango, Iteso and Kumam peoples who depend on mixed-crop livestock farming – through the Stamp out Sleeping Sickness (SOS) project begun in 2006 (<http://stampoutsleepingsickness.org/>). An emergency intervention to maintain a “buffer zone” between the two HAT parasites, SOS undertook a series of mass cattle treatments using trypanocides (an injectable anti-parasitic) and insecticidal spraying in seven districts between 2006 and 2010. In districts still recovering from the atrocities of the LRA insurgency and the social and economic consequences of internally displaced persons camps (IDPs) (Jones, 2009; Allen, 2006), SOS was a “mass intervention” treating some 175,000 cattle over 8,025 km<sup>2</sup> (home to close to a million people) in phase one (2006-2008) and then, covering 733 villages in Soroti and Serere districts, a similar number in phase two. Epidemiological sampling of the original treatments in 2006 showed a 75% reduction in *T. b. rhodesiense* from 0.81% to 0.11% at 3 months, but then a steady increase in transmission (Selby, 2010). There was a need to create a sustainable tsetse control platform to maintain parasite reductions by targeting the vector through increasing the number of cattle being regularly sprayed with insecticides. This prompted a transition to a “bottom-up strategy” in 2008 where five recently graduated veterinary students (and six more in 2010) were financially supported to market and sell the previously donated veterinary drugs (Waiswa and Rannalette, 2010).

In a number of ways, SOS represents a series of popular contemporary trends in global health that promise to transcend the stereotypical problems associated with top-down approaches. First, it was a public-private partnership (PPP) – a “loose consortium” joining together the expertise of

business (Ceva Sante Animals, an international French pharmaceutical company who donated the necessary drugs), academia (the University of Edinburgh in monitoring and Makerere University in supplying final year veterinary students to implement the treatments), philanthropy (IKARE, the charity organisation of the European equity firm Industri Kapital who provided finances and managerial expertise), development (partially funded by the Research-into-Use programme, UK Department for International Development (DFID): <http://researchintouse.com>), and government (the Coordinating Office for the Control of Trypanosomiasis (COCTU) in the Ugandan Ministry of Agriculture was involved, largely to lend national legitimacy). With a flexible organisational structure, high-level peer-review publications, an emerging threat and strong personal relationships among the key actors drove the project forward (Morton, 2010).

Second, the project also engaged in “capacity building” and “institutional change” by driving curriculum changes in the veterinary department at Makerere University towards practical-based fieldwork and community training services, including the newly created Institute for Strategic Animal Resource Services (AFRISA) aimed at addressing the lack of employment for many graduates (Kabasa and Waiswa, 2011). Third, SOS involved the “quick translation” of new scientific knowledge into the field – *“putting research into use”* – including confirmation of the role of cattle in transmission, new laboratory-based diagnostic techniques, modelling data, and the effectiveness of veterinary drug treatments – part of the £38 million pounds of UK research funding on tsetse and trypanosomiasis between 1980 and 2006 (Clark *et al.*, 2013). Based on entomological research (mainly from Zimbabwe) showing that tsetse preferentially feed on the legs and belly of cattle, this included the use of the Restricted Application Protocol (RAP). Only applying insecticide to these select sites by some estimates reduced costs by 90 percent, a strategy used by the mass intervention and the SOS private veterinarians (Torr *et al.*, 2007).

Furthermore, by linking human and animal health SOS also became highlighted at numerous international meetings as a successful “One Health” initiative that went beyond a single disease focus (Zinsstag *et al.*, 2011; WHO, 2011). Aiming to enhancing livestock productivity and create veterinary service delivery networks, the project addressed issues of sustainability and the social determinants of health. SOS went beyond a vertical disease specific intervention to engage more in horizontal veterinary capacity building in rural and remote areas of Uganda.

It was here that SOS was perhaps the most unique. By moving from mass treatments to agro-veterinary business, the project linked business development to public health – engaging in wider debates about social business (or “smart capitalism”), “pro-poor” agricultural markets, rural innovation systems and Corporate Social Responsibility (CSR) (Yunus, 2010; Scoones and Thompson, 2009; Prieto-Carrón *et al.*, 2006). The private veterinarians – having become known as the 3Vs Vets because they sold the three previously donated Ceva Sante products – were envisioned as part of a “social entrepreneurship” initiative combining profits, education, job creation, improved access to animal health and the control of sleeping sickness. According to Morton (2010), support from the private sector partners – as part of a CSR initiative – included an interest to build markets over the long-term, to educate consumers and learn “what works.” Compared to previous community-based tsetse trap projects that have rarely been sustainable once outside donor-led support is withdrawn (Brightwell *et al.*, 2001), this dramatically changed the nature of participation by blurring the line between private and public good.

By assuming that farmers would purchase veterinary pharmaceuticals driven by their interests in maintaining healthy animals (control of ticks is viewed as a private good) while also contributing to the prevention of a deadly NTD – traditionally a public good paid for by the state and development donors – SOS was following tenets of “Bottom of the Pyramid” (BOP) economics.

A critique of traditional CSR initiatives since “they can only go so far...[not] fully integrated with the core activities of the firm,” the BOP position aims to target consumer goods and services to “those 4 billion people who live on less than \$2 a day” in order to alleviate poverty by creating “the capacity to earn more so that [they] can afford to consume more” (Prahalad, 2006:18). C. K. Prahalad’s (2006) seminal book, *“The Fortune at the Bottom of the Pyramid: Eradicating Poverty through Profits”* involves a number of public health examples: soap marketing to address diarrheal diseases, salt distribution for Iodine Deficiency Disorder and low-cost surveillance systems to detect infectious disease outbreaks. According to BOP proponents, we need to “stop thinking of the poor as victims or as a burden and start recognising them as resilient and creative entrepreneurs and value-conscious consumers” (Prahalad, 2006). Targeting products to the poor – in this case veterinary pharmaceuticals – is presented as a “win-win scenario” where international companies benefit financially and the poor obtain access to new material goods, technologies and delivery networks which “empower” them through becoming “active, informed and involved consumers” (Prahalad, 2006). Critiques of the BOP position, however, have accused it of romanticising the poor, neglecting the importance of the state in poverty reduction, an over-emphasis on micro-finance and “doing much more harm than good” (Karnani, 2008; Karnani, 2009).

Using SOS as a case study, this chapter reflects broadly on these emerging trends within global health. Drawing on the anthropology of human pharmaceuticals – where the “social lives of medicines” are traced (Van der Geest, Whyte & Hardon, 1996; Oldani, 2004), my analysis of the SOS vets is situated within the local world of veterinary drug providers and consumers – business norms and values, the exchange of medicines, the activities of “mobile doctors” and the perceptions and practices of livestock-keepers. To this end, the chapter specifically unpacks the

notion of sustainability. Through a rather unique set of actors and strategies, SOS sought to link public health to business, rural markets and livestock development. This promised to move beyond narrow, preconceived intervention strategies (as seen in the last two case studies of this thesis) through a compelling local incentive structure. This research is based on six months of fieldwork conducted between 2011 and 2012 on the veterinary pharmaceutical market in four adjoining districts that form the core of the SOS intervention, straddling the administrative divide between eastern (Soroti and Serere districts) and northern (Dokolo and Kaberamaido) Uganda.

## **II. MAKING BUSINESS, BUILDING PROFITS**

The SOS vets – which totalled eleven recent Makerere graduates divided between phase one (2008) and phase two (2010) of the mass treatments – were given the two seemingly reconcilable goals of creating agro-veterinary businesses and controlling sleeping sickness. This was to be primarily done by “initiating and coordinating a commercial logic for livestock owners to purchase the three Ceva products and ensure the products are widely available at all key points in the SOS area” (Morton, 2010:31). Given a salary, equipment (motorcycles, phone time and fuel) and a 25% commission on the Ceva products in order to incentivise sales to other drug shops, the vets were initially (in phase 1) mobile salesmen and community educators travelling to livestock markets, trading centres and villages spreading health messages and selling products. The lack of access to veterinary pharmaceuticals and the dependence on SOS salaries – an initial study found that only 10% of income was coming from sales (Morton, 2010) – drove the need to establish permanent drug shops in 2008. One SOS partner reflected: *“There was no plan then...we had to adapt to the emergency situation as we went along...it became clear [over time] that there was a big lack of vet drugs on the ground and a need to increase the number of cattle being sprayed monthly [with insecticide].”*

As in much of rural Africa, qualified veterinary staff in the area were in short supply, the profitability of private veterinary practice remained uncertain – especially given the deterioration of the commodities market in the face of the LRA – and the capacity of the district veterinary sector lacking (Leonard, 2000). According to one District Veterinary Officer (DVO):

“The production department is under-funded; we are overlooked by the politicians. This has come about from three “big bad words”: privatisation, decentralisation and liberalisation...thrown on us by SAPS [Structural Adjustment Policies] in the 1980s...funding either comes from begging the local politicians or sporadically for large programmes from the national-level...it is hard to plan anything!”

Given the lack of state involvement, the private drug market was an integral part of supporting agricultural production given that oxen – together with hand hoes – were used for ploughing fields; owned by roughly 30 to 60 percent of households in any given village.

Trading veterinary goods and services – the principal activity of any business – was discussed in distinct spatial terms by the SOS vets. In an effort to “*reach deep into the village*” and enhance access for the poor, they had been encouraged to establish their shops in remote areas and to “*move up and down to conduct sensitisation at the grassroots*” while engaging in “*strategic partnerships with government and other providers.*” This included vast geographical distances – my four study districts (the core HAT endemic area of SOS) included seven 3V Vets for some 630,000 people, 406,000 cattle and 5,340 km<sup>2</sup>. This rural geography – composed of extensive permanent and seasonal swampland and remote sub-districts with unpaved dirt roads and villages accessible only through small footpaths – created logistic challenges that were viewed as “*continuously threatening our profits.*” This involved high transaction costs (which included transport to Kampala to acquire stock) as well as the inaccessibility of many areas in the wet season due to the impassable roads.

The vets – many of which emphasised the need to be “*daily in the field on our motorbikes to communicate with farmers*” – expected long-term support in facing these pressures. However in moving from “*mobile men*” to “*putting down roots*” in establishing their shops, the opposite occurred. While salary support was continued, additional cash given to buy stock (including other veterinary drugs) and business training provided (including laptops to keep inventories), contrary to the initial sensitisation stage inputs to maintain community outreach (fuel, phone airtime, small payments to village leaders, and motorcycle maintenance) became the financial responsibility of the vets themselves. This was based on the notion that sustainable tsetse control was equated to sustainable businesses. However this encouraged the 3Vs to, in the words of one, “*stay seated in our shops...[since] if you go out to the village you are paying from your pockets.*” Gradually, therefore, the amount of time the vets engaged with villagers decreased so that few of the vets established in 2010 spent anytime “*travelling to remote places...unless we are called by a customer.*”

The relationship of geography to business was also discussed in another respect. Transport routes were considered “*sites of competition,*” revealing that the particular location of a shop relative to other animal health providers and “*local centres*” (groupings of small shops selling produce, human medicines and soda, cigarettes, soap, beauty products, clothes and trinkets) were significant. Despite the emphasis on locating SOS shops in remote areas, the two vets (out of seven in my four study districts) that were the most successful – with double the amount of profit – were not “*out in the bush*” but along two of the main district roads: on the national highway and near a district headquarters. In contrast, the other shops – accused by the two more profitable vets of not doing proper “*tracer studies*” – were in more remote areas where lower profits had led two vets stationed in the most northern reaches of the SOS area (more heavily affected by the



LRA to the north of my specific study districts) to abandon their shops and drop out of the project for other more profitable work.

Most of the vets were clearly, according to one, “*struggling for our businesses*,” something that was discussed in two interrelated ways. First, many complained of high competition not only from animal health workers (both trained and untrained “*quack doctors*”, discussed below) but also from a proliferation of other veterinary shops. In fact, between the establishment of SOS in 2006 and fieldwork in 2012, there had been a huge proliferation of agro-vet shops: a questionnaire survey I conducted as part of my research showed that out of seventy-four identified shops in my four study districts (with a range of products, profitability and education of owners and attendants) 80% had been established in the last five years (Bardosh et al., 2013).<sup>23</sup> Since the end of the LRA insurgency, the area had “*come up...you now see many permanent [iron roof] houses where before you saw only camps all around, high bushes and children with so much swollen bellies and suffering...now everyone is looking to make money!*”

However the second narrative emphasised the difficulties of engaging with the client-base. Livestock-keepers – mostly illiterate peasant farmers – had a “*poverty of the mind*”, were “*drunkards and laggards*”, “*adapted slowly like snails*”, suffered from a “*handout mentality driven by western NGOs in the camps*” and “*had not embraced the idea of preventative medicine...they only pay when the animal is almost dead!*” While the two more profitable vets took different positions, the others emphasised the differences between southern Uganda (most were from Busoga and hence did not speak Ateso, Kumam or Langi, the local languages) and “*the north...where people just want animals for prestige but don’t care for them*” and “*are less*

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<sup>23</sup> Revenue ranged from slightly less than \$400 a month to over \$2000 dollars per month of which profit was roughly 20 to 30 percent of revenue.

*commercially-minded and backwards.*"<sup>24</sup> In the context of rain-fed agriculture, seasonal shocks to farmer income (i.e. driven by a cattle quarantine for Foot-and-Mouth Disease), climatic change (long dry seasons followed by severe floods), rapid inflation of the Ugandan currency and hence commodity prices, and the social repercussions of war created deep-seated, structural challenges for such rural businesses. This also included, as was repeatedly mentioned to me during interviews with villagers, land fragmentation driven by population growth. Many fathers expressed desperation at how they would divide one or two acres of land between a few sons. Interestingly, however, this process itself may have had a significant impact on reducing sleeping sickness in Serere district since 2004; since intensive farming is known to reduce tsetse breeding sites.

For the vets, these financial difficulties and cultural differences were embedded within notions of professionalism. Of the 19 fully trained veterinarians in the four districts with shops (including the seven 3V Vets) all were simultaneously employed as government extension officers and/or were involved in a wide variety of other agricultural-related businesses. Three of the 3Vs were rarely found around their drug shops at all, but spent most of their time in other districts. Being involved in the daily running of the shops was "*only temporary...a springboard for future ventures.*" As one SOS vet candidly put it:

"I am an educated person not like those quack doctors. They are local people but I am a professional person from Kampala...you cannot languish in these remote places while you see your friends are rising higher making big farms and running around in different things...my aim is to establish this shop and then move on..."

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<sup>24</sup> Interestingly, both Teso and Lango regions traditionally had little centralised political authority – in contrast to the centralised authority of the monarchy in Buganda – but was rather composed of a "stateless" society where leadership was more fluid (Jones, 2009). Both Teso and Lango had been home to pastoralists in the early 20<sup>th</sup> century.

The main concerns of all shop owners, therefore, were ultimately with profit: turning over stock, maintaining capital, attracting customers and creating a self-sustaining enterprise that could be maintained minimally. Despite being illegal – Ugandan law stipulates that the owner must be present on a full-time basis – this left the attendant to tend to customers, who would only call the owner for important inquiries or personal field visits. This echoes a study by Bett *et al.* (2004) in tsetse-infested areas of Kenya where under-qualified shop keepers provided little knowledge support to farmers. Unlike many of the other veterinary shops, where attendants often had little actual animal health knowledge (often being relatives of the owner), the SOS vets generally hired people with at least some prior experience and also helped to train them. This was done as part of their efforts to build capacity but also, at least partially, because most of them were also dependent on assistants to communicate in the local languages. The 3V Vets also spent much more time, predominately in the first 6 months of establishing their shops, directly dispensing advice to customers and talking with community-based animal health workers in order to build trust and their reputation.

A veterinary shop, after all, was not only a physical location for purchasing drugs but also for seeking out, obtaining and exchanging information: on disease transmission, drug types, pricing, drug dosing, injection procedures, prevention methods and breeding strategies. Different types of customers entered these shops, with different presupposed ideas about disease aetiology and which drugs were effective. Given that farmers often entered shops – not wishing to pay the expense of having an animal physically assessed – with a list of symptoms expecting a clear diagnosis and treatment, interactions were social affairs built on trust, doubt and consensus building. The movement of bottles, syringes and papers together with shouting and contemplative stares were commonplace, personal relationships had important consequences for

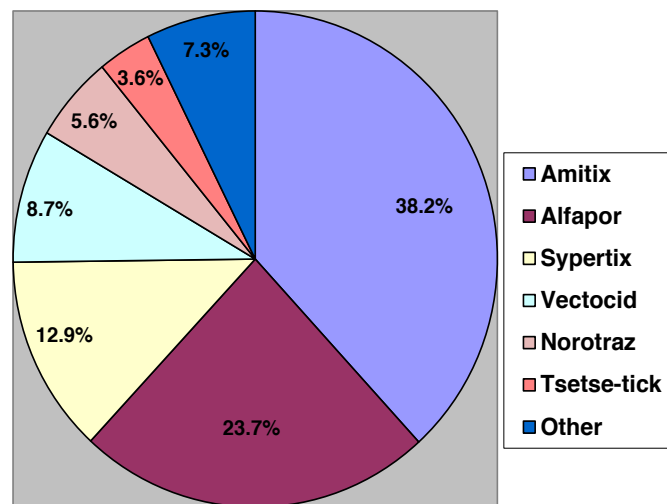
bargaining, and fellow customers would often voice their opinions – similarly noted by Craig’s (2002) discussion of human pharmaceutical practices in Vietnam.

In this social performance, it was also common for the shop keeper to prescribe what he/she believed were inferior products, inappropriate dosage (especially given that weight is essential to dosage) or treatments of dubious quality if it was clear that the customer did not have the money to “*follow the proper recommendations.*” This was noticeably reduced in SOS shops where there was a much stronger emphasis on “*proper knowledge*” and “*value over prices,*” although even the 3V Vets acknowledged that this was a persistent tension (something that was emphasised in interviews with their assistants). Farmers, after all, were seeking out assistance to their problems and expected the “*professional people*” to solve them. This interaction was not structured by deference to “objective” scientific knowledge; rather, it involved the preconceptions of the farmer, the available money and the persuasive power of the shopkeeper.

Outside the knowledge system of the (rarely read) information packets and training of the shop attendants and owners, healing was itself, to a degree, objectified and made tangible through pharmaceuticals as commodities (Geest and Whyte, 1989). Hence, shop attendants had to “*play the game...I have to give him something [that is cheap but not so effective] so that he is happy even though in my heart I know it will not work.*” Given such therapeutic anarchy, the SOS vets stressed their distinct role in providing “*superior products*” and “*accurate and effective information.*” However, most shops (including most SOS vets) emphasised that farmers cared much more for price than quality and that inferior products, if cheaper, were more important to stock at a “*farmer friendly price*” since they were guaranteed to be sold. As one vet stated, with important repercussions for tsetse control: “*business is not about gathering dust on the counter.*”

### III. SPREADING THE VECTOCID GOSPEL

The multifaceted challenges of establishing and maintaining rural businesses in a post-conflict region (orientated, as discussed above, around geography, competition, professional values and business norms) as well as the tension between business interests (to make money, to be perceived as cheap and to retain customers) and the desire to provide sound scientific advice, was reflected in the sale of Vectocid – the SOS insecticide (also known as an *acaricide*) that formed the core objective of the 3V Vet initiative. The vets were given targets of selling around 10 litres per month with an original study in 2008 estimating that 20% of the cattle population (30,000 cattle) was being treated monthly (Morton, 2010). However, my questionnaire with all identified drug shops showed that of 12 insecticide products on the market in early 2012, Vectocid only had an 8.7 percent market share and roughly half of insecticides were amitraz compounds, only effective against ticks and not tsetse; in contrast, pyrethroids (the other category of products) target both ticks and tsetse flies (see Table 8 and Figure 3). There were a number of reasons for the low market share of Vectocid and the popularity of amitraz products.



**FIGURE 3: The acaricide market divided by product sales.** Based on data from 48 veterinary shops that exclusively imported products from Kampala, showing an estimated 640 L sold monthly in the rainy season in 2011. Note that Amitix and Norotraz are amitraz products while Alfapor, Sypertix and Vectocid are pyrethroids.

**Table 8: Acaricide brands marketed and sold**

Target vector	Brand name	Compound	Recommended dilution	Price range of 100ml bottle (UgSH)
Ticks	Amitix©	Amitraz	2ml:1L	5,000 – 8,000
	Milbitraz©	Amitraz	2ml:1L	7,000 - 9,000
	Norotraz©	Amitraz	2ml:1L	5,000 - 7,000
	Supona ©	Chlorfenvinphos	1ml:2L	6,000 – 7,000
	Tactic©	Amitraz	2ml:1L	8,000 – 10,000
Ticks and tsetse	Alfapor©	Alpha-cypermethrin	1ml:1L	6,000 - 9,000
	Decatix©	Deltamethrin	1ml:1L	9,000 – 10,000
	Paratryn©	Cypermethrin	1ml:1L	10,000-12,000
	Sypertix©	Alpha-cypermethrin	1ml:2L	7,000 – 13,000
	Tsetse-tick©	Cypermethrin	1ml:1L	Not sold in 100 ml
	Cypermethrin-10 EC©	Cypermethrin	1ml:1L	8,000 - 10,000
	Vectocid©	Deltamethrin	1ml:1L	10,000- 15,000

Vectocid was by far the most expensive insecticide. Initially, the international animal health company involved in SOS subsidised the price in what was supposed to be a “two-for-one-deal” but this was never properly conveyed to farmers and not fully understood by the vets either. After a problem with distribution on the side of the Kenyan manufacturers which made it unavailable for a few months just as education efforts had begun to attract attention, the wholesale price for a 100 ml bottle doubled in price (from 5900 UgSH to 9100 UgSH), and was set to go up further to 15,000 UgSH in late-2012 – store prices in early 2012 were between 10,000 (\$4) and 15,000 (\$6) UgSH. Hence, farmers accused the 3Vs of “being expensive”,

*“stealing our money”* and *“cheating us.”* In turn, the vets explained that, aside from the devaluation of the Ugandan currency, this high price was the cause of the official dealer of Ceva products in Uganda (Coopers) positioning a high-quality product in a competitive market, paying attention to long-term sales and market position throughout the country. Despite its expense, Vectocid was known as the most effective insecticide since it *“killed everything and made the ticks fall off the crawl”* with reports of a residual period upwards of a month. In comparison, the most popular insecticides had a residual period of less than one week – Amitix, an amitraz only effective on ticks, had a 38.2 percent market share and was sold at 5,000 (\$2) to 8,000 (\$3.2) UgSH per 100 ml bottle – whereas the second most popular one (Alfapor, a pyrethroid with 23.7 percent market share) offered two weeks of protection and was sold at 6,000 (\$2.4) to 9,000 (\$3.6) UgSH (see Table 8). However, many farmers and vets emphasised that such residual periods were often less than this due to tick resistance, complaints that were never made against Vectocid.

