ICTs, participatory video and farmer-led agriculture extension services in Machakos District, Kenya
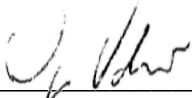
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Thesis submitted in accordance with the requirements
for the degree of Master of Philosophy, University of London

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Declaration of Authorship

I, Ugo Vallauri confirm that this thesis and all work presented in it is entirely my own. Where I have consulted the work of others, this is always clearly stated.

Signed: _____

Date: _____29 / 05 / 2016_____

Abstract

This thesis explores the use of participatory video to enhance the provision of farmer-led agricultural extension services in rural Kenya. It brings together literatures on information and communication technologies for development (ICT4D), agricultural development and participatory development communication. The objectives of the research are: to understand the necessary conditions making ICTs effective in developing farmer-led agricultural extensions; to understand the influence of locally produced video in delivering extension services; to explore whether participatory video brings more inclusion to farmer-led agricultural extensions.

The empirical research was undertaken in three rounds between 2010 and 2012, in partnership with two organisations using ICTs in the delivery of farmer-led agricultural extensions in Kenya: the Infonet-Biovision network and its member, Katoloni Mission community-based organisation in Machakos, Eastern Kenya. The thesis revolves around the experiences of the author as both researcher and practitioner in Kenya, through his dual role, first as a consultant and then as a postgraduate research student collaborating closely with both organisations.

The main contributions of the thesis centre around the meaning, feasibility and relevance of an approach to participatory video combining a focus on the creation of agricultural extension content with the traditional attention on participation as process. The thesis analyses information officers' enhanced role emerging from participatory video, particularly the opportunity to learn more about local agricultural innovation and to document it by creating locally relevant agricultural extension content. The thesis also analyses farmers groups' responses to participatory video production, in particular their interest in video about other local farmers as a source of inspiration to improve their practice, despite the multiple other challenges they experience. Finally, it reflects on the technical challenges experienced and their implications for ICT4D initiatives in rural areas, especially the need to consider infrastructural limits and the importance of ensuring technical support and ownership of the implemented projects.

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Abbreviations

AIRC	Agriculture Information Resource Centre
AKIS	Agricultural Knowledge and Information Systems
ALIN	Arid Lands Information Network
CBO	Community-Based Organisation
CCK	Communication Commission of Kenya
DFID	Department for International Development
FAO	Food and Agriculture Organisation
FCP	Farmer Communication Programme
FLOSS	Free Libre Open Source Software
icipe	International Centre of Insect Physiology and Ecology
ICT4D	Information and Communication Technologies for Development
ICTD	Information and Communication Technologies and Development
KARI	Kenya Agricultural Research Institute
MoU	Memorandum of Understanding
OLPC	One Laptop Per Child
PV	Participatory Video
SHDC	Secure Digital High Capacity
SMS	Short Message Service
TOT	Transfer of Technology
ZIZO	Zoom-in-Zoom-out

Acknowledgements

Postgraduate research is a challenging experience. Yet, what appears as a very individual adventure is the result of hundreds of human encounters, unexpected exchanges and connections, leading to new sources, alternative perspectives and new questions. As much as this work is "entirely my own", it would have never been possible to achieve it without the support, the contributions, the kindness and the patience of many people. I will be grateful to them forever.

My first thought goes to my wonderful wife Carla, who has witnessed my passion for research in the field, as well as my frustrations in developing my own writing voice and my frequent questioning of research ethics and international development as a whole. I owe her immensely for all her support, her unconditional love and her patience – and I look forward to becoming a more available companion from now on!

I am immensely grateful to my parents for their love, their generosity and their constant support. They have always encouraged my curiosity, allowing me the freedom and the independence to experiment, make the "right" mistakes, travel to all corners of the planet. Most importantly, we keep sharing our perspectives and learning, in person when possible but thankfully through ICTs as well!