Supported by radio advertisements, the mass SOS treatments that actively promoted it and then the 3Vs, Vectocid was nonetheless a product *“for specific customers”* who had *“grasped the logic of the Vectocid gospel”* – that is, effectiveness over cheap things. In the words of one shop attendant, it was *“for those who have gone to school and understand how to do simple math!”* This mathematic involved understanding that, although more expensive upfront (whether bought in millilitres in old human medicine containers, or by bottle), overall costs of regular spraying needed to prevent tick-borne diseases and bovine trypanosomiasis were reduced because of the longer residual period – especially if the customer was following the RAP method. Furthermore, most of the pyrethroids were also cheaper, if farmers were following the dilution rates that were explained, rather incoherently, on the bottle. Veterinary personnel emphasised that pyrethroids

only required 1 ml/ 1 litre of water to spray one animal whereas amitraz products required 2ml/ 1litre, which either equalized the price (as was the case in comparing Vectocid to Amitix) or made them less expensive – not to mention their dual impact on both ticks and tsetse (additional farmer perceptions of products are also discussed below).

Following tenets of BOP economics, Vectocid was targeted towards “value conscious consumers” – as discussed by Prahalad (2006). Being “*preachers of the gospel*” this was the primary work of the 3V Vets; however, the work proved difficult. While there were areas with relatively high sales this was often caused by Vectocid being promoted by the local agricultural extension officers, sold to commercially-minded animal health workers to “*make a name for themselves*” and, a marketing trick of the 3Vs, the only option for customers to buy in millilitres. The high price was also a deterrent to shop keepers. Even those that actively promoted pyrethroids and understood the importance of tsetse control for sleeping sickness, Vectocid was seen as a “*risky product*” since it would tie up more capital and threaten perceptions of a given shop as cheap. Hence most Vectocid sales were only from the 3V Vets themselves and a few shops in the district capitals. As one SOS vet commented:

“Even though the product is superior, the price is overshoot. It is too high and it lowers my sales since farmers perceive me as expensive and avoid coming to me for other problems...the people told me “Doctor, I thought when the Makerere students came they said that your shop would be cheap but you are too expensive!...you see my problem?!”

In an effort to manoeuvre between the support offered by SOS and local business realities, most of the 3Vs had begun stocking and selling other insecticides, including those that were not effective on tsetse flies. This was similarly the case for other professional vets, including the shops of all District Veterinary Officers (DVOs). Although most of the seventy-four vet shops had a few poorly placed, sometimes half-ripped, insecticide information posters obtained from



their suppliers (including a number found in SOS shops developed by the project), they were all in English and not always very clear. Participant observation also showed that many shop attendants, who were often poorly paid, clearly lacked any motivation to explain the scientific basis of insecticide use to farmers. This is similar to other studies among human health workers in Uganda; as Whyte (2000:136) noted, “Patients seldom ask questions...[nor are they] informed about their diagnosis or the name of the drug prescribed.” Engaging farmers in the simple difference between amitraz and pyrethroid products was not a priority – and had noticeably decreased in importance over time in the 3V shops.

Contrary to the more sociable interactions for injectable drugs (where drug dosing was fundamental since injections were done by farmers themselves), discussions about insecticides typically involved farmers entering a shop and saying, “*You give me an acaricide*”, or else asking for a specific brand product they had used before or had heard about from a neighbour or a mobile animal health worker. A purely commercial action then followed where the shop keeper quoted differences in price and volumes. As one of the most active 3Vs stated:

“I have gone to those shops in Otuboi [an area with many sleeping sickness cases] saying: You can change the buying attitudes of farmers! You are the ones to explain and tell them about the power of Vectocid and how it will help them. You need to explain the logic...but you find they are still only stocking amitraz since they just want a big profit and do not have the community at heart...they don’t even inform people of the options.”

Situated between commerce and medicine, as noted by Whyte, Van der Geest and Hardon (2002) in their study of human pharmacies, veterinary shops all acknowledged this tension between “*helping farmers*” and “*making money.*” In the end, however, the idea that “*customers always know best*” and that they “*should not be pushed...let them have their choice*”, predominated. Whyte (1997) in Uganda also noted that despite trained human health workers “knowing about the importance of diagnosis and treating pathological processes, they act like all retailers to

please customers.” One DVO, who had a shop in a sleeping sickness endemic sub-district, explained to me:

“I have been very active in discouraging the use of Amitraz when in the field [as a government officer] and in every discussion with people I promote Vectocid since farmers know it is better...but in business we have a liberalised economy and I have to go to the tune of customers. Paravets are my major customers and they move around from Soroti to Kaberamaido to Dokolo so I have to stock what they want which is the cheapest [insecticide].”

The conflict between cheap things and quality products and the tension between profit and tsetse control was also framed by vets themselves as a common dichotomisation of farmers as two general types: “*backwards*” (farmers that were viewed as stubborn, stupid, lazy, bad with money and unable to think analytically) and “*modern*” (farmers that were critical thinkers, able to interpret new information, plan ahead and hard working). The veterinary market was influenced by notions of a knowledge deficit where educated (and not so well educated) shop attendants categorised farmers as ignorant (Scoones and Thompson, 1994). The “*stubborn*” tendency of farmers “*not understanding logic*” was believed to be more prevalent in certain areas, even discussed as a “*disease of backwardness*” that covered whole sub-counties and “*shielded the light of proper thinking*” where it was related to drunkenness, divorce, food insecurity, corruption, lack of education, absence of religious faith, and other things. To shop owners and attendants, therefore, efforts to persuade such farmers to use pyrethroids were not only time-consuming but also a waste of time. They were “*stubborn and unwilling to change...they cannot interpret new ideas and only want the cheapest option.*”

When pressed in interviews about their lack of education to farmers on insecticides, shop keepers used religious metaphors, emphasised that informing farmers about insecticide differences was done only when “*the ground for conversion is [already] prepared.*” This related to a popular

religious belief that being saved by Jesus Christ only happened when He “chose” you, in contradistinction to the more widely held protestant view that Christian salvation is open to everyone. As one shop owner, after I commented on his interactions with customers, told me, *“The grounds for conversion had not been prepared in the mind [of that customer]. We should not waste our time, just as Christians cannot waste their time with people Christ has not chosen.”* However this dichotomisation did not always stand-up – vet owners and attendants all emphasised that even so-called *“modern farmers”* could go back to using what they themselves believed to be inferior products since it all depended on available income; known as *“the pocket.”*

Given the challenges of engaging farmers and the high price of Vectocid, the 3V Vets all accused the SOS project of *“not thinking about the sleeping sickness problem.”* Similarly, most district officials believed SOS was more about *“making money and muscling into the market”* for the pharmaceutical company. As one stated, *“I think that was more of a research project...this disease is really tricky to control...if you want to eliminate [HAT] you will need more people and resources on the ground...they should think about subsidies.”* Given that farmers generally *“only look at expenditure and not the value added”* other insecticides that *“still did the same job”* at a much reduced price were preferred.

Within this context, the 3Vs had become but one more veterinary shop in an increasingly competitive market as their capacity to engage farmers and shop keepers in behavioural change was limited by the high price of Vectocid and a tendency for them to be engaged in other activities. Some SOS partners wondered: *“Is this business or public health?”* The two were equated in the SOS model, but having young educated professionals eager for profits and prestige tied to the most expensive product in a post-conflict subsistence-level economy was

problematic. In their efforts to “*keep our heads above water*” the emphasis on human health became an abstraction (or at best, a vague goal) used to rationalise activities but rarely to orient them. So, for example, despite upwards of 50 reported cases of sleeping sickness each year in these four districts from 2008 to 2012, there was no communication between the vets and the district sleeping sickness treatment centres and only one instance of a 3V Vet targeting an active village for sensitisation, which came about through a chance encounter with a medical officer. A combination of professional values, business practices, geographical remoteness, social norms and a competitive market limited the number of people “*converting to the Vectocid Gospel*”, questioning the poor as “value conscious consumers”, as promoted by Bottom of the Pyramid economists (Prahalad, 2006).

#### **IV. REACHING TO THE GRASSROOTS: VILLAGE NETWORKS**

It was never the intention of the SOS model to fully rely on the vets to educate and sell pharmaceuticals to farmers. Rather, the project engaged village-level actors by establishing a network of community-based animal health workers (CAHWs), linking the interests of the pharmaceutical company and the private vets with a new form of community-based vector control centred on participation, sustainability and profit motives. This involved creating jobs, facilitating better product access, formalising and training animal health workers and increasing the use of Vectocid. These activities were envisioned to be based on a “*backbone*” of spray teams – according to one vets these were to be, “*local people who are willing to move household to household, village to village spraying animals for a small fee.*”

The strategy to create these “*village sprayers*” was based on cultivating “*business partnerships*” but differed substantially between Phase One and Two. During the first phase, Vectocid was

given on credit and a spray pump loan initiative (given that hand pumps were prone to breakage) was used to enroll and train people to “*go around their area*” (i.e. in villages surrounding their own) with a goal of 1 litre of Vectocid per month. The model had a sound logic: Give basic training on animal health, provide people with some incentives (training, spray pumps on loan and drugs on credit) and help to monitor and support their progress. A “Spray Team Empowerment Workshop” in 2010 involved distributing protective gear, gumboots and colourful orange overalls with the SOS logo to 75 sprayers to galvanise commitment, support and address complaints of the toxic effects of insecticide use – Vectocid (and other insecticides) were known to cause skin rashes. The incentive structure was also economically appealing: purchasing Vectocid at 85,000 UgSH per one litre bottle (2010 prices) and spraying 1,000 animals at 300 UgSH each month (the agreed spray team price) would equal 300,000 UgSH, a profit of 215,000 UgSH (slightly less than \$100 US dollars), a not insignificant monthly income. However, while some sprayers had certainly disseminated information to endemic sleeping sickness villages – many used drinking joints and churches, some even using “*demonstration cows*” where they sprayed different insecticides to “*show the power of Vectocid*” – most 3Vs had abandoned the spray team model over time. Why was this?

First, geographical distances and social norms made it difficult to organise cattle herders to assemble on set days in order to have animals sprayed together for a fee. All of the 3V Vets had, at some point, organised villages for mass treatments (using trypanocides and insecticides) at a reasonable cost per animal, but these had proved largely fruitless, ascribed to the history of conflict in the region driving an expectation for “*free things*” as well as the association of the SOS campaign – and hence the mass treatment of animals with Ceva products – as a free government initiative, making farmers suspicious of paying. In order to address the problem of

“*chasing after people*” and “*moving long distances*” in search of customers – farmers rarely abided by a set spray routine (discussed below) – sprayers, on the advice of the 3Vs, had attempted to follow this model and organise groups of households and villages for mass monthly sprayings, which often involved building a village crush (a wooden structure used to channel the animals during spraying) and paying local leaders for mobilisation. The original hope was to have “village spray teams.” However local realities were more complicated; in the words of one sprayer:

“It was so much work to run after people individually so I organised households together...[but] people are just not organised...the first month I got about 200 animals but again it was too much work for so little money...then very few came and everyone wanted free things they spread rumours that I was using government drugs for my own profit!”

Similar experiences had occurred in the mid-2000s when a number of NGOs as well as an EU-funded tsetse control project (Farming in Tsetse Controlled Areas, FITCA) had attempted to reinstate cattle dips and establish farmer-based spray groups. Both proved short-lived since, as a district official stated, “*farmers received money at different times and would rather spray on their own schedule*” as well as avoiding the need (and bother) of moving cattle to dip or spray points, which could cause conflict with other farmers if crops were destroyed in the process given the high population density. These issues were also discussed in reference to the effects of war and poverty on collective organisation and village cooperation more generally (Jones, 2009). As one old man put it, “*the collective will here in Teso has gone away...there is no longer a heart for working together. It went away with the [IDP] camps.*”

Furthermore, there were also challenges with the incentive structure of engaging such spray teams. There was a high run-over rate; for example, one 3V shop reported to have trained 48

sprayers but had only 13 still in operation six months later. Sprayers that attempted to remain in specific geographical locations – trying to spray animals within easy travel distance from their homes – encountered multiple “*barriers in business.*” Seasonal fluctuations in farmer demand, difficulties in maintaining capital to buy new stock and a lack of what sprayers perceived to be “*promised inputs from SOS*” (gumboots, posters, bicycles, overalls, pumps, etc...) served to excuse sprayers “*dropping out and returning to their farms.*” There was an expectation that, given SOS was a donor-funded project, free inputs or, in the very least, proactive marketing support and other incentives would be provided.

In reality, however, going “*house-to-house*” for spraying was unattractive since it involved much work and “*only ends in small profits.*” As shown by a few examples of “*successful sprayers*”, the people with the ability to organise their time, money and customer base to carry out spray routines wanted to move away from spraying into the treatment of animals, which would also involve (as with the 3V Vets themselves) the stocking of different drugs (insecticides, de-wormers, trypanocides, and different injectables). As one explained:

“I am so thankful for the SOS since they gave me training and helped me to get my initial money spraying animals...they gave me the knowledge to help farmers on treating animals and even helped me get drugs on credit...from that moment now I am so successful and I have a motorcycle that helps me move around big areas treating animals and getting good money as a vet to support my family.”

Contrary to the 3V model of spray persons moving from village-to-village spraying animals as a successful business (Waiswa and Rannalette, 2010), the real money to be made was in treating sick animals with injectable drugs. Treatment of common diseases would typically cost between 5,000 to 30,000 UgSH depending on the treatment pathways needed – compared to between 100 to 500 UgSH for spraying an animal – and could go much higher if multiple visits were necessary. Hence during the workshop in 2010, most of the 75 “*sprayers*” had prior experience

before SOS as CAHWs (many with over 10 years experience) and the vets in the second phase of SOS simply engaged in giving “*bonuses*” to such established workers. Promises of protective gear and workshops on a continuous basis – perceived by the vets to “*make sprayers feel like a team and give them incentives like a franchise company*” – never materialised for Phase 2. This was due to ambiguities in project management, according to the 3Vs.

Hence, there were no “village sprayers.” In fact, insecticides were dispensed as a side business; spraying only done alongside treatments, sometimes given as a free add-on – a “*customer appreciation*.” Like the 3Vs themselves, as a means to attract customers for more profitable work, most of these CAHWs actively sold both amitraz and pyrethroid insecticides. They needed to stock products that were “*fast money*” and “*the cheapest options*.” In turn, spraying itself was considered unrewarding, unsophisticated and involved unpleasant exposure to the toxic side effects of the insecticides; most were sold in millilitres and by bottle directly to the farmer. Associating with the 3Vs, therefore, was borne more out of hopes for professionalization and legitimisation than following the prescribed SOS model. This was most vividly shown in their emphasis on “*inputs from SOS*” which reflected the fact that owning equipment and clothing (included foot and hand spray pumps, syringes, gumboots and overalls as well as tape measures, gloves, thermometers and drug information booklets) were seen as “*insignia*” that indicated a degree of reputation, experience and knowledge. Becoming attached to a veterinary shop – and receiving special bonuses like credit and equipment – was a catalyst to “*become a vet doctor*.”

The reality was that, given the lack of district capacity, anyone with some experience treating animals and the confidence to advertise themselves as legitimate, capable and knowledgeable in animal health could become known as a “vet doctor.” These “*mobile men*” were much more numerous than drug shops and an integral yet heterogeneous category of veterinary



pharmaceutical suppliers and bedside doctors. They were sometimes called “*Malaya*” in Langi (meaning prostitute) because of the wide geographical distances they would cover, visiting multiple villages and customers each day. This category ranged from the more professionalised practitioner who covered many sub-counties by motorcycle to those treating animals mostly within their home parishes travelling by bicycle on a part-time basis. Although the work was physically challenging and demanding, they made good money, which was often complained about by licensed vets who considered them both “*integral to vet services*” and yet “*corrupt quack doctors.*” As one *Malaya* reflected:

“Being a paravet is a business and you are interested only in treating sick animals. For me I pray to God each day that He will give me more sick animals... staying in one village will not get you money since you will finish all the cases of disease and you will become poor as a common man who does not have the knowledge...you need to move around.”

As with most of rural Africa, their legal status was ambiguous (Leonard, 2000). In the face of a lack of veterinary capacity, weak legal enforcement codes and informal acceptance by the district offices, they sold drugs to farmers, treated animals and dispensed advice. Included within this category of practitioners were those who sold drugs at markets (known as “*market vendors*”) as well as the many “*village doctors*” – villagers with some past experience with drug use that wished to make a small profit as the opportunities arose. While some of the more established para-vets had attended short training workshops and a few even had certificates in agriculture from a nearby college, most had begun their practice by experimentally treating their own animals, those of neighbours and then those in other villages and beyond driven by the fact that “*villagers have little options...they have to rely on people with half-knowledge – the guess-workers – and after sometime guessing like that you graduate into being a real vet doctor.*”

Animal health knowledge provided powers of access, prestige and profits; hence, mobile doctors carefully concealed the details of specific treatments from farmers “*to preserve our market*” and seldom explained the details of an illness to customers. They would, however, almost always tell farmers to spray their animals more consistently, often blaming the lack of insecticide use for a specific disease – this was especially ubiquitous if a treated animal subsequently died and where the doctor faced pressure to divert any possible responsibility for inappropriate dosing. Promoting insecticide, of course, was part of the business transaction as the mobile doctor hoped to increase his sales of insecticide. Although generally knowledgeable about sleeping sickness, many mobile doctors had precarious abilities to diagnosis even common cattle diseases and some of their activities were of dubious quality. As one 3V vet commented:

“Some of those para-vets are cheating farmers seriously...you see them buy some oxy[tetracycline], 2 Sackets of Veriben, 3 Sackets of dewormers and then in the evening they come back with 250,000 shillings [\$100 USD] and say: my day was good!”

One of the most positive aspects of the SOS intervention, therefore, was that the 3Vs, at least initially, were actively engaged in “*giving proper knowledge*” and referral services to local para-vets, which certainly helped to improve the knowledge-base of individual mobile doctors. This became sidelined, however, as the vets became increasingly occupied with other business opportunities, pro-active marketing support never materialised and resources for community outreach diminished.

## **V. FARMER PERCEPTIONS AND THE RAP METHOD**

According to the SOS model, the control of human sleeping sickness was to be an “*invisible benefit*” for farmers, over a large geographical area, purchasing and using veterinary

pharmaceuticals (specifically Vectocid) driven by their desire to “*become healthy and wealthy*” (as mentioned by the Minister of Health at the beginning of this chapter) by preventing against both tick-borne diseases (anaplasmosis, theileriosis, and cowdriosis) and bovine trypanosomiasis. The original emphasis of SOS on the Restricted Application Protocol (RAP) offered an enticing narrative to circumvent issues of cost and affordability for farmers. Rather than spraying the whole animal, only the legs and belly had to be treated. Original costs claimed that with as little as 0.02 US cents per month, a farmer could keep an animal “*tryps-free*” – a low estimate only for the cost of the drug itself (Kabasa, 2007). Despite the insistence of officials in the Ministry of Agriculture (MoA) in Kampala that livestock keeping was “*a business for making money*” and that “*disease control has become fully decentralised to the farmer who are fully capable*”, cattle management north of Lake Kyoga (at least outside the few cattle traders operating at livestock markets) was rarely seen in these ways. As one farmer mockingly questioned a district livestock extension worker during a focus group, “*how can living in a mud hut with two cows and no money to buy your children shoes be considered a business?*”

Writing before the LRA, de Berry (2000:25) described my study districts after the Teso War in the 1990s as “all but destroyed...by violence and economic collapse.” In such a post-conflict society, keeping cattle and investing scarce cash resources into animal health was viewed as an integral part of “*our daily struggle for survival*”, which required balancing risks with competing demands on available income. Furthermore, what was physically observable and experienced took precedence, which structured the rationale for spraying cattle and made the RAP method – at least as a form of targeted tsetse control – unappealing, despite its sound technical and economic basis.

Cattle played central yet multifaceted roles in Teso and Lango. They structured social

relationships (especially dowry payments and acted as signs of status and wealth), provided households with milk (slaughtering cattle was only done when it died from disease), acted as cash reserves (“*our village banks*”) for large expenses like school fees, and, importantly, were fundamental to small-scale mixed crop-livestock farming through providing both manure and draught power. Integral to rural livelihoods, cattle management was generally of three types: those with a few animals kept them just around their homestead to graze with short trips to a waterhole; those with more than five generally grazed them at nearby swampland for most of the day; and those with many cattle (typically between 15 to 80) kept them at more remote wetlands, cared for by herdsmen who were paid through milk supply.

Following the work of Green (1999), disease causation for “*diseases of cattle*” was generally explained through reference to outside forces acting on the body of the animal, described as “*small sicknesses that move around*” in water, dung, urine, air and through various insect vectors, mostly ticks, snails and flies. Cattle diseases were viewed as sources of “*great misfortune*”, “*suffering*” and “*throwing us back into poverty.*” The costs of treatments were compared to treating children in hospital and the difficulties of seeking out knowledgeable veterinary doctors and mobilising financial resources pervasive. The linear relationship between larger herd size and more “*willingness-to-pay*” was often discredited locally. People were insistent that because cattle were a sign of wealth, and that they were cared for by herdsmen removed from the owner and restricted to more “*disease prone areas*” along the major swamplands (due to population density and land pressure inside village boundaries), many larger herds were actually poorly maintained; families who owned only a few animals could “*care for them like children...they are so precious to us in farming.*” It all depended on the “*mindset of the farmer*” rather than the number of cattle.