Professor Tim Unwin has been a true source of inspiration. His rigour, his ethical values, his energy and commitment are indeed unique. I have learned much more from Tim than what ended up in this thesis, and I look forward to continuing provocative conversations on the moral and ethical dilemmas of new communication technologies, as well as on the merits of Piedmontese wines.

None of the empirical work analysed in the thesis would have been possible without the fruitful partnerships with Biovision Foundation and Katoloni Mission community-based organisation. I am grateful to the whole team at Biovision's Nairobi office, and in particular to Anne Bruntse for the logistical support and for our exchanges of perspectives at the intersection between ICTs and rural agricultural development. I would also like to thank Dr David Amudavi at

Chapter 1 – Introduction

1.1 A better world?

> "(…) are we making a better world with ICTs?"
> (Walsham, 2012, p. 92)

This simple and direct question summarises the aims and objectives, as well as the main preoccupations, explored in this thesis. It is a simple question, but there are certainly no simple answers. The area of Information and Communication Technologies for Development (ICT4D) has grown exponentially, particularly with the coming of age of mobile devices, which have progressively reached rural and semi-rural communities across the world. This expansion has resulted in a multiplication of economic as well as social and political interests around the further development of services, as well as the emergence of new markets and new research opportunities.

At the same time, the increased visibility of ICT4D initiatives, programmes and theorisation has resulted in increased opportunities for critique and questioning, both at practitioner and at academic level. Many are the topics at the centre of debates: from the difference between self-funded ICT projects and heavily funded ICT4D programmes, to the supposed patronising relationship between a first wave of ICT4D researchers in the North and the current emergence of a much more nuanced and diverse, global, distributed community of researchers; from the dilemma between what kind of mobile device might be appropriate to the wider questioning of any programme designed around a specific device, instead of on people, aspirations, dreams and intentions.

With this thesis I do not dare to give answers to all of these questions. Despite my increasing criticism and disillusionment with technologies in development, I aim to contribute to the key question: are we making a better world with ICTs? And I do so by engaging specifically with one programme working with marginalised farmers' groups, exploring the role of ICTs in reforming farmer-led agricultural extensions.

1.2 Research aims and objectives

The thesis concentrates on the key role of Communication as a subset of ICT4D.

It focuses on the application of new media and technologies to rural agricultural development by identifying the ongoing changes to agricultural extensions as a battleground for testing and revisiting the potential for ICT4D to be an enabler of new conversations, new voices, communication flows and exchanges of knowledge. Participatory video is chosen as a framework for exploring new roles and opportunities for ICT4D to contribute to more distributed and farmer-led extension practices, beyond the common rhetoric of ICTs as enablers of more efficient information transfers from scientists to rural farmers.

The main research objectives of the thesis are therefore:

- To understand the required conditions enabling ICTs to be an effective driver in the development of farmer-led rural extension services
- To understand the influence of locally produced video in the delivery of agricultural extension services
- To explore whether participatory video contributes to a more inclusive approach to farmer-led agricultural extensions

1.3 An MPhil and not a PhD

As will be explored more in depth in subsequent chapters, my multidisciplinary skills and interests in the area of ICT4D derive from the eclectic mix of academic and professional experiences that eventually led me to join the ICT4D Collective at Royal Holloway. I joined the Geography Department in October 2007, while I was still living and working in ICT4D in Kenya. I therefore enrolled as a part-time, distance-based postgraduate research student, partly because of the lack of funding available, and partly because I valued the challenge of blending living and working in two drastically different environments, trying to make the most of the sharp contrasts I was experiencing. For the first two and a half years, I spent four months in London and eight in Nairobi every year. The mix of experiences and feelings proved however much more challenging to manage than I had originally anticipated, even when I eventually moved to London. Frequently changing perspectives at first generated an urgency to re-engage with the universal meaning of ICT4D – that is, to work with marginalised groups in developing regions of the world, and not just in the countries traditionally thought of as developing. This brought me to a standstill while unsuccessfully trying to develop a framework that would bring together e-agriculture in the context of Italy, my

home country, and Kenya.