Although insecticide use was certainly linked to wealth, this was expressed in local debates about “*being modern*”, which were embedded within individual perceptions about ticks and tsetse and influenced by education, geographical mobility and exposure to animal health workers – also shown in other studies on veterinary drugs in developing countries (Mugabi *et al.*, 2010; Mugisha *et al.*, 2008; Heffernan, 2001; Heffernan *et al.*, 2008; Heffernan *et al.*, 2011). Beliefs about ticks revolved around three not always mutually exclusive perceptions: ticks caused specific diseases by transmitting pathogens; ticks caused many unknown diseases by transmitting pathogens/sucking blood; and ticks predominately caused only physical morbidity (weight loss, reductions in milk, reduction of plowing and coat scars). For “*those who stay in the village and have no knowledge*”, ticks were associated with the latter two categories, where most lacked an explanation as to how spraying actually reduced disease. There were a variety of different types of ticks, described by their shape and colour. Ticks that “*fall off by themselves*” were considered “*not to be a problem since they got satisfied and then leave the animal alone*” while “*those that stay on the animal for long are the ones that cause diseases.*”

Although there was a high awareness of tsetse flies, it was difficult to differentiate them from other biting flies (stomoxys and other tabanids). All biting flies were considered nuisances capable of transmitting sleeping sickness since they were all classified as “tsetse flies,” although some differentiated that it was “*only the big tsetse that can make you sick.*” Tsetse flies were known as “*lions that lurk in the bushes who only come out in search of prey*”, alluding to the moderate to low tsetse challenge restricted to villages near swamps and places with an abundance of *Lantana Camera*, an invasive bush. Such understandings of vectors in tropical disease transmission have been widely observed in other cultural settings around the world (Nichter, 2008:47-50).

Furthermore, insecticide use itself, as with understandings of ticks and tsetse, was heavily dependent on physical observation and local interpretations – as shown by other studies on human pharmaceuticals (Whyte, 2000; Craig, 2002; Whyte, Van der Geest and Hardon, 2002). Many started to spray routinely only after an animal died from a tick-borne disease and the owner was told how they could have prevented it: *“When Dr. Donasious saw my dead bull used for plowing, I was so sad. He told me it was Epiu [anaplasmosis] and that I should be spraying. That is how I started to spray.”* *“Being modern”*, therefore, involved learning from past mistakes and consistently putting this knowledge into practice to prevent future misfortunes. A competing narrative, however, often voiced by farmers without deaths in their herd, was that since their *“animals look so healthy”* and that they *“acquired resistance like to malaria from those diseases”*, spraying was unnecessary. Resistance to tick-borne diseases does, in fact, have a scientific basis in acquired immunity for some tick-borne pathogens (Eisler *et al.*, 2003). This was sometimes commented on by more progressive farmers who found it perplexing that the cattle of their neighbours (who did not spray regularly) were *“always healthy while my herd suffers from much disease”*, even though they regularly applied insecticides.

Similarly, apart from discussions of price and availability, insecticide product preferences were explained almost solely in reference to observable effects: smell, colour, familiar packaging, effects on the animal’s behaviour and appearance, the residual period and the mode of action (the more popular brands killed ticks very fast, while others (including Vectocid) were slow acting) (see Table 9). Farmers wanted to see ticks *“dying fast...their psychology is to be so moved when they see ticks on their animals.”* Two farmers, representative of many, stated of Vectocid: *“That drug is too powerful...my animals fear the smell since it hurts their eyes”* and *“it does not work well since the ticks do not fall off right away but can take a day or even two.”*

**Table 9: Farmer perceptions found to influence acaricide choice**

<b>Major factors</b>	<b>Minor factors</b>
Understanding of disease and vector	Dilution colour
Brand recognition	Effect on the animal's coat
Price	Smell
Mode of product action	Perception of side effects
Product residual period	Perception of tick resistance
Availability	
Information dissemination	

In fact, many farmers did not associate spraying with tsetse and trypanosomiasis control at all. Perhaps most surprisingly was the fact that despite numerous sensitisation activities by the district and SOS, livestock-keepers and major political leaders at the district and parish-level still did not associated insecticide use with sleeping sickness control, even in most endemic villages. In line with the rationale for spraying ticks, people often commented that it would be difficult to spray to kill tsetse flies since the insects are “*always moving around...you would have to spray the whole village!*” There was a sense that in order to kill an insect, you had to spray drugs directly onto it. So despite a general awareness that tsetse flies caused a human disease that was painful, costly and potentially deadly and a bovine disease – not always very well understood but often related to weight loss – few farmers associated sleeping sickness with an animal reservoir.

There was also a concern that existing practices were suboptimal, especially as it concerned the active targeting of tsetse predilection sites on the legs and belly. In order to target ticks efficiently, farmers actively experimented with dilution rates, as reported in other studies (Mugisha *et al.*, 2008). The most common practice, at least reported by vet shops and many farmers, was to use one millilitre of insecticide to one litre water per animal. This would not

allow for a full body wash but rather selective spraying of tick predilection sites, majorly the ears, tail, udders/scrotum and hooves. In contrast, the Restricted Application Protocol (RAP) promoted by SOS emphasised the low cost of targeting only the legs and belly, but these areas were only sprayed if ticks were present. Interestingly, selective spraying was frowned upon by more progressive farmers, who would naturally be the target for the adoption of a new innovation like the RAP method promoted by SOS. They considered it unsophisticated and believed that to be effective you needed to “*wet the whole animal thoroughly.*” Selective spraying was for poor and backwards farmers. Therefore, all District Veterinary Officers (DVOs) agreed that SOS should “*forget about RAP*” and few of the original spray team members had used it for long. Without understanding its rationale, progressive farmers found it perplexing that the SOS mass treatments used RAP; some even accused the Makerere students of “*stealing the medicines for themselves [from the government programme]...they are trained doctors how could they be spraying like illiterate villagers?!*”

However a major proportion of livestock-keepers were, in fact, regularly using insecticides. A total of 70.5 percent of questionnaire respondents (n=495) – a survey taken with ten individuals in 56 villages – reported to spray their animals at least once a month during the rainy season (when ticks are most abundant).<sup>25</sup> This number had clearly been increasing since 2006, when the LRA left the region and social services, small business and livestock keeping resumed. Although the exact number is likely slightly lower, this high proportion in spray coverage was confirmed

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<sup>25</sup> The livestock-keeper survey showed that: 15.7% of respondents reported to spray their cattle weekly in the rainy season, 21.5% fortnightly, 2.8% every 3 weeks, 24.3% every month, and 18.7% at irregular intervals, while 17% were found not to use acaricides at all. Of those livestock-keepers using acaricide, 35% reported using pyrethroids, 25% amitraz and 40% could not name the product. Making the conservative assumptions that those spraying irregularly did so every 3 months and those spraying every 3 weeks did so every month, an estimated 70.5% of these livestock-keepers reported spraying of their cattle at least once per month during the rainy season.



by data on sales from the veterinary shops that showed between 640 and 740 litres of acaricide being sold each month in the rainy season (see Bardosh *et al.*, 2013).<sup>26</sup>

Interestingly, however, many vets emphasised that larger herds kept in the wetlands (where ticks and tsetse were considered more abundant) were rarely sprayed routinely given that the herdsmen, who looked after animals from multiple owners, had to coordinate spray routines with individual owners who had to physically bring the drugs to them; cattle keepers rarely cooperated to spray their animals together, even when watched over by the same herder. Some of the herders I interviewed presented a more complex situation when they emphasised that cattle become resistant naturally to tick-borne diseases and that spraying was unnecessary. Hence despite recent mathematical models showing that only 20% of cattle have to be routinely sprayed to sustainably reduce sleeping sickness (Hargrove *et al.*, 2012), skewed geographical distribution relative to tsetse populations need to be considered in practice.

However, as already discussed, half of all insecticide treatments were not effective on tsetse flies. Removing ticks – often with only a vague association with disease – rather than preventing the spread of tick-borne diseases and human and bovine trypanosomiasis through routine treatment was the major focus of most farmers; spraying was often done less frequently than

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<sup>26</sup> According to data from the livestock keeper survey, 55% of acaricide usage was estimated to be pyrethroid-based and 45% amitraz-based per month (assuming that an equal amount of the two products were used by the 40% of respondents who could not recall the name of the product). Using the spray interval data provided in the survey and data from the 2008 livestock census on cattle numbers, I can estimate coverage for the four districts in the rainy season. This would involve: 157,677 cattle sprayed at least once per month with a pyrethroid (38.5% of the cattle population); 129,008 cattle sprayed at least once per month with an amitraz (32%); 50,831 cattle would have received treatment 1 to 2 months previously that would now be ineffective (12.5%); and 68,975 (17%) would consistently be un-treated. Although some farmers heavily over-dilute and under-dilute acaricides, I assume that most apply between 1 to 2 ml to each animal. Using the interval periods provided by the survey and this range, the total amount of acaricide required to spray 286,685 cattle each month during the wet season would be between 543.01 L to 1086.01 L, which fits within the range of 640.1 L to 740.4 L provided by the veterinary drug shop data. This confirms the relative accuracy of the livestock-keeper survey, showing that a significant number of cattle were sprayed regularly during the wet season.

recommended and applied selectively to tick predilection sites. Additionally, many farmers, especially those in more remote areas, heavily diluted insecticides, which reduced their efficacy. Some of these issues were similarly observed in a recent study of the RAP method using footbaths in Burkina Faso (Bouyer *et al.*, 2011).

When I questioned village leaders in six of the most highly affected sleeping sickness villages, the headman in Komolo village (with about 100 households and over 20 cases since 2004) conceded that although SOS had, in fact, disseminated information during the mass interventions, *“they spent so little time talking to us...with peasant farmers you need to come back to remind those that have forgotten or neglected to act on the knowledge since they were reluctant...you need continuous sensitisation.”* The idea that you had to *“come back”* to remind people represented a pervasive opinion that a one-time sensitisation effort (done alongside students busy with treating hundreds of cattle) would do little to change consumer habits and animal health practices in rural villages. To farmers, the fact that people may have *“forgotten”* or *“neglected to act on the knowledge since they were reluctant”* alluded to a myriad of socially-embedded local realities that structured motivations for using (or not using) insecticides.

Although similar to interviews with vet shops, farmers regularly dichotomised themselves into three stereotypes: *“modern,” “semi-modern”* and *“backwards”* – those with the knowledge, those without the knowledge and those with some knowledge but who rarely put it into practice. The *“backwards people”* were characterised by the *“I don’t care attitude”*, they *“moved without a plan”* and were *“living only for today”*; they were commonly described as lazy, drunkards, irresponsible and unwilling to understand the benefits of spraying cattle regularly for either ticks or tsetse. To the much more numerous *“semi-modern”* farmers, however, it was the nature of poverty and risk perceptions rather than a lack of analytical skills that was drove irregular

insecticide use. In the end, spending scarce cash resources on disease prevention never actually guaranteed that a disease would be avoided. As one leader put it, *“Even if I am spraying daily but my neighbour is not, I may still get sick...so what is the point?”* The regular spraying of cattle was discussed in reference to the limited use of mosquito nets and boiling suspected contaminated water; it was considered *“a gamble”* since *“often the animal does not get sick...so you better first use that money to buy food and soap and paraffin.”* In contrast, progressive farmers stressed the need to follow the abstract, scientific knowledge given by professionals and maintain spray routines consistently.

Insecticide use was strongly related to the difficulties of acquiring money and of the competing demands on the use of cash in large families, viewed as one of the central reasons why people preferred the cheapest insecticides, and why spraying was frequently done selectively and intermittently. Farmers, dependent on rain-fed agriculture and residing in remote communities with barely accessible roads, were poor and faced many challenges in securing their livelihoods and taking care of their families. Despite these challenges, the tendency to spray animals was increasing as people became more accustomed to the idea, availability increased and as recovery from the LRA conflict continued to make people *“more modern.”* This involved *“working hard”*, *“copying my neighbours”* and *“using technologies like mobile phones”* all of which, like insecticide use itself, were believed to have been increasing significantly in the years since SOS.

## **VI. UNFINISHED BUSINESS: IMPLICATIONS FOR POLICY AND PRACTICE**

Sleeping sickness has been called a “failure of both science and public health” – a statement alluding to the politics behind scientific research (given an overemphasis on the intricacies of

tsetse and trypanosome biology, which benefit many scientists professionally) and the relatively overlooked “unsexy control strategies” that must be effectively sustained among vast areas of rural Africa to manage this fatal disease (Molyneux, Ndung’u and Maudlin, 2010). A case in point is the recent sequencing of the tsetse genome whose scientific sophistication appears obtuse when juxtaposed with the practical benefits for at risk subsistence-level farmers. For years, research institutes were obsessed with developing a vaccine against trypanosomiasis even when they were faced with knowledge that, given the way trypanosome antigens evolve and change, such a breakthrough was unlikely. Similarly, global initiatives (mostly funded by the International Atomic Energy Agency, IAEA) have promoted the development of the sterile insect technique (SIT), which involves rearing millions of sterile male flies in laboratories to be released en masse in rural geographies. These sterile males then mate with females, and eliminate the tsetse population, as shown in the only successful use of SIT on the island of Zanzibar. However most areas have more than one sub-species of fly (requiring multiple species to be released) and, as recently experienced in Uganda when the Ethiopian “tsetse factory” ran into technical inefficiencies and mishaps, field practicalities appear nothing short of the absurd. In short, the tsetse and trypanosomiasis field showcases the complexities of the global NTD scientific research apparatus and how biomedical research can be driven more by scientific interests, persuasive grant applications and the concerns of donors than by the search for appropriate technologies and field strategies.

In contradistinction, the SOS intervention was formed around an emerging epidemic of *T. b. rhodesiense* in northern Uganda and the threat of the geographical merger of the two sleeping sickness parasites. The concerns of global actors in business, academia, development and philanthropy mobilised resources and new scientific knowledge to undertake an impressive

large-scale mass intervention of cattle in a post-conflict region, itself a large feat of planning. Socially and economically marginalised, Teso and Lango regions had only recently been under the threat of the LRA; the area's history was continuously invoked during my fieldwork to explain business norms and consumer habits. Following the words of the Teso historian Vincent (1982), it was a “backwater” – a place where the Uganda state was largely absent, viewed with suspicion and considered somewhat irrelevant, given the lack of state involvement in agricultural development (Jones, 2009). In this operationally difficult terrain (itself representative of the fact that diseases of poverty exist because of larger structural economic and social processes), the SOS mass treatments were successful in gaining local legitimacy, allowing the project to mass treat many hundreds of thousands of cattle. Valuable rural assets, the threat of mass community resistance to the programme (given suspicion of government interventions) was carefully navigated and hence avoided, and the intervention succeeded in reducing both the geographical range and prevalence of the parasite (Selby, 2010).

It was at this point that the intervention was at an impasse on how to sustain such parasite reductions over the long-term. SOS was a work in progress, in need of adaptation. Representative of emerging trends in global health governance (Buse and Harmer, 2007; Richter, 2004), the SOS public-private partnership was “striking in its flexibility...without logframes and the like...[SOS] improvised as needs arose...especially [in]...supporting the 3Vs.” (Morton, 2010:38). Adapting and shifting priorities from mass treatments to private rural businesses for sustainability involved a willingness to experiment given emerging issues, driven by the available expertise and interests of the different partners. This was rather unique in global public health practice. Scientific and social reasoning then formed the basis for future activities that linked private profits with tsetse control: the need to increase access, build profitable businesses,

sell Vectocid, establish spray team networks, promote RAP and educate farmers. However, as this chapter has shown, the application of intervention plans conceived at the international and national levels – and based on what seemed to be sound incentive structures and appropriate technologies – faced a multitude of local barriers to adoption that ultimately constrained vector control and hence the sustainable control of human sleeping sickness.

The SOS case study offers a fascinating insight into the genesis of global health initiatives and interventions where science, technology, pathogens, delivery networks and local realities intersect in dynamic, often unpredictable ways. It shows how, behind the global legitimisation and resource mobilisation process that depend on framing interventions in specific types of frameworks for action – in this case dependent on a unique form of business, profit incentives and appropriate technology – global health interventions function more as “social experiments.” The movement of such knowledge, technologies, social forms, finances and expertise between the global and local occur in ways that are highly uncertain. At the global-level, such interventions rely on the formation of partnerships, the proposing of novel service delivery models and technologies, and the creation of coherent narratives to garner policy traction and finances.

However once conceived, these plans, models, frameworks and technologies involve the equally difficult task of moving from boardrooms into rural villages where the global and local become enmeshed in new ways. Moran-Thomas (2013) provides a fascinating example of this in northern Ghana, where cloth filters were hung on hut walls rather than being used to filter water to prevent against guinea worm. Simply technology became symbolic of the incursions of modern medicine; in a subsistence-level agricultural landscape cloth filters became sophisticated

technology and were used as a form of “magic medicine”, taking on local significance that had nothing to do with the intentions of the control programme.

At the local-level, then, a more complicated story emerges of struggle, transformation and the need for adaptation, played out between very different cultural and economic arenas (Whiteford and Manderson, 2000). In the SOS area, this was expressed in a series of dichotomies between modernity and backwardness that structured a veterinary pharmaceutical landscape defined largely by flux, profit incentives and therapeutic anarchy. In an insightful ethnography of indigenous innovation in the Teso region Uganda, Jones (2009) noted that, “institutions borrow from each other...the bric-a-brac of what is around the place helps explain what comes to be established.” Although he was speaking about social changes in churches, village courts and burial societies – which “meant something to people’s sense of ideological and religious concerns” in contrast to most short-lived donor programmes (Jones, 2009: 9) – this can also be applied to global health programmes like SOS that seek to explicitly address issues of sustainability.

Global health talks a lot about sustainability. Interventions need to be sustainable to justify action, to ensure they work beyond the project life-cycle and that activities synchronise with established networks of care, outreach and service delivery. But sustainability is fundamentally contested because it involves divergences between global and local notions of the meaning behind a given intervention. Relying on profit motives, SOS aimed to create new local organisational structures and ways of doing business to control an NTD, but ultimately underwent transmutations by the 3Vs, other shop owners, attendants, animal health workers and farmers. Some things were incorporated and others left aside. Integrating a view of “populations”

as publics (Marsland, 2014) allows for an appreciation of how much influence “the community” has on structuring the terms and nature of sustainability.

Global health “experiments,” as shown with SOS, are often left “half-finished” as funds dry up, fatigue sets in, priorities shift, models change and partners enter into new forms of relationships. Although SOS was adaptive in certain ways, in others – as this chapter has shown – local constraints were not fully engaged (including the changing nature of the veterinary drug market), especially since 2010 with the second phase. Over time, the SOS private sector partners continued to support the 3V Vets, but progressively less so. Certain actors and pathways were also invariably left out – for example, district veterinary workers, the treatment of cattle at livestock markets, proactively learning about farmer constraints, targeting active HAT villages with subsidies, continued financial support for community outreach and emphasis on a cheaper insecticide (Morton, 2010; Selby *et al.*, 2013). The number of reported HAT cases, however, remained unchanged between 2008 and 2012, continuing to be reported from similar villages and, as shown by my interview at the beginning of this paper, slowly moving northwards. Despite this, endemic villages were not prioritised, nor targeted by the 3V vets.

This was not necessarily caused by a lack of commitment by SOS – it also included the essential issue of financial resources. A number of grant applications, including my own to trial a participatory insecticide zoning strategy to restrict the sales of amitraz, were turned down. However, high-level advocacy efforts continuing in 2014 may soon change this. Remaining committed to innovative organisational structures, SOS has advocated for the use of a Social Impact Bond – that is, using private investors to attract development funds with the potential for returns on investment – to roll out the SOS model across 32 districts to eliminate *T. b. rhodesiense*. DFID has agreed to support the project (if private investors are found) with a price



tag of £32 million over eight years (CIDSF, 2013). At the time of writing (June 2014), DFID has already approved a six-month inception phase to design the intervention strategy, and provided some £1.5 million towards this end. Interestingly, this includes employing me as a consultant to undertake additional research on how to increase the use of pyrethroids in the target area of 32 districts. This shows that global health projects involve actors engaging between the global and local over time, building up social networks to mobilise continued resources, and addressing gaps and scaling-up. However, as this chapter has clearly shown, these activities tend to prioritise global over local engagement, which requires planners and implementers to be actively committed to remaining locally grounded, and relevant.

A further question raised by the SOS case study involves how global health projects are evaluated and the nature of success and/or failure. While impacts are often defined by epidemiological statistics and the quantities of coverage and treatments dispensed – elimination remains the ultimate goal for many of the Neglected Tropical Diseases, including HAT – how can we evaluate individual projects as “social experiments”? What are the criteria, who are the judges and who are global actors ultimately accountable to? For SOS, it is clear that the mass treatments were initially successful but that parasite prevalence soon returned (Selby, 2011). Institutional changes in the Makerere veterinary curriculum were also positive, exposing students to rural villages and the practicalities of working with a mass programme. Similarly, most of the 3V Vets have maintained their rural drug shops – even the two which were abandoned were soon replaced – and they have engaged a wide variety of local animal health workers, certainly contributing to improved training and services, while simultaneously contributing to increased insecticide sales and use.

In other ways, however, opportunities were certainly missed, especially in fostering incentive structures for the vets to actively target villages with reported HAT cases. Roughly half of insecticides on the market are still only effective on ticks and not tsetse, with many reports of tick resistance (Bardosh *et al.*, 2013). It was clear that spatial distributions of cattle and spray routines (larger herds in the wetlands that were not regularly sprayed) are not homogenous but heavily skewed. The geographical distribution of cattle and spray routines need to be taken into account, questioning what is perhaps an over-simplification of recent mathematical models showing only 20% of animals have to be sprayed consistently for HAT elimination (Hargrove *et al.*, 2012). Furthermore, it is increasingly likely that *T. b. rhodesiense* and *T. b. gambiense* have, in fact, geographically merged, as based on recent epidemiological data obtained through active surveillance (Acup, 2013). While SOS has contributed to increased access to veterinary services, there is still much to be desired in the quality of services for many rural farmers. In some ways, therefore, a major shortcoming of the SOS business phase was that it did not go far enough in strengthening veterinary services – it was restricted to only a few shops and gradually reduced training capacity, links with para-vets and active engagement on the ground. Clearly, SOS’s transition from “charitable” support to “sustainable” business subsumed the focus on sleeping sickness by the daily needs of running a business, sidelining other important intervention pathways required to control the parasite over the long-term. However this might soon be addressed by the new approaches being designed for the potential scale-up of SOS, discussed above.

There is also an interesting side story to be told here on the ambiguities of sleeping sickness epidemiology. Tsetse control is often framed as a “struggle” for socio-economic development in the sense that interventions will control tsetse and bring increased cattle productivity, land usage

and improved human health (McKelvey, 1973). However interviews with district officials, vets and farmers in Serere district – the site of a large epidemic from 1998 to 2004 – emphasised the role of *increased* human population and agricultural productivity on reducing the tsetse population and bringing about the control of human sleeping sickness. According to many local actors it was socio-economic development *itself* that had helped control trypanosomiasis, not the other way around.

Sustainability and success in global health, then, is a fuzzy issue open to some interpretation. Global public health interventions are dynamic and involve many facets and dimensions so it is invariable that success will involve a gradient over different issues. Given that interventions are both shaped from above (by the global level) and from below (by the local-level), sustainability is not necessarily easily definable or predictable. Ultimately, interventions to improve health among the poor engage in larger structural processes of wider societal change, which like all social engineering cannot be managed exclusively by planners (Scott, 1998). Adaptability, therefore, is a key component of sustainable NTD control, and is both a labour and knowledge intensive process.

Furthermore, as this case study shows, increased involvement of the private sector (and private incentives) as a movement towards sustainable global health interventions needs to move beyond neoliberal assumptions of “win-win” scenarios and “value conscious consumers” towards more systems-based approaches that engage with the difficult realities of linking health improvement to building businesses in rural African geographies. As noted in a recent ethnography on the participation of private practitioners in the DOTS programme in India for tuberculosis (Ecks and Harper, 2013), money – as the ultimate form of incentive to garner local participation – has much

potential; but linking profits to public health requires careful understanding and manipulation of market dynamics over time.

## **CONCLUSION**

Building on the two previous case studies that explored the shortcomings of a top-down elimination programme (Chapter 3, rabies in Tanzania) and a participatory behavioural change intervention (chapter 4, CLTS in Zambia), this chapter has explored the challenges of sustainability in NTD control as shown in the implementation of an innovative and small-scale PPP that aimed to combine private sector expertise, business incentives and sleeping sickness control in post-conflict Uganda. Sustainability is a ubiquitously repeated policy goal of many preventative NTD interventions; however what is actually meant by sustainability is often unclear. There is the assumption that it equates to the cessation of support from donors, to the point where delivery networks have become sufficiently entrenched to outlive the project and when behaviour change has been deemed successful. However, as we have seen in Chapter 4 with CLTS in Zambia, economic and political realities certainly reduce the resources, time and capacity of people to sustain disease control in the absence of state/donor inputs and support. This questions the idealistic notion that community members can identify, prioritize and resolve their own health problems, reinforcing the need for initiatives to help build long-term societal resilience and address the broad social determinants of health.

SOS was an innovative PPP that aimed to do just this by linking agro-veterinary development with the control of a deadly neglected parasite. Furthermore, it built on emerging lessons from other disease control programmes that found that enrolling the support of key actors at the

community-level with compelling incentive structures, something that the CLTS champions in Zambia certainly lacked (see Chapter 4), are fundamental to creating the enabling environment for sustainable activities. It also aimed to move away from the challenges of engaging district authorities in the direct management of NTD control, shown in both the WHO rabies elimination project (Chapter 3) and the implementation of CLTS in Zambia (Chapter 4). In many ways, SOS offered a unique and compelling organisational model that promised to overcome the major shortcoming that defined the ineffectiveness of both the rabies project and CLTS. By linking local incentives for sustainability to local business and monetary rewards for tsetse control, it aimed to reorganise responsiveness of local needs.

However as this chapter has shows, there was a fundamental tension between profits and vector control that was not very well navigated by project partners. Divergences in knowledge, power, values and social norms shaped veterinary drug sales, service delivery and the adoption processes of poor farmers in dynamic, unpredictable ways that required more engagement and understanding. However partner expertise and funding arrangements made this difficult. The case study showed that global health interventions focused on becoming sustainable, which is often the case, function as “social experiments” defined by struggle, transformation and the need for adaptation.

The SOS case study aimed to garner public and private sector expertise to respond to the tendency of global health programmes to be non-sustainable; however sustainability itself was shown to require engaging more explicitly with local complexities and adapting strategies to their particularities. This demanded alternative management skills that were not sufficiently available from the intervention partners due to prevailing funding streams and different partner interests that joined together business, profits and disease control. Becoming sustainable,

therefore, is not as simple as commonly assumed; even for interventions that rely on simple technologies and what appear to be locally acceptable incentives structures.

As with CLTS in the last chapter, SOS promised new approaches and better results that claimed to move beyond the shortcomings of top-down interventions (as discussed in Chapter 3 with the WHO rabies elimination project in Tanzania). However, in both case studies (CLTS and SOS) many of the most salient shortcomings that limited intervention effectiveness were similar to those found in the WHO rabies elimination case study. Why was this? The next chapter, outlining the major conceptual contribution of this thesis to the social science literature on global health, explores how and why this occurred across these three case studies

## CHAPTER 6

### Ordering Complexity: Unpacking Intervention Effectiveness in Global Health

“Rigorous evaluations should no longer be seen as an optimal academic add-on to major programs. It should be required so that both successful and failed experiences yield knowledge for smarter policymaking and program design in the future. Only with high-quality evaluation will we have a credible basis for claiming the effectiveness for foreign assistance.”

- Preface to *Millions Saved: Proven Successes in Global Health* (Levine *et al.*, 2004)

“I must confess to a sense of déjà vu...[hearing] the same conclusions I drew twenty years ago when first studying the fit between international health policies and local priorities. I was depressed to realize that although priorities and actors had changed, we still have not found a way to close the gap between the international and the local.”

- Anthropologist Judith Justice (2000:34) on child survival initiatives since the 1980s

#### I. INTRODUCTION

Policy momentum for the control of NTDs has increased globally, reflected in bold new control and elimination targets set for 2020 by the WHO (see Chapter 1). While these represent a significant opportunity to alleviate the devastating impacts of tropical diseases on poor people around the world, this thesis has shown that many embedded challenges to meeting these targets exist. This includes a multitude of complex relationships that mediate how NTD interventions move from international boardrooms into socio-economically marginalized villages. Despite the importance of understanding these social processes and the clarion call to integrate implementation research into global health policy and planning, there continues to be relatively

limited work being conducted into the social complexities of contemporary NTD interventions; few studies have explored the effectiveness determinants of NTD interventions from a critically-engaged social science perspective. To help address this knowledge gap, the last three chapters, being the core empirical work of this thesis, have presented three detailed case studies unpacking the social dynamics of interventions to prevent NTDs in Eastern Africa. Conceptualised through dominant global health narratives, these three programmes were all designed by global actors (donors, academics, the private sector, international NGOs, philanthropic organisations and the WHO) and then moved (or rather translated) into poor and remote rural villages where people faced multiple livelihood vulnerabilities. Divergent understandings and practices then shaped community responses in ways that were, as we saw, not always congruent with intervention plans and assumptions.

Each case study followed the same methodological approach outlined in Chapter 2. Based on a social constructivist perspective, this focused on unpacking the multitude of social, technological and environmental factors that influenced intervention outcomes. This involved exploring how and why health technologies were adopted, or not adopted, within wider contextual factors. To this end, my fieldwork used a mixed methods research strategy, combining quantitative coverage estimates with qualitative research aimed at exploring the particular ways in which these interventions were negotiated at the local level by planners, implementers and communities. To this end, I simultaneously cast a critical eye, quantified coverage data, made generalizations, framed the case studies ethnographically and unpacked the various discontinuities between policy, practice and local realities.

As outlined in Chapter 2, there were important differences between these interventions. They involved different pathogens – HAT, rabies and parasitic worms – in three different Eastern



African countries with diverse cultures, landscapes, languages and other contextual factors. Similarly, the three interventions all used very different approaches (top-down, participatory and market-driven), institutional arrangements (WHO country office, district teams and PPP), control technologies (vaccination, social mobilisation/pit latrines and veterinary insecticides) as well as delivery networks and local incentive structures to enrol support and participation by implementers and communities (these are summarised in Chapter 2).

This diversity, however, was underpinned by a number of important similarities in their nature, purpose and modalities. These were all “mass interventions” that covered large geographical distances and aimed for “big impact” in order to showcase the cost-effectiveness and feasibility of preventing the NTDs in rural African geographies. They were financially supported by international donors and planned by global and national technical experts. In short, they represented “scaled-up” interventions with specific and ambitious preconceived targets revealed explicitly in their names: “eliminating rabies”, “stamp out sleeping sickness” and “total sanitation.” Furthermore, these interventions all aimed to introduce a new health technology for the prevention of NTDs that relied, on some level, on behaviour change and local adoption. These were underpinned by specific theoretical and policy justifications that were deemed to be “appropriate” in these rural contexts, which underscored the justification that meeting project targets were feasible within a short project cycle of a few years, or less. Meeting these targets relied, in one way or another, on the incentive structures and field strategies put into place and promoted by planners, who relied on cadres of local district or sub-district actors (extension workers, local leaders, volunteers and private businessmen) to deliver and manage the intervention technologies.

In concurrence with a growing body of critical social science literature on global health (Adams *et al.*, 2014; Biehl and Petryna, 2014; Janes and Corbett, 2009; Nichter, 2008; Whiteford and Manderson, 2000), these case studies all showed that interventions, even those using seemingly “appropriate” technologies and social forms, encounter a myriad of complex relationships at the local level that mediate their effectiveness. The individual coverage estimates in each of my three studies showed disappointingly low uptake of the health technologies promoted: 25% vaccination coverage in Tanzania, 31% latrine coverage in Zambia, and an 8.7% market share for the SOS supported insecticide (Vectocid) in Uganda. Although no epidemiological data assessing impact on disease prevalence are available, we can conclude that it was in many ways minimal and, at the very best, certainly sub-optimal. However, these projects did not only share these low coverage rates; many of the most salient dimensions surrounding why dogs were not vaccinated, latrines were not constructed and the SOS insecticides were not purchased had numerous underlining commonalities.

This low coverage was not inevitable. There were a number of adaptive pathways – as the case studies all made clear and discussed in detail – that could have been used to increase coverage to more acceptable levels both initially and as the programmes progressed over time. Many of these required only modest changes in operational plans but were unfortunately not taken. As my research showed, this was largely because of organisational norms (as well as, to some degree, resource limitations and wider bureaucratic and historical processes) that restricted learning from poor populations in order to adapt strategies. Although there were certainly many endogenous barriers to the adoption and use of the promoted health technologies in these rural villages (that I discuss at length in each case study), this low coverage was predominately due to top-down information flows that drove programme management. This common, and overriding, dynamic

points to established processes in the global health industry and its political economy as well as the larger socio-economic and political issues facing states and regions where diseases of poverty persist. That such an overarching conclusion about the nature of global health interventions to prevent NTDs emerged from three heterogeneous studies – on different diseases, in different countries and using different organisational forms – merits additional reflection and analysis.

In this chapter, I explore the major themes developed in my empirical chapters and discuss more broadly what these commonalities tell us about global health interventions to prevent NTDs in Africa. The first section of this chapter revisits some of the theoretical and methodological discussions outlined in earlier chapters (specifically Chapter 1 and 2) and argues that, to address ineffectiveness in interventions, planners need to take on the responsibility of “ordering complexity”; that is, an active attempt to engage the divides between global/local and policy/practice. Based on a comparative analysis of my three case studies, in the second section, I draw together five operational domains where the effectiveness of interventions as “negotiated assemblages” (as I call them) are played out and, to a large extent, determined. I argue that focus on these five areas draws attention away from interventions as established models and frameworks and illustrates the value of a more fluid and reflexive perspective dependent on the need to unpack and engage the local.

In the third and final section I argue that, although engaging with the complexity of these five domains through a critical praxis would avoid many operational blunders and ineffective strategies, top-down ways of planning and managing global health interventions remain ubiquitous and hard to change. Here I discuss why knowing about local contexts is often marginalized and, reflecting on the two quotes offered at the beginning of this chapter, explore

the wider challenges of embedding social science perspectives within the established political economy of the global health industry.

## II. INTERVENTIONS AS NEGOTIATED ASSEMBLAGES

As we saw in Chapter 1, the terms “global” and “local” are contested (Bozorgmehr, 2010; Brown *et al.*, 2012; Janes, 2004). Globalisation – the supranational criss-crossing of resources, people, technologies and ethical regimes – invariably blur the boundaries of what can be classified as a “local” phenomena. Global health interventions, then, as a “coming-between” (the Latin meaning of the term itself) involves a process of extending notions of modernity and development from the centre (the echelons of wealth, power and material advancement) to the periphery where “diseases of poverty”, by their very definition, are predominately found and clustered (Singer and Bulled, 2012). As shown in the three case studies, these geographies are “marginalised”, “poor” and “resource-limited”, descriptions that point to the decidedly spatial segregation of wealth, resources and political voice in developing countries. In many cases, these are “non-state” regions (Scott, 1998). Jones (2010:165) described the ephemeral nature of the state in rural Uganda as “islands of development” (project villages, district capitals and donor-clinics) in a “sea of neglect”; Geissler (2014:252) spoke about public health in Africa being an “archipelago” restricted to “well-resourced interiors and impoverished and comparatively uncontrolled exteriors.” Within these contrasts, the intervention is essentially as act of bringing order and control to the local through globally-defined shapes and regulations – a metaphor that finds expression in the ordering of pathogens, of people, of things and ideas.

From a Foucauldian perspective this is constructed through the exercise of “biopower” and “governmentality” whereby assemblages of actors and organisations regulate the conduct of populations through, among other things, discursive regimes that normalize specific practices (Bunton and Petersen, 2002). This is frequently presented in the anthropological literature on global health as a negative exploitation of marginalised groups. In their book *Stories in the Time of Cholera: Racial Profiling during a Medical Nightmare*, Briggs and Mantini-Briggs (2003) provide a compelling account of how narratives about cholera framed poor *indigenas* as “unsanitary citizens” something that shaped policy responses in ways that ultimately damaged social, economic and health conditions for these poor groups. Similarly, Tadros (2010) described how the livelihoods of the *Zabaleen* (poor pig-keeping Christian communities in Cairo) together with their intricate system of municipal rubbish collection were devastated by mass pig culling, itself perpetuated through historically-embedded government discrimination, socio-cultural beliefs and a particular narrative surrounding H1N1 in Egypt. There are many other such examples of the ordering of poor citizens through biomedical narratives that cause significant socio-economic harm – for example, Engel and Susilo (2014) made this point in reference to CLTS in Indonesia mimicking punitive colonial narratives of the “dirty natives.”

Yet the ordering of pathogens and populations is at the very core of biomedicine and public health. Discursive practices function not only in racial profiling poor *indigenas* and *Zabaleen* as second class-citizens but also in getting lifesaving medicines to needy patients, preventing children from dying of diarrheal diseases and helping to avoid large-scale epidemics in humanitarian emergencies. Extending biomedical order into marginalised places always runs the risk of bringing the good with the bad, reorganising social, ecological and technological relationships and creating new structures in their wake. They can have “unanticipated

consequences” – a concept originally proposed by the American sociologist Robert Merton (Kleinman, 2010). The dualities of positive and negative social change inherent in biomedical order are well illustrated by the foray of colonialism and tropical medicine more generally into the so-called “dark continent.” Critiques of the patchy, racist and often violent and coercive nature of colonial biomedicine coexist with a more positive vision, offering socio-economic progress, responsible government, public services and relief from physical affliction (Greene *et al.*, 2013; Prince, 2014; Vaughan, 1991). This shows us that the inherent social values and ideologies that guide activities and orient praxis have a large impact in shaping how interventions are experienced locally. It is this realisation that underlines the reason why anthropologists consistently emphasis people-centric and rights-based approaches to global health problems (Farmer *et al.*, 2013; Farmer, 2005).

The dominant ethos in global health, however, continues to frame discussions of implementation through the need to bring a particular type of order to the local. The prevailing judgments of biomedicine – of randomised control trials, risk factor surveys, epidemiological distribution maps and rapid scale-up that is easily transferable over disparate countries and cultures – continues to maintain a deeply reductionist, positivist standpoint. These are “monopolized by scaling-up, quick technological fixes, and statistically-based data-driven research” (Adams *et al.*, 2014), “driven by biomedical conceptions of [disease being a] purely pathophysiological process” that ignores social pathologies (Baer *et al.*, 2003) and the narrow focus on “the triad of technology delivery, patient compliance and the basic science of disease” (Biehl and Petryna, 2013).

Whilst global health, as a field, has attempted to redefine “international” health to incorporate notions of bottom-up implementation and context (Adams *et al.*, 2008), the “old ghosts” of

narrowed top-down implementation and biologically-defined populations continues to, in many places, supersede a more diversified engagement with national publics and citizens (Biehl and Petryna, 2013; Prince, 2014). The case studies in this thesis agree with this broader anthropological critique. It has shown the overriding tendency for global health programmes to prioritise volume and delivery structures over quality and effectiveness. The prevailing ethos remains surprisingly coupled to the technology-transfer model of innovation whereby innovations are “developed, delivered and released” to end-users with little or no consultation, or feedback loops (Olivier de Sardan, 2005:94; Roling, 2009). Adoption, as we have seen in the case studies, is typically viewed as a linear transfer from expert to ignorant where the specificities of end-users are overlooked and with it consideration of local knowledge, agency, needs and context.

This speaks to broader disjunctions between global aspirations and local realities. Translating interventions into “poor places” is guided by an implicit juxtaposition (perhaps played out more in practice than in policy) between what are considered sound, scientifically-validated “tools” and “strategies” and the variety of local realities and routines that, despite the best of intentions, are often blamed for low coverage and impact. Simplistic dichotomies between modernity/backwardness, developed/developing, rational/irrational, science/tradition and rich/poor are upheld by the physicality of different actors (Agrawal, 1995). This involves the juxtaposition of clean, ordered and connected global players with access to hotel lobbies, medical laboratories, land cruisers and scientific jargon (as symbols of scientific medicine) against the dirty, chaotic and rain-fed livelihoods of “marginalised communities.” The implicit narrative, like the heroic medicine of the colonial era, is that these populations require “urgent interventions” to lift them out of poverty and that global resources and expertise knows no

bounds, is all consuming and capable. Local specificities are put to the margins in efforts to scale-up interventions across regions, ecologies and ethnic groups to “eradicate global poverty” where the goal is to generate uniformity based on perpetuating universal strategies, most often through targeting a specific pathogen. In the processes, however, biomedical ordering too often becomes detached from implementation, not to mention local priorities and broader developmental needs.

However as this thesis has shown, the translation of “modernity” – that is, a modern biomedical and public health order – from the global to the local invariably provokes acts of reinterpretation between local pasts and presents; a hybridity of forms and modes of thought predominate among the “target populations” (Arce and Long, 2000). This is especially the case when, as was the case with our three case study interventions, there are limitations in resources and finances. One could argue that well-resourced “military style” operations – for example, the use of specialised helicopter teams of WHO experts to eliminate smallpox during Ethiopia’s civil war in the mid-1970s – suffer less from the agency of populations. More finances would appear to abscond planners of the need to engage with local barriers, since it allows for a greater ordering (or buying off) on the ground; albeit other examples, such as polio eradication, certainly point to more complex issues (Yahya, 2010).

In this thesis, there would have likely been a different outcome had SOS continuously subsidised insecticide distribution and funded the 3V Vets for continued mobilisation in endemic villages, the budget for rabies vaccination ensured greater capacity to vaccinate in remote areas (or even twice annual vaccination!) and CLTS paid their volunteers generously and enrolled the support of other stakeholders through copious financial incentives. This is not to say that money alone could have solved all of the embedded barriers to behaviour change found during my research



but that increased coverage would have certainly been achieved, at least over the short course of the project. With less resources, the promotion of “country-ownership” and the desire for “sustainability” (as we have seen in different ways in both the Ugandan and Zambian case studies), interventions depend more on embedding themselves within the local. This requires garnering the support and active involvement of diverse groups – as in the case of volunteers for CLTS (Zambia), village leaders for rabies (Tanzania) or private veterinarians and sprayers for HAT (Uganda). In the absence of adequate resources allocated to incentivise these groups and meet expectations, their performance is unfortunately reduced with significant effects for intervention effectiveness.

This thesis has shown that moving global aspirations of preventing neglected tropical infections from global boardrooms to district offices and then into rural villages is a process fraught with uncertainty, complexity, struggle and transformation that needs to be engaged, not hidden from view. These findings follow the small but growing critical social science literature on NTD control in Africa (Parker *et al.*, 2008; Parker and Allen, 2010; Parker and Allen, 2013; Samsky, 2012). In agreement with Long and Long (1992:35), it shows that the concept of the intervention needs to be deconstructed and viewed as “an ongoing, socially constructed and negotiated process, not simply the execution of an already-specified plan of action with expected outcomes.” Negotiation, in this sense, is a process of enrolment, the generation and translation of interests and the fashioning of context into a material and conceptual order (Mosse, 2005:9; Latour, 2000).

Social scientists in global health have become increasingly interested in understanding how global and national forces (the supranational processes that define our era of globalisation) shape such interventions in specific locales and geographies – Ong and Collier (2005) have termed

such networks “global assemblages.” Associations and relationships form across disparate geographies, shaping realities and subjectivities in the local in unpredictable and malleable ways (Latour, 2005). They are “systems” characterised by network relationships, non-linearity, emergence and hybridism – “ordering” them requires adapting to uncertainty and dealing with “complexity” (Gatrell, 2005; Marchal *et al.*, 2013). Global health literature has become replete with models, frameworks and approaches that offer a road map for how to deal with such complexities – for example, ecosystems approaches to health (also known as EcoHealth) as well as in the One World, One Health movement (Charron, 2012). However while the rhetoric of complexity becomes more normative and incorporated into the mainstream of development, these approaches rarely engage with the wider socio-anthropological and developmental literature to the problems they seek to address. Detailed and locally-grounded analysis of *how* multiple endogenous and exogenous factors form barriers to the translation of prevention tools and strategies are significantly lacking.