At the same time, I was growing increasingly unsatisfied with the symbolic power associated with ICT4D, and especially with the power relationships between North-based researchers and the "communities" to be researched in the Global South, no matter how participatory. This progressive dissatisfaction, this critique of the very essence of ICT4D particularly when connecting with truly marginalised, fragile communities, convinced me to submit this thesis as an MPhil and not as a PhD, with the objective of positioning myself closer to the practitioners' conversations I have been long engaging with, while still contributing my findings, participatory methodology and theoretical framework to urgent academic debates on the future of ICT4D.

1.4 Outline of the thesis

The thesis is organised in seven main chapters. *Chapter 2 – A participatory communication perspective on ICTs for agricultural development* presents the theoretical framework for the thesis, combining the diverse bodies of literature I have engaged with, and makes the case for exploring participatory video in agriculture as a subset of ICT4D particularly focused on communication and local content creation.

Chapter 3 – From one Kenya to multiple Kenyas introduces the diversity of Kenya's information technology and agricultural sectors, with the aim of going beyond the hype surrounding the self-proclaimed "Silicon Savannah". It also presents the case study for the thesis.

Chapter 4 – Methodological approach presents and justifies the mix of methodologies employed for the empirical research and contextualises them within the timeline of field research. It also reflects on the ethical implications of working in partnership with practitioner organisations and on the positionality of the postgraduate researcher.

Chapter 5 – Participatory video practices and their role in farmer-led extension analyses the learning experiences of information officers, the main difficulties and the evolving meaning that the production of video acquires throughout the programme.

Chapter 6 – Farmers' experience with locally made videos and the emergence of new voices sheds light on farmers' information needs and focuses on their

reactions to the initial videos produced as part of the programme. It concentrates on the inspirational role played by videos featuring local rural innovations.

Chapter 7 – Limits to technology?: Hardware, software, infrastructure and technical skills reflects on the still prevalent challenges faced by rural ICT4D initiatives, and based on the empirical findings from the research, makes the case for a new approach to infrastructure and technical aspects of ICT4D projects, and for the relevant skills required for ensuring their implementation and sustainability.

Chapter 8 – Conclusions summarises the main research findings and outlines their contributions to ongoing academic debates. It highlights future research directions and implications for the further development of farmer-led agricultural extensions. It also reflects on the main challenges faced while conducting research.

1.5 About participatory video

In the thesis I use the expression "participatory video" to define part of the methodology of the research. However, the term requires further explanation. As will be discussed in more detail in Chapter 4, while participatory video is a wide set of methodologies, in my research I refer to it as the introduction and collaborative use of video-making and video-editing as part of community development, with a strong focus on community ownership of the technologies used and on tangible content development objectives to be achieved by participants. This differs from most common views of participatory video, focusing on open-ended content development and to a lesser extent of community ownership of the technology.

1.6 Credits and naming conventions

Most pictures used in the thesis are my own. Sources for the few exceptions – mostly pictures in which I feature – are indicated in the relevant caption. All quotes captured as part of the qualitative empirical research are reproduced in italics. The name of the person quoted is cited only for individuals who played a key role in the research and gave their consent. As for participants from all farmers' groups visited and interviewed during the research, I chose to only mention the group identity, and not the identity of the individual.

Chapter 2 – A participatory communication perspective on ICTs for agricultural development

2.1 Introduction

This thesis explores the role of information and communication technologies in rural agricultural development, specifically in the context of rural Eastern Kenya. This chapter brings together three bodies of literature: ICTs for development, the role and evolution of agriculture and agricultural advisory services in sub-Saharan Africa and communication for development, particularly the role of video. Additionally, it asks the question of what type of agricultural development is promoted through ICTs, and it centres its objectives around smallholder farmers in pursuit of environmentally sound practices.

The chapter builds a conceptual framework by creating a trajectory across the different bodies of literature, to theoretically inform and guide the research process. It begins by questioning the very essence of ICT4D, its efficacy and ethical grounds. It then moves on to ask the question of "what (agricultural) development" is associated with ICT4D initiatives and theories and ends by presenting the main questions which will be explored in the analytical chapters ahead.

2.2 Why ICT4D?

> "I go crazy when I hear about ICT4D. And it's not because technology cannot be used to address challenges like poverty and so on, but more often than not when it comes to Africa and most of the developing world there is this idea that the only lens that we look at technology is ICT4D. And this ghettoisation of how we see technology and its potential has to be limited to a development space. It drives me nuts. ICT4D limits the potential of technology, and also as we see it and as we introduce it to young people and to the government, civil society and so on. And it makes a fundamental wrong assumption, that we don't enjoy technology like everybody else does. And if you assume that we like technology for the same fun reasons as everyone else, the rest follows. So it's not about checking prices for the crops, and it's not about you get on and get access to education. Fundamentally people are captured by technology, by mobile phones – that's why it's been so successful. The mobile device in Africa is not successful as a development device, but as a communication device." (Ory Okolloh, transcript of

her speech at Activate 2011, London – http://www.guardian.co.uk/media/video/2011/jun/22/google-africa-technology-video).

Ory Okolloh is a leading figure in what some people would refer to as the African ICT sector: a lawyer by profession, she co-founded in 2006 the website Mzalendo (http://www.mzalendo.com), with the objective of monitoring the activity of Kenyan members of parliament, in order to increase accountability and transparency of their activities. Okolloh is better known for being one of the founders of Ushahidi (http://www.ushahidi.com), the open source crowd-sourcing software and platform (Wachanga, 2012), which in 2008 put Kenya ICT developers in the spotlight during the tragic days of the post-election violence. Ushahidi is now used all over the world for projects as diverse as Al Jazeera's election monitoring in the Middle East, the sharing of information in the aftermath of earthquakes (such as in Haiti) and the mapping of artistic activities in Nairobi (the now discontinued Urban Mirror, https://web.archive.org/web/20130324060058/http://urbanmirror.org/). The platform – far from a traditional international development project – was originally the experiment of three software developers, and has since received generous support first from the open source community, then from organisations traditionally funding media for development and international development programmes.

In many ways, the work of Ory Okolloh – who after Ushahidi has worked as Google's Policy Manager for Africa and is now Director of investments at Omydiar Network, is very much what ICT4D aspires to be about: the creative engagement of concerned citizens in new collaborative ways redefining space and time boundaries; the shifts in power relations between the governing class and spread-out watchdog communities of interest in the spirit of participation and citizen reporting; the addressing of crucial gaps in the access to information and knowledge in areas traditionally neglected and left out from information and communication flows.

However, ICT4D is also about the contradictions, limits and ethical dilemmas intertwined with the role of global capital in delivering technological change: ICT4D is often a buzz word for hardware and software manufacturers to expand to new markets. Its success results in new technological dependencies in the name of development, as well as the scramble for rare materials and the dumping

of technological junk in the African continent.

Okolloh's provocative remarks about her perception of ICT4D are a key contribution to debates and literatures on the subject, for two main reasons. First of all, ICT4D studies tend to focus on a specific technology, gadget or use in the context of a specific development sub-sector or "problem". For example, ICT4D rarely addresses the wider, non-sectoral, implications that access to a technology brings to usage patterns of specific services. For instance, access to the Internet in schools or through telecentres is analysed in terms of education goals, while the variety of other uses and their relevance (or lack thereof) to education goals is more rarely examined. Secondly, the developmental goals achieved by the extension of the wider ICT ecosystem – outside of ICT4D initiatives – is generally not taken into sufficient account. A typical example is the sustained interest of ICT4D practitioners and scholars in services based on short message service (SMS), for instance in enabling dual communication between radio stations and listeners, or to exchange agricultural market information. While such services might play an important role, the cost implications and the resulting exorbitant gains of telecommunication operators pose ethical questions on the importance of more fairly priced and open alternatives, such as social media platforms like Facebook and Twitter.