Applying the concept of the intervention as socially negotiated to the mundane details of why and how global health interventions go awry can open up new possibilities for imagined futures where local realities are better aligned with operational practices. This thesis has applied this theoretical approach through three case studies and yielded important insights into operational shortcomings, their drivers and pragmatic pathways to address them. In agreement with the anthropological literature on global health, it has shown that NTD interventions are contested and socially constructed assemblages made up of technologies, social forms and knowledge(s) experienced through different actor interfaces. Through this analysis, the thesis has yielded important insights into where and how interventions are negotiated as well as what components make up these “negotiated assemblages.” The major contribution of this thesis, therefore, is in

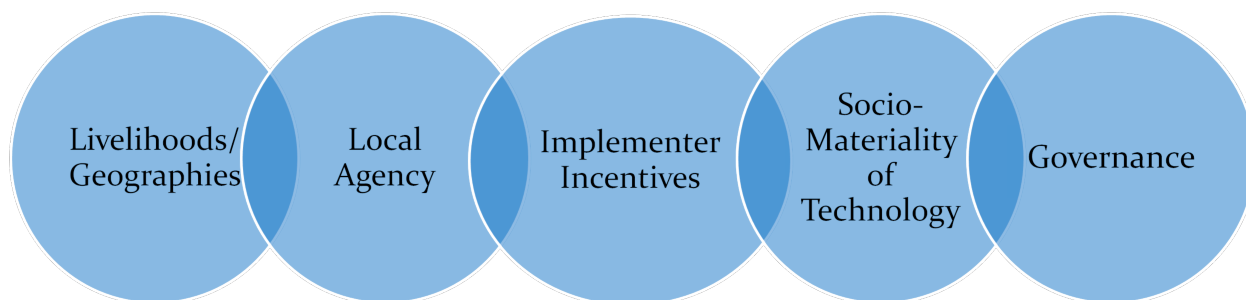
describing this assemblage in more detail, its parts and in suggesting how to embed such an analysis into interventions.

In my experience working with biomedical scientists, there is a need to synthesis, or make simplified, the discursive meanderings of social science interpretations in order to garner support from so-called “power brokers.” After all, social constructivist analysis tends to occupy very different interpretative worlds in comparison to those who actually plan, manage and implement interventions (Long, 2001). This requires new ways of conceptualising global health interventions in space and time to make explicit interventions as defined by uncertainty, transformation and adaptation; there is need to be seen as presenting a clear “guideline” for how such projects should go about trying to “order complexity.” It is to this that I now turn.

### **III. UNPACKING INTERVENTION EFFECTIVENESS: A CRITICAL SOCIAL SCIENCE FRAMEWORK**

In this section, I pull together the major findings of the empirical chapters in this thesis with the wider anthropology, development and public health literature. Drawing on a comparative analysis of my three case studies, I unpack the notion of intervention effectiveness in order to provide a critical social science framework for understanding effectiveness determinants in global health practice for NTDs. The framework is based on a synthesis of my three case studies and the wider literature. It includes five intervention domains where complexities at the local level as well as gaps between policy and practice were encountered in my case studies (see Figure 4): these include geographical/livelihood variation, local agency, incentives, the socio-materiality of technology and planning/governance. In an effort to make explicit the complexities

of interventions, I discuss the disparate components within these domains that together form their assemblages. Furthermore, I reflect on how, beyond locally-embedded determinants, overlooking these complexities as well as an unwillingness to engage them is one of the single most significant barriers to effectiveness. This highlights the need for a critical praxis and greater attention to social inquiry in policy and practice, discussed more in the last section of this chapter. This synthesis forms the major contribution of this thesis by systematically outlining the variety of social dynamics mediating global health interventions for NTDs that need to be engaged to ensure effective interventions.



**Figure 4: Critical Social Science Framework for Understanding Intervention Effectiveness**

***Domain 1: Local Geographies – Access and Livelihoods***

Global health interventions often function over a predefined “local space” where issues of coverage and impact are measured, assessed and determined. These local geographies are artificially created, cartographically aligned to regional, ecological or district boundaries, and arranged through strategic decisions based on available resources, political expectations and

epidemiological knowledge. As a process of bringing order and *coming-between*, interventions are a battleground between diversities inherent in place(s), people(s) and pathogen(s) over a spatial and temporal plane. They operate over a specified (often short) time period in which the “field” takes on particular meanings, is parceled, zoned and objectified (Geissler, 2014). The variability inherent in local livelihoods and their routines are downplayed and made legible. Influenced by histories and ecologies, these include socio-cultural processes, multiple vulnerabilities stemming from socio-political and economic dynamics, seasonal and climatic fluctuations, agriculture-related plant and animal diseases, and wider environmental and socio-demographic change (De Haan and Zoomers, 2005; McMichael *et al.*, 2008; Scoones, 2009). Interventions need to account for the fact that, at least at a general level, there is a variety of livelihood systems in a given geography with important differences, fluctuations and stresses that impact them. Although geographically- and temporally-bounded, programmes are shaped by inter-linkages between livelihoods, environment, seasonality and their corresponding biosocial fluctuations (Chambers, 1982). This was shown to influence access to intervention technologies in a number of subtle but important ways in the three empirical studies of this thesis.

First, local livelihoods were shown to be structured by seasonal and geographical variations that sometimes contradicted with intervention delivery schedules. Seasonal changes in crop farming and livestock management, for example, drove the migration of (agro-) pastoralists in my Tanzanian case study. The social group with the largest number of dogs, the fact that they were absent from the village during rabies vaccination had a significant impact on coverage. The subsequent eviction of livestock-keepers from the Kilombero Valley, based on concerns of soil erosion and land carrying capacity – itself an entrenched but contested socio-political narrative about pastoralism (Benjaminsen *et al.*, 2009) – demonstrated the dynamism of population

movements in NTD control; this has been reviewed by Aagaard-Hasen *et al.* (2010) and commented on recently by Parker and Allen (2012) in their analysis of how cross-border movements between Uganda and Congo DRC affected coverage for MDA for soil-transmitted helminths and schistosomiasis.

Seasonality not only influenced migration but also the purchasing power of households and the willingness of people to participate in disease control. In the Ugandan case study, reductions in income during the dry season on insecticidal use affected both livestock-keepers and veterinary businesses. This fluctuation, however, happened to correspond with significant reductions in the number of ticks and tsetse, mitigating an otherwise dramatic influence of seasonality; other important influences on income generation included foot-and-mouth disease (FMD) quarantines, cassava mosaic disease, flooding, drought and, part of a much larger socio-ecological process, land fragmentation due to rapid population growth. These vulnerabilities led to a volatile market for many of the veterinary drug sellers in the area, affecting efforts to institute the spray team model.

Seasonality also directly influenced the amount of time people had to engage with a given intervention. This was shown, for example, in the low levels of attendance at CLTS meetings in Zambia, itself a result of triggering having been conducted when farmers were still busy harvesting their crops. Among others, these observations are similar to those found by Omedo *et al.* (2012) in Kenya who recommended that MDA correspond to the harvest season to avoid side-effects and ensure adequate time to engage local communities; Mpanya *et al.* (2012) who noted the discrepancy between HAT active surveillance units and the movements of farmers and miners in Congo; and in an analysis of fisherfolks in Uganda in relation to geographical and livelihood barriers to schistosomiasis drugs (Parker *et al.*, 2013). These dynamics clearly have a

major impact on intervention coverage, showing that there is often an optimal “window” for interventions in a given geography, orientated around these seasonal changes and the specificities of high-risk sub-groups. Geographies need to be problematized as diverse and coupled to livelihood-seasonal change instead of the predominate tendency to conceptualise them as uniform and singular.

In addition, seasonality shaped the mobility of intervention staff and their use of local terrain. The large distances with poor road conditions (especially in the rainy season) created high translation costs for the 3V Vets in Uganda, reducing their time in educating farmers when financial support for these activities was withdrawn. Large distances also dissuaded insecticide sprayers – who did not like “*running around chasing people*” – one reason, among others, for why they preferred the more profitable work in injectable drugs.

Seasonal variation also revealed some of the more difficult barriers to local adoption. For example, changes in defecation patterns between the village and farming fields in Zambia helped to normalise open defecation and de-motivate households to maintain latrines in the village since construction could only address “*half our sanitation problem.*” Weather and ecology was linked with a high degree of latrine collapse while densely settled villages created bylaws enforcing latrines to be constructed at the periphery of the village, due to concerns about contamination and miasmatic notions of disease.

Interventions have to make strategic spatial decisions regarding delivery and coverage with important consequences: the placements of central vaccination point in Tanzania, the location of veterinary drugs shops in Uganda and the triggering of villages in CLTS. In the three case studies, delivery was always conceptualised at an abstract “district level” which, in ways, did not

consider local variations, epidemiology and change over time. In Zambia, we saw how certain conditions – many of these tied to ecological characteristics (i.e. access to materials) and levels of socio-economic development – offered CLTS the best chance of having an impact on sanitation. A targeted strategy whereby these villages were first triggered and the scale-up process was done more gradually would, as I argued, offer the most likely scenario for having more latrines built and used.

Generally, the distribution of disease is seldom uniform within a certain intervention area, but often clustered in “hot spots” that should be prioritised. A vivid example of how the more abstracted, quantitative conceptualisation of space and time negatively impact interventions can be seen in the Ugandan case study. Despite being financially supported by the SOS campaign and patient registers available from the local treatment hospitals, no effort was made to actively target villages where HAT patients were recently admitted to hospital – instead the focus was on meeting monthly sales targets. There were no 3V Vets located in the most highly endemic sub-counties of Kaberamaido, further confirming that the intervention modality was conceptualised from a geographically uniform standpoint.

These examples all show that changes in livelihoods, environment and seasonality on interventions are clearly dynamic and demand engagement. As shown in the three case studies, interventions presuppose the uniformity of populations and ecologies across temporal and spatial dimensions at their own peril.



## ***Domain 2: Local Agency and the “Public” in Public Health***

As with geography and livelihoods, there is a tendency to reify “communities” – a much used term in global health – as the ultimate “target” for interventions. This sometimes amorphous category needs to “comply”, “participate” and “adopt” the technology and social forms promoted by the intervention. Outcomes, which are most often measured in quantitative distribution and coverage rates, are determined largely by how well, or poorly, this works. Despite geographies having diverse social groups (based on wealth, ethnicity, livelihoods and geographical location) and sub-groups (i.e. women, children, men, elders, local leaders, etc...), these differences tend to get glossed over. As with livelihood and environmental diversity discussed above, geographical areas are approached as if they were composed of social homogeneity, if not conceptually then at least, for the most part, operationally (Espino *et al.*, 2004; Nichter, 2008). As we have seen, there is a tendency for interventions to largely ignore the interpretive lens of local people and their differences in needs, capacities and constraints, as well as the endogenous ways in which they exert influence on the intervention itself.

Prince (2014) has argued that the very notion of a “public” in public health is somewhat of a misnomer in the African context where the social contract between citizens and the state is weak. Instead, in such places biomedical ways of knowing see only crowds and populations, devoid of agency and variety (Marsland, 2014). The overemphasis on the “noncompliance” of crowds and populations ignores the role of structural socio-economic, political and environmental determinants – concisely and convincingly, Farmer (1997:186) argued that, “throughout the world, those least likely to comply are those least able to comply.” However local publics certainly do demonstrate agency and cannot be reduced to passive “poor people.” While many

actively seek out biomedicine as a “thriving for modernity”, local publics also, metaphorically, “have weapons” to challenge dominant knowledge claims through resistance, avoidance, noncompliance and strategic accommodation (Scott, 1990). These actions of resistance, often provoking scorn and derogative labelling as “tradition” or “backwardness,” are deeply rooted in local frames of reference, tied to social networks and related to wider socio-political issues. Local understandings of disease, relationships to government officials and the state, and past experiences with development projects play important mediating roles. This is well represented in the growing anthropological literature on “local resistance” to global health interventions (Yahya, 2010; Scoones, 2010; Hastings, 2013). The results of this thesis concur with this wider literature on a number of levels, showing the importance of interventions understanding and engaging with “communities” as active and heterogeneous publics.

First, we have seen that the adoption process of intervention tools, be they pyrethroid insecticides, canine vaccinations or pit latrines, reveals the social heterogeneity of the rural African village and its local socio-economic and political marginalisation; that is, the “uneven playing field” of global health (Whiteland and Manderson, 2000). Adoption of these technologies tended to align with higher levels of material and social capital. This was most clearly articulated in Zambia where latrine ownership, as a symbol of modernity, was related to education, mobility, access to government subsidies, food security, social networks and better housing, among other factors. Metaphorically, the myriad of barriers to latrine adoption were embodied within the relationship of “*the bush*” representing both the site of open defecation and the marginalisation of the rural populace from the modern Zambian state and its wealth, resources and institutions. Inequalities and spatial distributions were also shown to vary between different villages. Some villages suffered from chronic food insecurity and late payments from

the state-owned maize parastatal that fostered a disempowered ethos that did not resonate with CLTS principles. Chaata village, due to converging social, environmental and material capital, was the only village with any substantial impact.

The importance of social heterogeneity was also shown in the other case studies. In Uganda, the effects of land fragmentation, recovery from decades of war, rapid inflation and other developmental challenges were repeatedly invoked to explain why the many “disorganised people” preferred the cheapest insecticides, despite knowledge that they were not necessarily the most effective. Certain sub-regions were known as having an “epidemic of backwardness” whilst villages closer to dense settlements and transport routes were more “progressive” and “modern”, categories that impacted knowledge of disease and insecticide use patterns. Similarly, in Tanzania dog ownership was divided between dogs with a utilitarian value and those that did not have a specified livelihood role, which lowered the willingness of people to participation in, and their ability to physically bring their dog to, vaccination. Important variations also existed between rural, urban and pastoralist villages.

Socio-economic processes were reflected in the various interpretations regarding the value and purpose of disease control. At the village level in Uganda, adoption was perceived according to dichotomisations between “modern”, “semi-modern” and “backwards” villagers. This segregation was found, more or less, in all three case studies serving as the major explanatory framework by which people discursively made clear why some adopted these technologies while others did not. This was upheld through exposure to “scientific” frames of references facilitated by greater exposure to veterinary extension workers (Uganda), urban notions of hygiene and sanitation (Zambia) and as expressions of “social responsibility” (Tanzania). It was expressed in following scientific notions of progress as well as perceptions about the benefits that people

would accrue by complying and participating. This relied on certain narratives about what was “logical” and “illogical” – for example, the mathematics of insecticide usage and the benefits of using latrines. It required being convinced that efforts today (in complying and participating with the intervention through planning and forethought) would reap benefits tomorrow, improving livelihoods, wellbeing and absence from disease, either for the individual, household or wider community.

Although compliance was related to such notions of “modern thinking” it was also suspect and questioned through local reference frames. Generally, what was directly observable and experienced garnered the most support, rather than abstract biomedically-defined phenomena or, for that matter, its antithesis, witchcraft (Nichter, 2008; Green, 1999). Perceptions of disease had clearly been influenced by past outreach programmes, but details were combined in curious ways. A certain “hybridism” between local experiences, tradition and health clinic information predominated – a process of integration and synthesis highlighted by Marsland (2007) in her discussion of the “modern traditional” healer in Tanzania. In these ways, village ideas about the value and usefulness of practicing disease prevention strategies were often discussed (in Zambia and Uganda, at least) as a “gamble” and “risk” that was never guaranteed to work. Given the multiple vulnerabilities associated with local livelihoods and these associated perceptions – which was often similarly discussed in reference to, for example, sleeping under a mosquito net or boiling water – many simply did not see the control of neglected diseases as a priority. These were “rare” diseases. This was especially the case with ambiguous disease pathways that did not follow local conceptual frameworks – as in spraying to prevent tsetse flies from biting an animal or the fact that multiple pathways were identified for sanitation-related diseases. Sporadic

attempts at community education did little to change these more deeply embedded experiential perceptions.

On the other hand, the case studies also showed that there were a number of “motivational” processes that were found to be important in garnering local support for NTD control. With much variation based on local experiences, fear of disease, dog culling and treatment costs were important drivers for rabies control in Tanzania. The traumatic, albeit rare, occurrence of rabies deaths, the 2006-2008 outbreak and vicious dog attacks in the community (whether rabid or not) stood out as visible reminders of the potential for harm and suffering, giving rabies wider community-level knowledge and priority than the number of cases – or DALYs for that matter – would have demanded. Furthermore, the level of input (in time and resources) that people had to put into attending to vaccination was relatively minimal compared to the other case studies, reflecting the lower end of the “participation scale” (Rifkin, 1996). This certainly helped amplify people’s willingness to comply. In Uganda, experiences of tsetse and ticks and a villages’ location relative to swamps and bushes were important causes for the level of priority given to HAT and cattle diseases. Having an animal die due to tick-borne diseases was significantly related to willingness-to-pay for regular insecticide application.

The driving forces behind participation and the promotion of community compliance sometimes had little to do with disease control, but rather the exercise of power and authority. This demonstrated a different angle to public agency; for example, in owning a latrine to show one’s wealth and prestige, positioning oneself as a “knowledge broker” in relation to building techniques for latrines and assisting in mobilising (or even rebuking) other community members. Punitive efforts included “bylaws” to lock latrine doors and impose “fines” for not having a latrine (Zambia) and dog culling after vaccination; efforts to enforce a “village law” for the

mandatory payment of medical fees; and a desire for the village office to register dogs (Tanzania). Social pressures and simplified “local narratives” were fundamental to normalising participation and making important the rationale for compliance and involvement – ticks can kill our cattle, shitting openly can make people in the village sick, and not vaccinating your dog can kill your neighbour. Those who did not see the importance of these activities were frequently classified as “unsanitary subjects” by other villagers – deemed incapable or unwilling to adopt modern biomedical understandings of the body, hygiene, illness and healing (Briggs and Manti-Briggs, 2003).

Alternatively, agency was also shown in efforts by the village leadership to mobilise community members to attend meetings and spread information. Village leadership was seen to be a highly variable but essential aspect of involving local publics. In Tanzania, for example, leadership was instrumental in arranging the location of the central point and disseminating information about the campaign. The 3V Vets and spray teams in Uganda complained at length of the challenges of engaging village leaders (often considered “drunkards”) and the continued demands to provide them with financial incentives to mobilise people as well as the general suspicion (and unacceptability) of conducted mass treatments for a fee. In Zambia, poor leadership – where many village leaders themselves, for example, did not have a latrine – contributed to a lack of cohesion and motivation that was only noticeably circumvented in Chaata village where a number of active community members and greater gender equality contributed to more favourable conditions for CLTS.

Local agency, therefore, involved multiple levels and processes that impacted the moving of global technologies into rural African villages for NTD control. This involved recognition of the deep social heterogeneity both within and between villages (often separated by only a small

distance) as well as wider socio-economic and political marginalisation that structured reasons for (non-) adoption. The interpretative lens of people and the value they placed on the interventions themselves was also significant, intimately linked with local observation and experience. Motivational processes, in turn, involved elements of fear, the level of input needed and prioritisation given to the disease. Furthermore, public agency was expressed through different embodiments of power and authority, especially locally-acceptable methods of “soft” coercion, simple narratives that framed the importance of compliance, and village leadership processes.

### ***Domain 3: The Strategies and Incentives of Programme Mediators***

Agency, of course, was not only exerted by the recipients of interventions but also by those charged with implementation. Preventative NTD interventions seldom take place in a vacuum – they are rather *integrated*, in one way or another, within the existing district health, veterinary and/or agriculture system (Gyapong *et al.*, 2010; Marchal *et al.*, 2011). Neoliberal reforms in the late 1980s to “roll back the state” have led to drastic reductions in health and veterinary sector expenditure in Africa, which have yet to fully recover (Segall, 2003). As we have seen in the three case studies, programmes operate where human resources, information systems, essential drugs, basic infrastructure and supplies are limited and weak; this is implicit in the use of the term “resource-limited” settings. Interventions require enrolling the support of actors embedded within these systems, who in many cases are the ones responsible for actual implementation. Like the colonial chief, it is these “local people” – health and veterinary staff as well as community outreach workers and volunteers – that are responsible for bridging the divides between the local and global; they have dual identities acting as “brokers” and “mediators” between material and interpretative worlds (Lewis and Mosse, 2006). They are responsible for

translating between technical-scientific knowledge and popular knowledge whilst defending their own personal interests, those of the intervention and those of their community (Olivier de Sardan, 2005).

In this thesis, my case study interventions all tasked the delivery of policy models to local district or village actors: district bureaucrats, extension workers, local leaders, volunteers and private shop or mobile businessmen. Local barriers to uptake, compliance and behaviour change were often mediated at the interface between these project intermediaries and the wider rural population. In Zambia, many of the local champions did not implement CLTS in its standardised form – they did not use the word “shit”, rarely conducted follow-ups, were not very well respected, lacked technical knowledge to impart to expectant households and could not record data appropriately. In turn people were, at times, inherently sceptical of their efforts and showed this in their reluctance to gather in community meetings and their continued expectations for hardware subsidies. Leaving the local chief system and the environmental health technicians (EHTs) to oversee these volunteers – who were never given any clear expectations – was difficult since no attempt was made to understand the interests of these actors, their working norms or their particular constraints; for example, EHTs operated under severe staff shortages (I often observed building cleaners acting as doctors and nurses at the local health centres), corruption, inadequate supplies and low morale due to neoliberal policies in the health sector in Zambia (see Ferguson, 1999).

In Tanzania, veterinary workers were tasked with selecting the central point, mobilising dog-keepers and ensuring adequate numbers of vaccines and other equipment. Although they often enrolled the support of local leaders, we saw how central points were largely placed in convenient locations far from the more remote areas with more dogs and how information



dissemination to these places were limited. Although the situation in Uganda was more complex due to three broad groups of veterinary drug providers (the 3V Vets, other shops and mobile doctors), the tendency to prioritise profits over public health – both in terms of selling products and educating farmers – led to a large amount of non-tsetse effective insecticide being sold in HAT-endemic villages. The location of shops, prices, supply, cash availability and the training of the owner and attendants were all factors that structured the insecticide market. Shops that were not part of the SOS intervention felt little attachment to the need to prioritise tsetse insecticides while the spray team model was unsuccessful due to, among other things, the more lucrative work of treating animals. Furthermore, broader notions of professionalism and social norms regulating business transactions were important as they framed the lack of education to “ignorant” farmers about the differences in insecticides and the fact that most shops were manned by assistants (some with very little training) rather than trained veterinarians.

As Pigg (1995) has shown in relation to traditional birth attendants in Nepal, the tendency for projects to categorise local actors involved in implementation based on overarching stereotypes can create simplistic assumptions that objectify the local, leading to inappropriate delivery structures. This critique was largely confirmed in this thesis. We saw how, in Zambia, many of the volunteers – especially those who did very little triggering – had been selected by local political allies with the expectation of gaining monetarily through the programme. They were provided bicycles and promised money for achieving 10 ODF villages but had little managerial oversight, provision of material (pencils, paper, airtime, etc...), social support networks to help galvanise their interests, and clearly (and realistically) defined benefits rewarding hard work. The motivation and support offered to volunteers who are used in many global health programmes impacts coverage in dynamic ways. This has also been noted in the ongoing delivery of

ivermectin for the control of onchocerciasis in West Africa where high dropout rates have revolved around to a lack of incentives and supervision, long travel distances, other duties, drug supply problems and working in areas not familiar to the volunteers – volunteers have also been noted to perform better where money has been provided, such as in polio vaccination (Amazigo *et al.*, 2007; Emukah *et al.*, 2008; Katarbarwa *et al.*, 2010; Okeibunor *et al.*, 2004).