2.3 Towards a definition

> "Why are we not holding conferences about the role of the pencil in development? Or the role of paper? There is more evidence of social progress made by these humble instruments than all the information and communication technologies (ICTs) over the last 20 years." (Manji, 2009, p. 129)

ICT4D is a relatively new field of study and practice, born at the intersection of well-rooted and diverse disciplines, including development studies, communication studies, information systems and computer science. Because of its inherent multi-disciplinary nature, it is a constant terrain of debate, where different agendas and visions of the world collide, mostly concerning the two nouns in the discipline's name, technologies and development.
Even the connection between the two – the *for* – is a source of controversy

(Coward, 2009; Gurumurthy and Jeet Singh, 2009; Peña-López, 2009): some view technologies for development as implying a paternalistic technological determinism in the use of the term ICT4D, thus preferring to endorse the alternative, but less common, ICTD, claimed to be more neutral, as referring to the use of ICT in developing countries, or ICT "and" development.

ICT for Development is seen by some (Dearden *et al.*, 2010; Kleine and Unwin, 2009) as a way to mark the distinction between the whole of ICT projects and studies and the subset that aims at achieving specific developmental goals, working with marginalised communities in developing regions (Winters, 2011).

The differences in the definitions of ICTD and ICT4D are however not as systematic and homogenous as they might at first appear. In the context of this thesis, while aware of the contested nature of the term, I am therefore using "ICT4D" to refer to both "sub-fields", but positioning my own understanding of the term in line with those scholars focusing on the normative role of ICT4D in debating alternative trajectories of human development, including a fairer access to resources and opportunities for women and the younger generations, and for their voices to become more visible, heard and listened to in development processes. In the words of Unwin (2009, p. 33):

> "Unlike IT and ICT, where the main focus is on what *is* and what *can* be achieved, ICT4D is about what *should* be done and *how* we should do it. ICT4D therefore has a profoundly moral agenda. It is not primarily about the technologies themselves, but is instead concerned with how they can be used to enable the empowerment of poor and marginalised communities".

Similarly, a focus on the communication aspects of ICT4D and of development, helps to reframe the normative role and contribution of technologies in support of better communication in development:

> "Communication for development is the use of communication processes, techniques and media to help people towards a full awareness of their situation and their options for change, to resolve conflicts, to work towards consensus, to help people plan actions for change and sustainable development, to help people acquire the knowledge and skills they need to improve their condition and that of society, and to improve the effectiveness of institutions" (Fraser and Restrepo-Estrada, 1998, p. 63).

The urgency of these definitions stimulates a deeper questioning of the kind of development (Kleine, 2010) we seek to associate with the advancement and

adoption of newer ICTs. While there is no consensus on the meaning of development within ICT4D, debates centre on the relative role played by economic development (Toyama, 2010).

Aside from considerations of economic development, the characters of ICT4D that can set it aside morally all lead towards a more inclusive, participatory approach to communication, one in which technologies becomes a support, and not a goal, as observed by Burch:

> "(…) we are backing a project of society where information is a public good, not a commodity; communication, a participative and interactive process; knowledge, a shared social construction, not private property; and technologies, a support for it all, without becoming an end in itself" (Burch, 2005, p. 68).

In the case of this thesis, as the following sections of the present chapter will make clear, the question of what type of development we are seeking to promote turns into a question of what vision for the future of agriculture and food resources can best fit the appropriate available communication technologies and the participatory communication methods we have.

2.4 The present and future of agriculture in Africa

After decades of policy neglect, the role of smallholder farming is again increasingly a focus of development agencies and African governments. While mixed livelihoods are becoming the norm, according to the Agriculture for Development 2008 report (World Bank, 2007), agriculture is still an important source of livelihoods for about 86 per cent of rural people:

> "It provides jobs for 1.3 billion smallholders and landless workers, 'farm-financed social welfare' when there are urban shocks, and a foundation for viable rural communities. Of the developing world's 5.5 billion people, 3 billion live in rural areas, nearly half of humanity. Of these rural inhabitants an estimated 2.5 billion are in households involved in agriculture, and 1.5 billion are in smallholder households" (World Bank, 2007, p. 3).