Local brokers have expectations that need to be met to ensure their continued enrolment and performance. The sprayers in Uganda, for example, expected regular workshops, knowledge dissemination, low prices, drugs on credit and various types of materials such as spray pumps, overalls and gumboots. Providing these in a concerted strategy could have helped support the spray model and its diffusion. Local leaders in Tanzania expected some small financial incentives for mobilising farmers and livestock keepers in remote areas, as did leaders in Uganda. Similarly, the 3V vets and other drug shops expected additional financial gains for education and engagement with farmers as well as posters and other physical materials. Traditional chiefs, EHTs and others in Zambia, who were essential to supporting CLTS but were sidelined due to embedded power relationships and institutional mistrust, also expected some “development rent” to garner their enthusiasm and commitment to the project.

These examples show that the positionality of project brokers and mediators as well as their established networks, norms, values and expectations play a significant role in shaping interventions. They face various barriers to effectively deliver intervention tools, replicate strategies and engage local publics that are mediated by expectations, incentives and different levels of commitment and willingness to collaborate with other actors. However it would seem that these critical points are often unaddressed, sidelined or downplayed, as was found in the three interventions studied in this thesis. The case studies all showed that understanding and

manipulating who is tasked with implementation (the selection processes), how they do it (the delivery strategies) and why they do it (the incentive structures in place) is a fundamental aspect of effectiveness and that this requires adaptation, changing roles and shifting engagement over time as the intervention and situations change and lessons are learnt.

#### ***Domain 4: Technology as Socio-Material Actors***

The adoption of preventative health technologies by local publics in Africa is habitually considered in relation to local “knowledge”, “attitudes” and “practices” as well as, to a lesser degree, socio-economic disparities. The “things” themselves – that is, their material and social particularities, known as their *socio-materiality* (Mumford, 2006; Orlikowski and Scott, 2008; Leonardi and Barley, 2010) – are seldom given much attention. However, the “social lives” of technologies has become an ever more theoretical approach, linking science and technology studies (STS) with development, anthropology and global health (Latour, 2000; Lewis and Mosse, 2006). Interested in a “physical” sociology, the dichotomization of science and society, the technical and the social are increasingly called into question, as things are given agency in configuring and organising networks of relations (Latour, 2005). Fisher and Arce (2000), for example, discussed the interlocking of technology, ideology and representations of modernity in controlling sleeping sickness in colonial Tanganyika. In turn, Whyte, Van der Geest and Hardon (2002) explored the multifaceted, entangled “biographies” of pharmaceuticals, which has now spurred a much wider literature on the subject. Other science studies have explored how ships, bacilli, scallops and water pumps have structured networks of actors.

The three case studies in this thesis have shown, on multiple levels, how the physicality of the technologies promoted, as well as their entanglement with the social and ecological, shape

adoption, delivery and use. In Tanzania, rabies vaccination included dynamic relationships between central vaccination points, equipment, the particularities of the vaccine (i.e. the need for cold chain) as well as the complexities of why and how people brought their dogs – the utility of the dog, the characteristics of the owner and the behaviour of the dog. These factors all coalesced to determine coverage. Alternatively, the situation in Uganda was more complex. For example, the preferences for non-tsetse insecticides were frequently discussed in relation to physical and observable characteristics and effects of the drug: smell, colour, packaging, residual period and mode of action. These provided a fertile ground for farmers to contest the SOS narrative to use pyrethroids. Inadequate promotion by the 3V Vets together with this deferral to experience by farmers – embedded within the conceptual framework of many farmers to target only tick predilection sites – was responsible for continued amitraz preferences as well as the unacceptability of the RAP method. Sprayers discussed the difficulties of spray equipment breaking, the need for protective gear, posters, and bicycle and motorcycle transport as a major impediment to their “village-based” routines. Farmers, in turn, emphasised how a lack of spray equipment (the use of leaves, water bottles and hand pumps) led to poor dilution rates and inadequate application methods that reduced the efficacy of treatments. Hence these physical characteristics coalesced with the social norms, values and local ways of knowing and acting (discussed more above) to reduce the effectiveness of the programme.

A different scenario presented itself in Zambia. As we saw, embedded social, technical and ecological barriers had to be “overcome” to move households from desiring a latrine to actually having and maintaining one. Weather and insects destroyed poorly constructed latrines while the build up of faecal matter itself in the pit created impressions that they were “unhygienic.” People had to negotiate the landscape as they searched for the more durable *Mbangu* logs and acquired

the necessary material (bricks or bamboo) to make the superstructure, which were increasingly seen as influenced by environmental change. Latrine construction was variable, with many different designs. Building was influenced by the technical knowledge of the owner and builder and their relationships. Latrines required maintenance, had different longevities and were spaced geographically based on notions of disease causation. As the chapter argued, access to durable materials and building techniques played a major role in influencing usage of latrines and their maintenance; other important aspects entangled with these technical dimensions included gender inequality, village leadership, environment and levels of technical knowledge. Latrines were a good example of the multiple ways that technologies, social forms and ecological characteristics were embedded within a dynamic web of causality.

In each case study, public perceptions of the intervention technology were explored, the particularities of how socio-materiality influenced the delivery and adoption of it as well as the embedded ways that technologies were then incorporated (or abandoned) by end-users. I explored the “everyday life” of these technologies and how they “form parts of complexes that co-produce effects in particular situations” (Whyte, Van der Geest, Hardon, 2002:14). Animals, equipment, drugs, natural material, interpretative frameworks and ecologies intermingle in ways that were not necessarily single or linear to unpack. Viewing health technologies as socio-material actors promotes understanding these network dynamics as an essential step in manipulating the embedded local and guiding it, as best as external project actors can, towards greater effectiveness. It provides a starting point for analysis that does away with the naïve notion that “socio-cultural” processes are the main problem by turning the focus of analysis on the things themselves. Perhaps most important of all, it also informs us of the deeply embedded barriers to proposed policy solutions and the fact that “things” (those technologies that need to

adopted by end-users) are contested and have multiple “lives.” This challenges simplified narratives about cause and effect and should challenge planners to think more creatively about issues of planning and governance.

### ***Domain 5: Planning, Governance and Narratives***

The translation of interventions into local geographies, communities and district offices is driven by specific policy narratives and governance arrangements that influence the planning and implementation process. Given the increasingly complex global architecture for health programmes, narratives are the interface where the exchange of resources and relevance are negotiated at the global level. Technical language is used to form dominant storylines about efficacy and propose solutions that are often framed in simplistic ways to reduce uncertainty and enrol support (Roe, 1991). For example, in Zambia CLTS was pushed by the larger policy environment of the MDGs, local government decentralisation reforms, the failure of past subsidy approaches, the need to “reinvent” the sanitation sector and a global discourse about the appeal of the technique itself and its simplicity. In Uganda, the need to sustain the parasite reductions from the SOS mass treatments through the 3V Vets was generated through an emergency narrative of the eminent merger of the two HAT forms, the synergies between business and public health and the low cost and simplicity of the RAP method. These cogent narratives were framed as locally appropriate but ended up locking themselves into certain delivery pathways involving a specific set of actors that were difficult to escape from or modify (Leach, Scoones and Stirling, 2010). Hence the narrative helped enrol certain actors and perspectives while excluding or marginalising others, despite their potential usefulness.

Policy processes can drive the mobilisation of resources and the arranging of intervention strategies in very linear and technocratic ways, where the confidence of the intervention's social engineering becomes over-extended (Scott, 1998). This thesis shows that the introduction of low-cost and low-tech "appropriate" technologies, which involve "local" people in their delivery, still requires a constant engagement and adaptation by project planners. In all three case studies, policy was only a loosely defined set of assumptions that required constant and incremental modifications in practice. However multiple bottlenecks in the planning, managing and governance of interventions were encountered that limited field-orientated pragmatism, most often influenced by various differences between the stakeholders involved and their ability to learn from operational mistakes and manoeuvre within their sphere of influence.

We have seen this on multiple levels in the three case studies. In Zambia, the focus of UNICEF on strengthening local government decentralisation led to CLTS funds and management being channelled through the Ministry of Local Government and Housing (MLGH). However the MLGH rural water and sanitation department had little experience with participatory methods or had worked much in sanitation. The department was staffed by recent graduates from other urban areas of Zambia who had somewhat patronising views of "dirty villagers", paid no attention to the history of the "projectification" of the sanitation sector and negated the importance of following CLTS principles of involving chiefs, EHTs and local volunteers in a mutually supportive network. While the project fell afoul due, primarily, to mismanagement, there were important institutional histories between these actors as well as constraints and enabling factors that needed to be accounted for – engaging them would have involved navigating local power relationships and larger institutional norms. Had the district focal person for CLTS been more committed to success, outcomes would likely have been very different – as occurred in some

other districts in Eastern Province. One single coordinator had much influence in shaping the subsequent failures of CLTS in Katete.

These issues were also widespread in both the Tanzanian and Uganda case studies. The rabies elimination project, centrally organised by the WHO office in Dar es Salaam, distributed equally set budgets to all 28 districts irrespective of geography, infrastructure and dog populations. The ability for the district office to navigate local complexities was further compounded by bureaucratic procedures, specifically having budgets sent unpredictably and being obliged to use funds in specific timeframes that conflicted with flooding and migrations. This influenced the physical assets (fuel, staff, vaccines and allowances) required to mobilise and vaccinate dogs in remote areas. Furthermore, the history of Structural Adjustment Policies (SAPs) shaped limitations of staff capacity as well as contributed to negative community perceptions and relationships with local extension officers. The top-down methods of planning used by the WHO country office maintained these rigidities.

In Uganda, the interests of the private sector partners preceded an adaptive emphasise on targeting HAT through cheaper insecticides. The eventual rolling back of financial support for education (airtime, money for village leaders, motorcycle repairs and salaries), driven by the aims of creating self-sustaining businesses – crafted through a compelling narrative about the relationships between business and HAT control – did not take into account the particularities of HAT epidemiology nor the fact that the original spray-team network model needed to be adapted. Important changes in socio-demographics and delivery during the course of the SOS interventions were also unaccounted for: a total of 80% of veterinary shops in my four study districts had been established since the original business model intervention in 2008. However the changing veterinary drug market, the continued livestock movements of infected cattle and



the high amount of non-tsetse insecticides being sold were left unaddressed. Despite active cases restricted to specific geographies – which were available from hospital records – there was no targeted strategy (or the use of subsidies). Villages that had HAT cases in 2008 continued to have them in 2012 – despite some being only a few kilometers from 3V Vet shops...they were never visited.

These examples show that policy pathways are hard to change once they are set into motion. A lack of finances, capacity and reflexive management – itself influenced by the vested interests of planners, their conceptual frameworks for action and their organisational limitations – all served to maintain the course of events. Reflecting the governance challenges of NTD programmes (Liese *et al.*, 2010), these interventions were funded, managed and driven by disparate actors joined as “partners” – international agencies, academics, the private sector, philanthropic foundations and a variety of government ministries. This reflected the complex world of governance where the capacity limitations of local government (Bratton, 2012), the sometimes conflicting interests embedded within public-private partnerships (Buse and Hammer, 2007) and the technocratic working norms of international agencies such as the WHO and UNICEF (Staples, 2006) are ever maintained and reproduced. In the three case studies, information links were constricted; bureaucratic norms maintained top-down financial, planning and managerial spheres; and responsiveness to local need was not very well prioritised. Unsurprisingly, these comments are found widely in the literature on preventative NTD programmes (Madon *et al.*, 2014; Mubyazi *et al.*, 2004; Rheinländer *et al.*, 2014).

However, there were alternative governance arrangements that could have avoided some of the institutional barriers involved – for example, rabies vaccination managed by NGOs in the Serengeti were known as more adaptive to local circumstances; the medical sector as well as

International NGOs were both considered more competent to implement CLTS; and not having been tied exclusively to the SOS brand insecticide through private sector partners could have opened up the possibility of promoting cheaper pyrethroid products. Interventions, however, were intimately tied to a specified set of actors with specific sets of expertise. These relationships were used to mobilise resources and framed by specific justifications for these organisational forms.

Importantly, this limited engagement with constraints was driven by the lack of emphasis on learning – that is, the gathering of data and cycles of reflection and adaptation. Anthropologists have often criticised the “tyranny of targets” in development projects (Mosse, 2005). They have shown how “evidence-based” advocacy and policy relies on a “technocratic narrowing” driven by an “audit culture” that negates anything that cannot be firmly quantified and transferable to other contexts (Adams, 2013; Biruk, 2012; Erikson, 2012). This obscures effects and limits an engagement with local specificities. Whilst in general agreement with this, my thesis has also shown the perils of not “striving for the target”; that is, an absence of “target-obsessed” practices. These programmes entered into management inertia because they lacked a determined ethos to reach specified targets and did not imagine new possibilities for reaching them once constraints were inevitably encountered. They did not monitor their progress. This was maintained not only through “playing the numbers game” – adapting figures and advocacy to present a continuously positive view of events on the ground (Biruk, 2012; Erikson, 2012) – but by ambiguities of data and reporting structures – quantification of the dog population and vaccination coverage; cases of HAT, number of sprayers and drug sales; and number of latrines built. A robust evaluation and monitoring system was not really integrated into any of these programmes. This raises the suspicions that accountability itself (for an effective intervention)

was somewhat ephemeral – it was not *the* priority and only loosely incorporated. What was more important was mobilising resources, intervening and then, to some degree at least, seeing if it worked or not; engaging with more nuanced local realities through, for example, systematically learning about local constraints, incorporating field knowledge into new pathways and engaging in improving coverage (which was required in all case studies but only really attempted in Uganda) was not part of the experiment.

This points to the need for fundamental changes in the management and planning of global health interventions to increase intervention effectiveness. There is a need for a reflexive engagement in planning and decision-making that moves beyond the narrative, promotes room for manoeuvring and allows for a more long-term engagement on the ground. As the thesis has shown, this is a major determining factor in the effectiveness of NTD interventions.

#### **IV. POLITICAL ECONOMY, CRITICAL PRAXIS, IMAGINED FUTURES**

A recent think tank report, *Implementation Research for the Control of Infectious Diseases of Poverty* outlined a compelling rationale for addressing gaps in implementation for the Neglected Tropical Diseases (WHO/TDR, 2011). Based on One World, One Health principles, the document (itself an outcome of extensive deliberation, research and synthesis) stressed the urgent need for research to address issues of access and delivery of health technologies, and the value of socio-anthropological inquiry to that end (Manderson, 2012). The document reminds us of the human face of suffering – of the “vicious cycle” of poverty and disease – and how, time and time again, efficacious health technologies for diagnosis, treatment and prevention of

tropical infections do not get to those who need it most in ways that are acceptable, available, affordable and adequate.

As we saw in Chapter 1, this emphasis is in line with a growing recognition of a wide gap between “what we know” and “what we do” in global health; that disease control tools and strategies with proven efficacy do not easily translate into reducing infection rates and saving human lives in a linear fashion (Haines *et al.*, 2004; Whitworth *et al.*, 2010). This thesis is situated within this growing literature and focus that places implementation research, in many ways congruent to evaluation, as a “top priority” in global health (Lancet, 2010). This trend is partially driven by emphasis on evidence-based policy, strengthening health systems and efficiency, impact and “value-for-money” in an increasingly monetarized policy space supported by econometric values, such as the DALY.

While there is need to learn “what works” and “what doesn’t work” and why (Levine *et al.*, 2004), the explosive field of *implementation science* has become replete with different models and frameworks. This has borrowed heavily from growing recognition of “complexity” in global health programmes that has drawn attention to interventions as “dynamic systems”, spurring new research approaches focused on adaptability and the need to understanding context-specific issues (Gatrell, 2005; Marchal *et al.*, 2013). This thesis is situated within this movement in global health that emphasises complexity, context and the need for flexible interventions. At the same time, however, the complexity of many interventions – involving multiple layers of factors, processes and actors as outlined in the above framework for intervention effectiveness – continue to be made simple. This was revealed throughout the three case studies of this thesis and is supported by much of the critical social science literature on global health (Biehl and Petryna, 2013; Farmer *et al.*, 2013; Scoones, 2010; Whiteford and Manderson, 2000). This critique argues

that ineffectiveness in global health interventions are primarily structured by top-down information flows and pre-defined technocratic strategies that perpetuate disparities between global aspirations, local realities and implementation.

The quotes at the beginning of this chapter each illustrate two different perspectives on this theme, which is found littered, like a call to arms, throughout the global health literature. On the one hand, the authors of *Millions Saved: Proven Successes in Global Health* (Levine *et al.*, 2004) make clear that there is a need for more “rigorous evaluations” to create “smarter policymaking.” Funded by the Bill and Mellissa Gates Foundation (BMGF), the report argues that there is no *single* acknowledged ingredient for global health programme success in developing country contexts. The authors review 17 successfully scaled-up and effective interventions ranging from smallpox eradication, trachoma in Morocco, population control in Bangladesh, Tobacco use in Poland and dental care in Jamaica. A few general trends presented themselves in the case studies: political leadership, technological innovation, expert consensus, sufficient financial resources, effective use of information and research, community participation and good management. The authors, in turn, argue that “rigorous evaluations” of large-scale global health interventions should “become the norm rather than the exception” since they are needed to “yield knowledge...establish[ing] the causal link between programs and impact to spur greater investment, broader application, and ultimately, more success” (Levine, 2004:11). In this view, a “knowledge deficiency” plays a significant role in upholding the gap between policy and practice since it perpetuates “poor implementation.” More knowledge will lead to better implementation.

On the other hand, the quote from the anthropologist Judith Justice (2000:34) draws our attention to perhaps a more thorny issue. In this account, it is not necessarily a lack of knowledge that perpetuates problems of implementation – although lack of knowledge is certainly a formidable

aspect that needs to be engaged; rather, the divergences and intrinsic divisions between the global and local constrain action in subtle, dynamic and complex ways. These constraining processes exist within the context of poverty and marginalisation at the local level, the bureaucratic structures and political relationships at the national level as well as, simultaneously, within the political economy of the global health industry itself – the particular logics that govern the ways in which resources are managed, priorities are set, knowledge is formed and solutions are framed. The epistemological and ontological worlds of the international boardroom, the district office and the village offer very different subjectivities that perpetuate disjunctions, contradictions and conflicts. In this account, “rigorous evaluations” alone that attempt to assess the success or failure of particular programmes do not, in and of themselves, satisfy the requirements necessary to bridge deeply embedded differences in material and interpretative worlds necessary to improve effectiveness. Rather, there is a need for larger structural changes that re-orientate and shift the bounds of conceptual and material worlds.

Both of these positions have important points that need to be considered. It is certainly true that knowledge generation is fundamental to improving programmes; however it is also true that embedded barriers to their generation and use continuously prevent critical implementation research (as represented by the research conducted as part of this thesis) from entering the majority of global health programmes. For example, it is telling that my own research was not conducted as an integral part of the three intervention case studies; in fact, there was no social

science component to these projects that was integrated into the planning and implementation process.<sup>27</sup>

For those that solely emphasise the “knowledge solution” to poor implementation, the established organisational and institutional demands of global actors will continue to dislodge their plans. That is because the overriding concern of global actors is not always focused on locally-relevant results and sustainability per se, but rather on convincing donors and power brokers for the need of further action – towards sustaining narratives and operational relevance (Quarles van Ufford and Giri, 2003). As Mosse (2005:237) states, the everyday is often hidden from view: “international development is about generating consensus and framing models that link investment to outcomes...questions of implementation are somebody else’s problem.” This regulates the exegeses of organisations and tends to externalise evaluation criteria towards predefined targets focussed on, as I have discussed, the nebulous criteria of “compliance”, which absconds planners from questioning the viability of the policy models used, adjusting modalities according to experience in the field and looking beyond the specific targets to the broader socio-economic and political issues involved (Long, 2001). Hence there is a pervasive fickleness about engaging the mundane details surrounding interventions and anticipating their dull and unexciting contradictions – instead global health tends to look outwards, always in anticipation of the next big thing and trend (Adams *et al.*, 2014). Like development itself, it is a thriving for a future that never quite comes to the present (Rist, 2002).

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<sup>27</sup> However, to be fair I am now engaged in extensive fieldwork to plan a scaling-up of SOS in Uganda across 32 districts in partnership with a London-based company as described in the case study chapter.

Part of the problem is in the very nature of “projects” in the global health industry. Many global health programmes operate within the short “project cycle” and are diffused over space. Dilution of resources and expertise inhibit the addressing of operational constraints, fosters high transaction costs and promotes a somewhat distracted attention towards the next grant cycle (Adams *et al.*, 2014). In many respects, undoubtedly true for the three empirical case studies in this thesis, interventions actually function without *adequate* funding to meet their ambitious goals. The tendency to cover large geographical areas is inherent in the logic of “impact” as well as the drive for organisations to command relevance (and funds) by fostering a narrative of “containment” – the idea that within an impressively sizable place the targeted pathogen(s) is going to be controlled or eliminated and that all of this will be done with minimal cost. Big ideas attract big attention; however, many projects appear to stretch their ambitions beyond their tangible financial abilities in hopes that additional resources will be secured. This has been noted, for example, by Buse and Harmer (2007) in their analysis of public-private partnerships, where most were shown to have substantial funding shortfalls.

An additional issue is related to state capacity. Global health programmes operate outside the remit of the state through a network of global institutions and national mediators, linked by personal relationships and expertise that regulate abilities to access funds and shape the agenda. The often weak institutional landscape of the state makes it into a bystander to programmatic operations, driving an “NGO-isation of society” and a “projectification of care” (Prince, 2014). There has, however, been a reinvigorated focus on the importance of the state in directing activities, having grown in parallel to greater emphasis on intervention sustainability and the need to strengthen primary healthcare (Farmer *et al.*, 2013). This often involves various forms of “country-ownership” and “capacity building” – represented, for example, in the WHO rabies



project in Tanzania and CLTS in Zambia. But, as shown in these case studies, building up delivery networks and service provision is itself a process that, in many ways, defies the otherwise short-term goals and targets needed to prove relevance and impact for global coordinators. There is a tendency, therefore, to sideline or overlook the scale of engagement and capacity building needed in places where political, economic and institutional pressures maintain a weak state and, by extension, weak health systems.

Diseases of poverty themselves are representations of this socio-economic and political marginalisation. Such pathogens thrive where the fragmentation of the citizen-state contract is most acute and where the existence of a “public” is conceptually negated by planners. Local feedback loops that can call failed programmes to account, demand improvements and rearrange agendas, are nearly absent or lacking. In such geographies, as Last (2014) has shown in relation to primary healthcare in Nigeria, there is a serious suspicion of the state’s claims to altruism and service; public health is imbued with the provision of jobs and power to professionals and an entrenched cynicism prevails regarding the value of thriving for uncertain state reforms.

The donor-driven agenda, like the aid industry itself, has an ephemeral nature. Interventions, situated across a transnational space with little input from the public and governed by capital flows from “the global”, further disjoins the very notion of accountability. As Biehl and Petryna (2013:7) remind us with succinct realism, “in practice, the concerns of donors, not recipients, tend to predominate.” Priorities are shifted by vogues and fads, which make the multilayered realm of capacity building and the re-orientation of working norms of government bureaucracies inescapably fragmented. There is a lack of time – time needed to become proficient in fine-tuning field operations and building up local expertise, which evaporates under the desire for quick results (Justice, 1989). This is driven, at least partially, by the need for concise and easily

conveyed narratives, required to guide resource mobilisation and implementation. Efficiency is predominately emphasised, obscuring opportunities for policy entrepreneurs to incorporate equity into mainstream project strategies and goals (Ridde, 2008). Dissemination, publication, engagement with information and reward systems promote global circulation rather than playing by local norms and needs (Trostle, 2000). Grounded in a locally-embedded analysis, all three case studies of this thesis point to these larger theoretical and pragmatic dimensions to the global health industry.

In some ways, this engagement with the local has become erased or simplified by the dichotomisation of “low tech” and “high tech” intervention tools. One of the major defining threads throughout this thesis has been to problematize the very notion of “appropriate technology.” I have argued that being “appropriate” involves much more than the simplicity or complexity of the technology itself; rather it is reliant on how planners and implementers negotiate the dynamic relationships between, as this chapter has shown, geographies, livelihoods, seasonality, disease knowledge, local agency, leadership, incentive structures, delivery networks and strategies, the embedded relationships of social and physical aspects of the technologies promoted (socio-materiality), and issues of planning, governance and data. I have argued that “appropriateness” implies a reflexive engagement with the local. In fact, relegating an intervention to the domain of the “appropriate” can serve to make incomprehensible these complexities. Moran-Thomas (2013) raises this point when she outlined why the use of simple “low” technologies by the Carter Center’s Guinea Worm Eradication programme in Ghana should better be seen as “magic bullets.” From the perspective of subsistence farmers, mass distribution of specially designed cloth filters, calibrated larvicidal treatment of water sources, and organised cadres of specialists used to disseminate them in places with limited health

infrastructure appeared as “high” technology. This is an important point that I have made on multiple levels in this thesis – the very notion of “appropriate” needs to be unpacked; it is never enough to be technologically simple.

On a more subtle plain, all these trends – the fragmentation of the global/local and policy/practice and normative/critical knowledge – are upheld by the “depoliticised quest for technocratic governance” where the dominant narrative directing resources and action emphasis disease containment rather than social transformation (Prince, 2014:35). The effects of neo-liberalism and inadequate (sometimes barely functioning) public health systems continue to demand, in the eyes of many global actors, disease-specific control/elimination/eradication programmes. In turn, the “idealists” continue to advocate for engaging with broader social determinants and what they often call “the forgotten tenets” of the Alma Ata declaration and Health for all by the Year 2000 agenda, which promised cheap, appropriate, effective, participatory and “horizontal” socialised medicine (Janes, 2004). The emphasis on the pathogen rather than the wider social determinants that drive its transmission and mediate its control is a persistent and unfortunate narrowness in imagination on the part of planners and the continued hegemony of positivist standpoints. This has become classically dichotomised in the vertical/horizontal policy debate, framing solutions from an *either/or* perspective (Mills, 2005). *Either* programmes efficiently reduce the health burden of select illnesses through “narrow biomedical” approaches (or “military operations”) *or* they improve health systems by promoting governance reforms, addressing of social determinants and citizen engagement. In the end, vertical NTD approaches offer more attractive, a-political and relatively simplified cause-effect narratives more effective in mobilise resources and amenable to conventional data reporting structures (Béhague and Storeng, 2008). Broader goals, such as “improving daily living

conditions” and “tackling the inequitable distribution of wealth, resources and power at the global, national and local scale” (as recommended by the WHO’s Commission on the Social Determinants) present somewhat of a challenge to the expectations, norms and capabilities that regulate most global health networks (Inhorn and Janes, 2007; Marmot *et al.*, 2008; Taylor, 2009).

However this thesis has shown that broader social issues invariably have a large impact on the effectiveness of interventions in dynamic ways. Extending a critical eye onto effectiveness through exploring the various facets of interventions (as discussed in this chapter) can help promote perspectives that link project goals to these wider problems in ways that have a lasting, positive impact – for example, building veterinary capacity and community outreach (Tanzania), fostering a long-term sanitation plan through a multi-stakeholder approach (Zambia) and improving private veterinary services and promoting coordination between the medical and veterinary sectors (Uganda). Despite the policy rhetoric of “low cost” and “rapid impact” interventions that dominate the NTD advocacy agenda, a growing critical literature is highlighting the lost opportunities to link vertical and horizontal agendas in synergy in ways that improve the effectiveness of existing interventions. Such approaches, which are also advocated by my own reflection on each of the three case studies in this thesis, need to appreciate the long-term needs of sustainably reducing NTDs and the multiple ways in which broader intervention plans that engage in addressing social determinants can deliver significant results for the poor (Aagaard-Hansen and Claire, 2010; Allotey *et al.*, 2010; Charron, 2012; Manderson *et al.*, 2009; Marchal *et al.*, 2011; Spiegel *et al.*, 2010; Spiegel, 2011). However as we have seen, a major shortcoming of current interventions – whether more top-down (the WHO rabies vaccination programme), participatory (CLTS in Zambia) and public-private partnerships (SOS in Uganda) –

is the lack of a critical praxis (dialectical movements between reflection and action) embedded within project planning.

Within these industry drivers, to return to the two quotes discussed above, critical social scientists are placed within a paradoxical position. We are encouraged to create new a-political knowledge about how programmes can be improved, which demands that data is framed in normative ways that does little to challenge overarching bureaucracies, policies and governance arrangement. However, we are not given assurances that this knowledge will be incorporated into intervention plans and activities due to, above all else, the prevailing tendencies of the global health industry. This tension underpins the negative perception that “applied medical anthropology is somewhat slighted as diluted anthropology and as too subservient to policy and medical science” (Van der Geest, 2006:313-14). In turn, many social scientists and the structural systems of reward within our own epistemic communities tend to valorise attacking biomedicine and public health without specifically attempting to improve it (Kleinman, 2010). However there is a need for a middle ground between these two extremes in order to make the social sciences applicable to the challenges of implementing effective global health interventions.

The critical social sciences aim to analytically unpack the relationships between actors and processes in relation to the “coming-between” of global health programmes in order to explore new futures, entrenched power relationships and how the prevailing ethos of the global health industry structures activities. This is a politically engaged task. Borrowing from Ferguson (1994), it challenges the “anti-politics” at work within global health that seeks to erase and obscure effects. For example, Allen and Parker (2013) have recently argued that behind donor-driven grant cycles to “look good”, there is a drive to limit opportunities to discuss operational challenges for integrated MDA programmes – discussion of failures and low coverage are

effectively “controlled” in the fear that funding will be cut. In this political economy approach, the prevailing emphasis on equity and “the poor” are cast as rhetorical devices that exploit an objectification of the local for the advancement of the agenda and interests of global actors (Allen and Parker, 2011). The local is effectively “black boxed”, maintained by the flow of knowledge and information in global health (Feierman *et al.*, 2010), which as we have seen in this thesis tends to flow downwards from the global to the local but with little evaporating upwards. However robust social critiques of policies and programmes tend to remain circulated within their own epistemic communities and seldom trickle out into the mainstream world of the global health industry. Despite their value, critical perspectives at times seem to be nothing more than a mere analytic or academic bystander to dominant modes and processes.

Part of this problem has to do with methodology and framing devices. Harper (2006), for example, has argued that the main difficulty surrounds the generalisability and translatability of local and interpretative work – often focused on a small locale – into the demands of “evidence-based” policy. There is a continued demand to “make relevant” social science knowledge in ways that are considered “rigorous” and “applicable” to wider geographical areas. There is a process of dilution and compromise to ensure relevance and to speak to the needs of funders and planners. In Nepal, Harper (2014:142) commented on the need to suspend his “critical and sceptical sensibilities” to help put into place structures to ensure targets and financial accountability for operational programmes related to the Global Fund to Fight AIDS, Tuberculosis and Malaria. Acting as a “cultural broker”, he maintains that power brokers (i.e. those who affect global health policy) should better realise the potential for ethnographically-oriented knowledge to bridge gaps.

This thesis has situated itself between normative/critical perspectives with the aim of being both in and out of the global public health establishment. It has argued that such engagement, while recognising existent tensions, can and should be more proactively pursued by social scientists and that this is best done through utilising mixed methods research designs, as done in this thesis and outlined in Chapter 2. In agreement with Janes and Corbett (2009), being a principled “public intellectual” is not enough. As producers and consumers of knowledge, social scientists should ask the pressing question of “So what?” and direct and engage our inquiries to possible solutions. Good social inquiry engages in multidimensional ways with the complexities of a given real world problem as embedded within its socio-cultural, economic, political and environmental contexts. It involves spending time talking with people, asking difficult questions, challenging common assumptions, incorporating and making sense of divergent views and generating novel interpretations based on “thick descriptions.” If programmes are to be truly “pro-poor” – as the NTD lobby so voraciously emphasise – then critical social science knowledge that combines both normative and critical perspectives have much to offer the planning and management of interventions, and has the potential to imagine new possibilities.

However in many quarters the biomedical establishment continues to degrade the value of social science. Adams (2013:65) has argued that the hegemony of statistical reasoning, embedded in the gold standard of the randomised control trial, erases the local and specific where the “messy world of public health has begun to look, here and there, like a bench science laboratory.” Social science research is regularly trivialised and made unimportant (Albert *et al.*, 2008; Napolitano and Jones, 2006), as we saw with the dispute between Allen and Parker (2013) and Molyneux and Malecela (2011) discussed in Chapter 1. Despite many global health projects employing multiple groups of expertise, there appears to be a general lack of willingness to conduct the

types of empirical research presented in this thesis, not only because of a lack of expertise available and the various political economy drivers discussed above but also because of an inherent suspicion of “soft data.”

The conceptual framework outlined in this chapter speaks to these broader issues. It builds on the growing movement in global health that promotes robust implementation research and emphasises trans-disciplinary research and intervention approaches while also being critical, self-reflexive and cognisant of how disease control relates to much wider societal and developmental processes (Charron, 2012). There are certainly some grounds for hope and for imagining new futures where problems of implementation are seen as problems of local constraints and priorities, and more engagement with the local – and its particularities and specificities – are the norm (Adams *et al.*, 2014). The movement towards conceptualising global health problems as “complex” is one step towards this end; this chapter, with its proposed “negotiated assemblages” metaphor and five intervention domains for effectiveness forms the core contribution of this thesis towards this end. It is derived from fieldwork over a one year period in Eastern Africa that was arduous, exciting, frustrating and, at times, made important by my persistent belief (or hope) that all the kilometers traveled, the hours of interviews and endless analysis was worth something – that understanding shortcomings in implementation and their deeply embedded contexts were relevant to guide ongoing and future efforts. This thesis, particularly the above intervention effectiveness framework, is the outcome of these deliberations.

I often wondered (in line with Judith Justice in the above quote), when moving “up and down” on dusty and pothole-driven rural roads, whether this sense of relevance was a deception on my own part. Given the prevailing tendencies of the global health industry – organisational and



institutional norms and demands, need for simple narratives, persistent obsessions with policy relevance rather than local results, anti-politics and the favoritism for vertical pathogen-specific interventions – what scope was there for an engaged and critical social science to direct agendas through a critical praxis? In a recent book, *Reimagining Global Health*, the anthropologist/physician/activist Paul Farmer and others (2013) argue that global health, as a new trans-disciplinary field needs to take a “biosocial approach” committed to equity and social justice. Furthermore, they pinpoint that although “no one sets out to ignore equity...the way we frame issues of causality and response typically fails to give it due consideration” (Farmer et al., 2013:6). This gets to the heart of knowledge creation and perspective, which itself is where critical social science ways of knowing and seeing, specifically my proposed effectiveness framework, can be made important.

Social studies on intervention effectiveness have the intellectual room to maneuver between project demands and local needs in order to, as Farmer notes, frame issues of causality from an equity perspective. Metaphorically, I believe that such studies (my own included) serve a utilitarian value comparable to the importance of journalism to democracy: it assists in giving voice and agency to the “bottom billion” by considering their perspectives, opinions, experiences, expectations, needs and wants. It can help them become involved in the conversation, part of the agenda. Engaged social scientists, however, cannot sit back and publish their results, hoping for improvements. Rather, we need to challenge prevailing positivist standpoints to avoid simplifying the local, something that itself requires a socio-political positionality, revisiting of methods and adjusting of expertise in the management of programmes and their design to maintain the tightrope between being *in* and *out* of the public health establishment. Social scientists need to become mediators and brokers themselves, translators of

the local – working within the paradoxical confines of global health and developmental bureaucracies (Justice, 1986). After all, combining critical and normative sensibilities within a new planning ethos may, in and of itself, be the single most fundamental part of improving the effectiveness of interventions. In short, social science perspectives need to become more integrated into the establishment. Given that social action is essentially an “improvisational art”, the social constructionist agenda can offer global health practice, in its ideal form, what Flyvbjerg (2001) in his book *Making Social Science Matter* calls a “practical wisdom.”

## CONCLUSION

This chapter has pulled together the broader insights of this thesis. Drawing on the major empirical findings of the three case studies, it has unpacked the dynamic relationships that mediate effectiveness for NTD preventative interventions by synthesising the case studies with the wider social science literature. To this end, the chapter first argued that planners need to take on the responsibility of “ordering complexity.” It is only through such reflective and continuous engagement with local concerns and processes that interventions can move beyond the tendency for top-down, technocratic approaches that have come to define, as shown in this thesis, the ineffectiveness of many global public health programmes.

Based on a comparative analysis of my three case studies, I then drew together five intervention domains where effectiveness was to a large extent negotiated and determined. I argued that focussing on the dynamics of these specific areas (livelihood/geographical diversity, local agency, incentives, socio-materiality of technology and governance/narratives) offers a conceptual framework that showcases the strengths of critical social science perspectives on

effectiveness determinants, as well as the need for greater integration of such perspective within programme planning and management.

However this chapter also discussed the range of phenomena that, despite the importance of adaptive management in interventions, continues to maintain top-down ways of planning and managing global health interventions. The chapter argued that local contexts continue to be marginalized due to prevailing tendencies in the global health industry. These are related to the nature of funding, short project cycles, systems of reward, prevailing expertise, the contexts of poverty, low capacity in endemic countries and over-emphasis on combatting specific pathogens instead of addressing the social determinants of health. However despite these challenges, there is an increasing trend to emphasise the need for robust implementation research on NTDs that engages with these complexities, and provides scope for change. This chapter, by outlining a conceptual framework to understand intervention effectiveness based in the critical social science literature, contributes important findings towards this end.

## CHAPTER 7

### Conclusions and Implications

Recent debates in global public health, including much focus by the Neglected Tropical Disease (NTD) community, have emphasised the limited attention given to the social dynamics of large-scale interventions. This has underpinned a growing interest in implementation research and the mounting call, by both social and biomedical scientists, for greater trans-disciplinary research and social science involvement (Charron, 2012; Frost and Reich, 2008; Sanders and Haines, 2006). In moving knowledge, social forms and technologies between the global and local interventions continue, in many ways, to be implemented with little attention to their social, cultural, economic, political and environmental contexts and processes (Adams *et al.*, 2013; Biehl and Petryna, 2013; Panter-Brick, Eggerman and Tomlinson, 2014). Recent reviews of social science research on NTD control have emphasised this neglect, reiterating the fact that local contexts are often simplified and hidden from view, despite their importance in mediating the effectiveness of contemporary interventions (Allotey *et al.*, 2010; Allen and Parker, 2013; Parker *et al.*, 2008; Spiegel, 2010).

Situated within a small but growing social science literature on NTDs, this thesis has unpacked the effectiveness determinants of three large-scale preventative NTD programmes in Eastern Africa. These three interventions had important similarities: they were all mass interventions with ambitious targets; they were planned by international and national-level actors and based on specific intervention narratives used to mobilise resources and justify organisational structures and delivery strategies; they all aimed to enact some degree of behaviour change and technological adoption at the village-level; and they relied on district and local-level actors to

deliver these technologies dependent on specific incentives structures. At the same time, however, the three case studies had important differences in institutional arrangements, control technologies, delivery networks and local incentive structures that provided this thesis with a rich empirical and theoretical scope for comparative analysis.

The first chapter introduced the major themes and sub-themes of the thesis by discussing some of the overarching preoccupations of global public health practice in relation to NTDs. It outlined the contemporary NTD control landscape and the increased prioritisation and funding for these 17 tropical infections, as begun in the mid-2000s and reflected in bold new control and elimination targets recently set for 2020 by the WHO. I argued that despite the acknowledged challenges of implementing existing control tools and strategies into resource-poor contexts (for example in relation to MDA for parasitic worms in Africa), there is little research into how the context of poverty itself mediates the effectiveness of contemporary large-scale NTD interventions. As noted in the chapter, the very term *intervention* itself (with its roots in Middle English) literally means “a coming-between.” In the global health sense, therefore, interventions are about the coming-between of cultures, geographies, social forms, histories and politics experienced and represented through the particular tools and strategies used. This process of “coming-between” is situated within many dichotomies and tensions that together compose global public health practice. For NTD interventions to be effective as they move from global aspirations into local realities, there is a need to understand, negotiate and navigate these complexities. The chapter highlights four such areas of tension: i) global health as *interaction* between the global and local; ii) as *process* between policy and practice; iii) as *strategy* between technology and people; and iv) as *understanding* between positivist and constructivist perspectives. The chapter argues that, if global public health practice for NTDs is to come to

terms with its own causality, there is need for a more theoretically robust understanding of how complex interventions, composed of these relationships, tensions and interactions, actually play out in real time, which demands more systematic social science engagement.

The second chapter presented the methodological approach used in the three case studies. It first discussed the growing calls within global health for implementation research and the divergences between biomedical and social science perspectives. I argued that there is a need to take a pragmatic approach to social science knowledge that seeks to be politically relevant and embedded within global health policy circles. This requires thinking critically about methodology and methods. Given that the predominant concerns of global health practice are with coverage dynamics, the chapter showed how mixed-methods approach that are “ethnographically-informed” offer a particular pathway towards legitimising critical inquiry, which is concerned with power dynamics, social norms, values and knowledge divergences. The chapter explored some of the relevant social constructivist literature from development sociology, medical anthropology and science and technology studies. It then outlined an approach concerned with tracing the multitude of social, technical and environmental factors that mediate the delivery, adoption and use of intervention tools and strategies. The remainder of the chapter reflected upon the mechanics of fieldwork including: how I entered the field, used particular research methods, defined my sampling strategies, negotiated research assistants, gained access to research participants and analysed and interpreted my data. It showed how, just as is the case with interventions, my fieldwork was an inherently personal, iterative and negotiated social process.

The third chapter then turned to the first empirical case study of this PhD thesis, which represented stereotypical problems with “top-down” interventions where intervention

effectiveness is mediated by narrow technocratic approaches that engage little with local contexts. This case study focused on a WHO/BMGF project to rabies elimination across 28 districts in Tanzania through mass dog vaccinations. A population-based survey conducted in six selected villages of Ulanga and Kilombero districts revealed that only 25% of dogs had been vaccinated in 2011, far below the 70% target. The chapter explored the multifaceted reasons for this low coverage, which involved livelihood patterns and dog ownership practices as well as campaign mobilisation, timing, the location of central points, equipment and staff, and project organisation and government bureaucracy. The case study showed that the ability for top-down programmes in resource-limited settings to consider geographical and livelihood diversity is limited by a combination of financial, managerial and capacity constraints at the project planning level.

This tendency for top-down interventions to overlook local realities in implementation has come to define global health, including for NTDs. In turn, critiques about the need to understand and engage with these shortcomings have demanded new approaches and strategies. The next two case studies of this thesis represented interventions that attempted to move away from the shortcomings of top-down interventions. The case studies on CLTS in Zambia and SOS in Uganda are representative of this trend in global health, claiming that new organisational arrangement and delivery strategies will better ground global health practice into local contexts.

However the thesis showed how these three case studies offered surprisingly similar trends in why NTD interventions achieve low coverage and impact. Although both CLTS and SOS promised new approaches that would transcend the stereotypical shortcomings of top-down interventions, as found in the WHO rabies elimination project in Tanzania, my fieldwork showed that despite the rhetoric, top-down information flows, reductionist perspectives and technocratic

strategies remained. While the rabies case study represented more accepted critiques of top-down interventions, the two other case studies revealed this in other ways.

In contrast to the top-down organisational strategy used by the WHO rabies project, CLTS was illustrative of global health trends emphasising local ownership, behaviour change and participation. Theoretically antithetical to “top-down” planning, Chapter 4 explored community responses and local contexts in relation to how CLTS was implemented in rural and remote villages of Katete district, Eastern Zambia. CLTS provided an interesting case study to compliment the WHO rabies project as it has been promoted by some NTD scientists and public health experts as a counterpoint to past top-down sanitation interventions and technocratic approaches to the control of parasitic worms through MDA. Crafted through a particular intervention narrative, CLTS has the airs of a development success story offering rapid results, low costs, empowerment and low-tech sanitation.

The chapter presented detailed research in eight villages done before and after CLTS was implemented by a network of volunteers associated with the local government water and sanitation department. Rapidly scaled-up by local government, CLTS was found to have had minimal impact on sanitation coverage due to poor management and limited stakeholder engagement that effectively diluted the approach and continued the “projectification” of the sanitation sector. Open defecation, both symbolically and practically, represented an embedded marginalisation from the modern Zambian state where multiple barriers to latrine construction coexisted in the context of fragile livelihoods. In this context, the chapter argued that CLTS revealed the tendency for global health practice to render societal problems into technical problems in need of easily definable technical solutions. Policy narratives of speedy sanitation improvement, while good at mobilising resources, were found to subjugate empowerment



principles to a narrowly conceived technocratic approach that ignored the difficult task of engaging state, civil society and citizen relationships to address open defecation as a manifestation of socio-economic inequality.

The final empirical case study explored a different type of intervention strategy and organisational arrangement that also, like CLTS, promised to move beyond the shortcomings of top-down intervention modalities. SOS represented broader trends in global health of using new private and public sector partnerships (PPPs) and market-driven incentives to motivate community-based disease control. Chapter 5 presented a detailed study of how these modalities were conceptualised as avenues towards a new model of sustainability in NTD control related to zoonotic sleeping sickness in Uganda. After mass treating hundreds of thousands of cattle, this small-scale PPP then transitioned to a bottom-up market driven strategy, supporting private veterinary shops and networks of sprayers to distribute insecticides for tsetse control through the private market in a post-conflict and subsistence-level economy. With the seemingly reconcilable goals of maintaining eleven profitable veterinary businesses with the promotion of sustainable tsetse control, this was to be done by selling a particular brand of insecticide, establishing “village sprayers” and promoting a restricted application method to reduce the costs to farmers.

The chapter showed that however appropriate the technologies and social forms promoted by SOS appeared to be, the complexities of a subsistence-level economy, existing business practices and the prevailing drive for profits over sleeping sickness control by veterinarians and para-vets constrained sales of tsetse-effective insecticides, especially in endemic villages. While the SOS case study aimed to garner new forms of expertise, specifically from the private sector, to respond to the tendency of global health programmes to be un-sustainable, sustainability itself was shown to require engaging more explicitly with local complexities and adapting strategies

accordingly. This demanded alternative management skills to reach beyond a focus on business and profits that was constrained by funding streams and the immediate expertise and interests of partners.

Following these three empirically rich case studies, Chapter 6 then reflected on what these interventions tell us more broadly about global public health practice for NTDs. Drawing on a comparative analysis of the major empirical findings of the case studies, it unpacked and synthesised the dynamic relationships that mediated effectiveness for these interventions. The chapter argued that planners need to take on the responsibility of “ordering complexity.” To this end, I presented a unique conceptual framework that showcased where and how intervention effectiveness is determined and negotiated, as informed by my empirical research and supported by the wider critical social science literature. This included five domains: livelihood/geographical diversity, local agency, incentives, socio-materiality of technology and governance/narratives. This is a major contribution to the existent social science literature on NTD control, promoting the need for adaptive and reflexive management to guide intervention strategies in understanding and engaging these various domains.

However as further discussed in Chapter 6 and reflected in the three case studies, local contexts continue to be marginalized due to prevailing and embedded norms and practices in the global health industry. These are related to funding, project management, expertise, an overall neglect of addressing social determinants and, importantly, the contexts of poverty and capacity constraints in endemic countries. All of these challenges were encountered in the three empirical case studies. However these are not necessarily insurmountable obstacles. This thesis is part of a growing emphasis in global health, including for NTDs, that promotes the need for robust implementation research, critical reflection and trans-disciplinary approaches that engage with

complexity in order to transcend prevailing technocratic approaches and implement more effective and locally-relevant interventions.

In conclusion, this thesis has contributed important empirical research and conceptual synthesis advancing our significant lack of understanding of the social dynamics of NTD interventions in rural areas of Eastern Africa. It has shown that, despite the rhetoric of new organisational arrangements, technologies and delivery strategies, there is a tendency for planning, management and implementation to be guided by top-down and technocratic approaches that negate engaging with local realities and contexts. While efforts at controlling the devastating effects of NTDs have been increasing, there is a need for new perspectives and changes in orientation that emphasise flexibility, adaptability and learning in order to bridge the divides between policy, practice and local realities in implementation. If we continue to neglect to address the complex, embedded challenges to NTD programmes and the need for reflexive engagement in operational practices, we are only doing a disservice to the poor.

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# APPENDIX 1: FIELDWORK DETAILS

## DETAILS OF RESEARCH PARTICIPANTS

This appendix provides details about research participants that were involved in qualitative research, including focus group discussions (FGDs) and key informant interviews. It is divided by case study and acts as a supplement to information provided in Chapter 2, specifically Table 3 on pg. 86.

### 1. UGANDAN CASE STUDY

**Table 1: Focus Group Discussions on disease control in 40 villages**

Village	Sub-county	District	Males Participants (n)	Female Participants (n)
<b>Atama</b>	Dokolo	Dokolo	9	7
<b>Ajuk</b>	Dokolo	Dokolo	19	10
<b>Angaramugenyi</b>	Kobulubulu	Dokolo	9	8
<b>Abongo Rwot</b>	Kangai	Dokolo	16	17
<b>Akuri</b>	Kangai	Dokolo	11	13
<b>Onyait</b>	Aperkira	Dokolo	7	14
<b>Ousia</b>	Apapai	Dokolo	16	6
<b>Osirima</b>	Apapai	Dokolo	24	6
<b>Akwen</b>	Bata	Dokolo	12	7
<b>Adwong Ger</b>	Kangai	Dokolo	7	8
<b>Omarai Acilo</b>	Kaberamaido	Kaberamaido	8	13
<b>Awelo Omer</b>	Okwalongwen	Kaberamaido	16	13
<b>Komolo</b>	Otuboi	Kaberamaido	13	7
<b>Bira</b>	Alwa	Kaberamaido	12	14
<b>Aoya A</b>	Alwa	Kaberamaido	10	11
<b>Anyamcoto</b>	Otuboi	Kaberamaido	10	9
<b>Gwaya</b>	Alwa	Kaberamaido	8	14

<b>Openo</b>	Alwa	Kaberamaido	13	11
<b>Olelpek</b>	Otuboi	Kaberamaido	9	6
<b>Ogasia</b>	Otuboi	Kaberamaido	11	7
<b>Okwenyi</b>	Tubur	Serere	14	10
<b>Opacet</b>	Gwei	Serere	10	8
<b>Olege</b>	Dakabela	Serere	8	9
<b>Amusia</b>	Gweri	Serere	8	14
<b>Lela</b>	Merok	Serere	14	16
<b>Oderai</b>	Pingire	Serere	12	15
<b>Akumoi</b>	Pingire	Serere	7	14
<b>Garama</b>	Labori	Serere	16	9
<b>Odungura</b>	Tubur	Serere	27	7
<b>Amurai</b>	Pingire	Serere	11	7
<b>Angopet</b>	Gweri	Soroti	10	20
<b>Omagoro</b>	Obule	Soroti	9	12
<b>Kabola</b>	Bugondo	Soroti	15	8
<b>Aputon</b>	Katine	Soroti	6	13
<b>Onguirio</b>	Katine	Soroti	17	12
<b>Oceketum</b>	Kyerere	Soroti	10	10
<b>Owangai</b>	Kamuda	Soroti	16	10
<b>Masoga</b>	Aloet	Soroti	13	8
<b>Asuroi</b>	Kamuda	Soroti	7	11
<b>TOTAL</b>			<b>470</b>	<b>414</b>



**Table 2: 12 Focus Group Discussions on Livelihoods and Social Organisations**

Village	Sub-county	District	Male Participants (n)	Female Participants (n)
<b>Komolo</b>	Otuboi	Kaberamaido	12	13
<b>Akumoi</b>	Pingire	Serere	9	11
<b>Atama</b>	Dokolo	Dokolo	10	8
<b>Ajuk</b>	Dokolo	Dokolo	7	7
<b>Odungura</b>	Tubur	Serere	8	13
<b>Olelpek</b>	Otuboi	Kaberamaido	8	15
<b>TOTAL</b>			54	67

**Table 3: Key Informant Interviews in Uganda**

Informant Category	Number	Location	Further Details
<b>Community-based animal health worker</b>	8	Serere district	These CAHWs were all associated with vet shops in Serere.
	12	Kaberamaido district	These CAHWs are all associated with vet shops in Kaberamaido.
	6	Dokolo district	These CAHWs were associated with vet shops in Dokolo
<b>Health Clinic Staff</b>	3	Lwala hospital, Kaberamaido	2 clinicians and 1 nurse
	2	Dokolo Health Centre 4	Laboratory staff
	3	Serere Health Centre 4	1 clinician and 2 nurses
<b>District Veterinary Officers (DVOs)</b>	6	DVOs from Soroti, Serere, Kaberamaido, Dokolo, Lira and Amolatar	These participants were repeatedly visited throughout the research period for multiple interviews.
<b>Vector Control Officers</b>	3	VCOs from Serere,	

<b>(VCOs)</b>		<b>Kaberamaido and Soroti</b>	
<b>District Health Officers</b>	<b>7</b>	DHOs from Soroti, Serere, Kaberamaido, Dokolo, Lira, Kole and Alebtong	
<b>District Politicians</b>	<b>8</b>	Politicians from Kaberamaido, Dokolo, Serere and Soroti	This included LC3s (4) and LC4s (4).
<b>TOTAL</b>	<b>50</b>		

## 2. TANZANIAN CASE STUDY

**Table 4: FGDs on disease control in Tanzania**

Village	Sub-county	District	Males Participants (n)	Female Participants (n)
<b>Machipi</b>		Kilombero	15	9
<b>Signalii</b>		Kilombero	10	8
<b>Mofu</b>		Kilombero	14	7
<b>Mlimba B</b>		Kilombero	12	9
<b>Mkangawalo</b>		Ulanga	21	12
<b>Mbingu</b>		Ulanga	12	14
<b>Iputi</b>		Ulanga	13	6
<b>Malinyi</b>		Kilombero	16	12
<b>Mwaya</b>		Ulanga	23	16
<b>Mahenge Town</b>		Ulanga	17	18
<b>Kidugalo</b>		Kilombero	9	9
<b>Lupiro</b>		Kilombero	8	13
<b>Kivukoni</b>		Kilombero	12	8
<b>Namhanga</b>		Ulanga	11	13
<b>Mtimbira</b>		Ulanga	10	8
<b>Chikwera</b>		Ulanga	13	14

<b>TOTAL</b>	216	176
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**Table 5: FGDs in remote villages with pastoralists and farmers (mixed gender groups)**

Village	District	Males Participants (n)	Female Participants (n)
<b>Signal</b>	Kilombero	11	-
<b>Mofu</b>	Kilombero	15	-
<b>Machipi</b>	Kilombero	9	5
<b>Mwaya</b>	Ulanga	12	-
<b>Nanhanga</b>	Ulanga	11	3
<b>Chikwera</b>	Ulanga	7	7
<b>TOTAL</b>		65	15

**Table 6: Key Informant Interviews in Tanzania**

Informant Category	Number	Location and Details
<b>Livestock field officers</b>	5	Ulanga district
	6	Kilombero district
<b>District Health Officers (DHOs)</b>	3	DHOs of Ulanga and Kilombero as well as one assistant in Ulanga
<b>District Veterinary Officers (DVOs)</b>	2	DVOs of Ulanga and Kilombero
<b>Ministry of Agriculture Staff</b>	3	Extension staff in Kilombero, Ulanga and Morogoro districts
<b>University Researchers</b>	5	National (3) and international (2) rabies researchers
<b>TOTAL</b>	24	

### 3. ZAMBIAN CASE STUDY

**Table 7: Pre-CLTS disease control FGDs**

Village	Males Participants (n)	Female Participants (n)	Children Participants (n)
<b>Chaata</b>	10	13	9
<b>Mpole</b>	14	11	6
<b>Mtulula</b>	8	6	-
<b>Samuel</b>	18	12	7
<b>Chingwawes</b>	10	12	9
<b>Kalililo</b>	9	12	10
<b>Mlozela</b>	13	14	-
<b>Zemba</b>	17	9	-
<b>TOTAL</b>	109	89	41

**Table 8: FGDs on livelihoods and social organization (mixed gender groups indicted by a \*)**

Village	Males Participants (n)	Female Participants (n)
<b>Chaata*</b>	5	7
<b>Mpole</b>	7	8
<b>Mtulula</b>	6	2
<b>Samuel*</b>	6	4
<b>Chingwawes</b>	8	17
<b>Kalililo*</b>	6	15
<b>Mlozela*</b>	9	8
<b>Zemba</b>	14	10
<b>TOTAL</b>	61	71

**Table 9: Post-CLTS disease control FGDs**

Village	Males Participants (n)	Female Participants (n)	Children Participants (n)
<b>Chaata</b>	7	9	
<b>Mpole</b>	10	8	-
<b>Mtulula</b>	9	10	8
<b>Samuel</b>	15	13	-
<b>Chingwawes</b>	13	15	-
<b>Kalililo</b>	7	14	-
<b>Mlozela</b>	25	26	11
<b>Zemba</b>	23	13	10
<b>TOTAL</b>	109	108	29

**Table 10: Key Informant Interviews in Zambia**

Informant Category	Number	Location	Further Details
<b>Environmental health technicians (EHTs)</b>	6	Katete district	These technicians were responsible for environmental health in the study area
<b>Local politicians at the counsellor-level</b>	5	Katete district	These counselors were responsible for political leadership at the district-level representing areas under my 8 study villages.
<b>CLTS volunteers</b>	6	Katete district	These volunteers were responsible for triggering my 8 study villages as well as many other villages in the district.
<b>Traditional leaders</b>	4	Vulamkoko neighbourhood	This included the main traditional chief in Katete (Chief Mbangombe) and three of his subornments.
<b>Health centre staff</b>	6	Katete district	This included clinicians at 4 health rural health centers as well as 2 laboratory at St. Francis hospital, the major reference hospital in Katete.
<b>Provincial Officials</b>	11	Chipata Town (capital of Eastern	This included 4 ministry of agriculture staff, 5 ministry of health staff and 2 ministry of local

		Province)	government staff.
<b>District Veterinary Officers (DVOs)</b>	2	DVOs from Katete and Chipata district	
<b>District Health Officers (DHOs)</b>	3	Katete district	DHO from Katete and 2 of his assistants
<b>Politicians</b>	8	Katete town	District-level politicians and bureaucrats from the local government.
<b>NGO workers</b>	7	Katete district and Chipata town	This included workers from World Vision, CARE International and GIZ
<b>TOTAL</b>	<b>58</b>		

# APPENDIX 2: PUBLICATION ABSTRACTS

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PLOS NEGLECTED TROPICAL DISEASES

## Eliminating Rabies in Tanzania? Local Understandings and Responses to Mass Dog Vaccination in Kilombero and Ulanga Districts



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### Abstract

**Background:** With increased global attention to neglected diseases, there has been a resurgence of interest in eliminating rabies from developing countries through mass dog vaccination. Tanzania recently embarked on an ambitious programme to repeatedly vaccinate dogs in 28 districts. To understand community perceptions and responses to this programme, we conducted an anthropological study exploring the relationships between dogs, society, geography and project implementation in the districts of Kilombero and Ulanga, Southern Tanzania.

**Methodology/Principal Findings:** Over three months in 2012, we combined the use of focus groups, semi-structured interviews, a household questionnaire and a population-based survey. Willingness to participate in vaccination was mediated by fear of rabies, high medical treatment costs and the threat of dog culling, as well as broader notions of social responsibility. However, differences between town, rural and (agro-) pastoralist populations in livelihood patterns and dog ownership impacted coverage in ways that were not well incorporated into project planning. Coverage in six selected villages was estimated at 25%, well below official estimates. A variety of problems with campaign mobilisation, timing, the location of central points, equipment and staff, and project organisation created barriers to community compliance. Resource-limitations and institutional norms limited the ability for district staff to adapt implementation strategies.

**Conclusions and Significance:** In the shadows of resource and institutional limitations in the veterinary sector in Africa, top-down interventions for neglected zoonotic diseases like rabies need to more explicitly engage with project organisation, capacity and community participation. Greater attention to navigating local realities in planning and implementation is essential to ensuring that rabies, and other neglected diseases, are controlled sustainably.

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### Introduction

Rabies has been known since antiquity as one of the most feared human diseases [1–3]. Today, it remains a significant albeit neglected disease, causing some 55,000 deaths each year, predominantly among children and the rural poor in Asia and Africa [4–6]. Transmitted by saliva from the bite of an infected animal, the rabies virus invades the central nervous system and, in the absence of post-exposure prophylaxis (PEP), is fatal once clinical signs appear [7]. Symptoms can be nonspecific but often include hydrophobia, hypersalivation, respiratory difficulties, biting and aggression. Although all mammals can be infected, the vast majority of human rabies cases are caused by domestic dogs [8].

Canine rabies has been eliminated from most industrial economies. In Great Britain, this was achieved in 1902 through a combination of dog licensing, muzzling, culling, tracing movements of rabid dogs and their contacts, and strict quarantine, which continues to be upheld by “pet passports” [3]. However, dog vaccination is now regarded as the most effective control strategy combined with secondary roles for population control, movement regulations and the promotion of responsible dog ownership [8–10]. There is a strong economic argument for dog vaccination, as eliminating infection from dogs should reduce the demand for costly PEP [11–12]. Yet dog vaccination remains under-prioritised by most developing countries with competing health issues and limited resources. Perceptions held by policy-

RESEARCH

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## Conflict of interest: use of pyrethroids and amidines against tsetse and ticks in zoonotic sleeping sickness endemic areas of Uganda

Kevin Bardosh<sup>1</sup>, Charles Waiswa<sup>2</sup> and Susan C Welburn<sup>3\*</sup>

### Abstract

**Background:** Caused by trypanosomes and transmitted by tsetse flies, Human African Trypanosomiasis and bovine trypanosomiasis remain endemic across much of rural Uganda where the major reservoir of acute human infection is cattle. Following elimination of trypanosomes by mass trypanocidal treatment, it is crucial that farmers regularly apply pyrethroid-based insecticides to cattle to sustain parasite reductions, which also protect against tick-borne diseases. The private veterinary market is divided between products only effective against ticks (amidines) and those effective against both ticks and tsetse (pyrethroids). This study explored insecticide sales, demand and use in four districts of Uganda where mass cattle treatments have been undertaken by the 'Stamp Out Sleeping Sickness' programme.

**Methods:** A mixed-methods study was undertaken in Dokolo, Kaberamaido, Serere and Soroti districts of Uganda between September 2011 and February 2012. This included: focus groups in 40 villages, a livestock keeper survey (n = 495), a veterinary drug shop questionnaire (n = 74), participatory methods in six villages and numerous semi-structured interviews.

**Results:** Although 70.5% of livestock keepers reportedly used insecticide each month during the rainy season, due to a variety of perceptions and practices nearly half used products only effective against ticks and not tsetse. Between 640 and 740 litres of insecticide were being sold monthly, covering an average of 53.7 cattle/km<sup>2</sup>. Sales were roughly divided between seven pyrethroid-based products and five products only effective against ticks. In the high-risk HAT district of Kaberamaido, almost double the volume of non-tsetse effective insecticide was being sold. Factors influencing insecticide choice included: disease knowledge, brand recognition, product price, half-life and mode of product action, product availability, and dissemination of information. Stakeholders considered market restriction of non-tsetse effective products the most effective way to increase pyrethroid use.

**Conclusions:** Conflicts of interest between veterinary business and vector control were found to constrain sleeping sickness control. While a variety of strategies could increase pyrethroid use, regulation of the insecticide market could effectively double the number of treated cattle with little cost to government, donors or farmers. Such regulation is entirely consistent with the role of the state in a privatised veterinary system and should include a mitigation strategy against the potential development of tick resistance.

**Keywords:** Sleeping sickness, Trypanosomiasis, Tsetse, Insecticide, Veterinary drugs, Community-based disease control, Uganda

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**SCOPING REVIEW**

**Open Access**

# Global aspirations, local realities: the role of social science research in controlling neglected tropical diseases

Kevin Bardosh<sup>1,2</sup>

## Abstract

Neglected Tropical Diseases (NTDs) are both drivers and manifestations of poverty and social inequality. Increased advocacy efforts since the mid-2000s have led to ambitious new control and elimination targets set for 2020 by the World Health Organisation. While these global aspirations represent significant policy momentum, there are multifaceted challenges in controlling infectious diseases in resource-poor local contexts that need to be acknowledged, understood and engaged. However a number of recent publications have emphasised the “neglected” status of applied social science research on NTDs. In light of the 2020 targets, this paper explores the social science/NTD literature and unpacks some of the ways in which social inquiry can help support effective and sustainable interventions. Five priority areas are discussed, including on policy processes, health systems capacity, compliance and resistance to interventions, education and behaviour change, and community participation. The paper shows that despite the multifaceted value of having anthropological and sociological perspectives integrated into NTD programmes, contemporary efforts underutilise this potential. This is reflective of the dominance of top-down information flows and technocratic approaches in global health. To counter this tendency, social research needs to be more than an afterthought; integrating social inquiry into the planning, monitoring and evaluating process will help ensure that flexibility and adaptability to local realities are built into interventions. More emphasis on social science perspectives can also help link NTD control to broader social determinants of health, especially important given the major social and economic inequalities that continue to underpin transmission in endemic countries.

**Keywords:** Neglected tropical diseases, Applied social sciences, Implementation research, Social determinants, Community participation, Policy, Global health, Sociology, Anthropology

## Multilingual abstracts

Please see Additional file 1 for translations of the abstract into the six official working languages of the United Nations.

## Background

Influenced by certain ecological conditions and transmitted through various vectors and animals, Neglected Tropical Diseases (NTDs) are a heterogeneous group of some 17 parasitic, bacterial, viral and fungal infections that

burden the poor and marginalised in developing countries where they cause much human suffering and poverty. One billion people, referred to as the “bottom billion”, are estimated to be infected by the seven most prevalent NTDs (schistosomiasis, trachoma, soil-transmitted helminths, lymphatic filariasis and onchocerciasis) in over 100 countries [1-3]. Taken together, NTDs are thought to be second to HIV/AIDS in terms of infectious disease burden yet they receive only a small proportion of development assistance allocated to health [4]. The impact of these infectious pathogens is often difficult to quantify due to under-reporting, focal clustering, poly-parasitism, diverse morbidity, stigmatisation and multifaceted influences on local livelihoods. Although notable gaps in control and treatment tools remain, many NTDs have a practical “toolbox” of control options; this ranges from

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