While according to the latest Rural Poverty Report from the International Fund for Agricultural Development (IFAD) the incidence of rural poverty across the developing world has started to decline (IFAD, 2011), it continues to grow across Sub-Saharan Africa, where 87.2% of rural people live with less than $2 per day (IFAD, 2011, p. 234). A renewed approach to agricultural development is

necessary to invert the trend, given the prominence of agriculture in rural areas. In Kenya, for example, 90% of the rural population is involved in agricultural activities (IFAD, 2011, p. 245).

Rapidly changing climate conditions are resulting in more unpredictable rains and frequent droughts in sub-Saharan Africa, repeatedly affecting arid and semi-arid areas. The challenge for smallholders in these areas is first and foremost to be able to cope with the speed of change, and to share existing and innovative solutions to retain previous levels of land productivity. This is happening at a time when pressure is high for a new "green revolution" in Africa, spelled out with different meanings: some refer to it as an ideal replication of the Green Revolution in India (Mosley, 2002; Quifiones *et al.*, 1997), by comparing the levels of access to agricultural inputs in sub-Saharan Africa with Asian countries and identifying the optimisation of supply of inputs as a key element in "solving" the continent's food issues.

Others – particularly the Alliance for a Green Revolution in Africa (AGRA) – offer a more comprehensive view of what the green revolution should look like in Africa, including programmes for strengthening the local production of quality seeds, improving access to markets, supporting access to financial services and increased availability of soil nutrients, as well as lobbying for the establishment of policy reforms sustaining such programmes. Part of this vision places agro-dealers at the centre stage for the future of agriculture (H. Odame and Muange, 2010), therefore fuelling a narrative where the commercial distribution of seeds and fertilisers is "the" solution. An admitted focus on "high-potential 'breadbaskets'" (AGRA, 2009, p. 4), meaning zones where a large concentration of smallholder farmers are based with relatively good soil and decent infrastructure, fails to acknowledge the diversity of conditions, challenges and possible trajectories for tens of millions of small-scale, subsistence farmers, and particularly it completely avoids addressing whether market forces alone might be able to reach out to rural areas where commercial farming is minimal (Scoones and Thompson, 2011). Additionally, aside from critiques on the actual effectiveness of the green revolution in India (Shiva, 1993), there is no consensus on whether the policies and projects inspired by the green revolution already implemented in Africa have been successful in creating sustained growth in production (Djurfeldt *et al.*, 2005, 2006).

Genetically modified organisms (GMOs) are heralded by some scholars (for example Collier, 2009; Paarlberg, 2010) as an important solution for increasing the productivity of rural Africa, and have recently gained more policy ground: as a result of the 2011 drought in East Africa, the Kenyan parliament approved a law allowing for the import of GM maize from outside the country (Kingiri and Hall, 2012), arguably paving the way for the introduction of GM seeds in the local agricultural market. The political and economic pressure from the international community is obvious (Zerbe, 2004), although heterogeneous: while for example there is evidence that the United States lobbied the Kenyan government into accepting the introduction of GM seeds (US Embassy in Kenya, 2009), European governments threaten African countries with bans on the import of GM foods, not only because of the perceived health and contamination risks, but also in an attempt to further protect their internal agricultural markets from African surplus (Paarlberg, 2010). Within this debate, however, insufficient attention is placed on the role of GM seeds and foods in general for the achievement of local food security and sovereignty in the very countries where they are more likely to be introduced (Kuyek, 2002). The risk – a common thread uniting debates on the future of agriculture with others on ICT4D – is to confuse what is one of many technical options with *the* technical fix (Scoones *et al.*, 2005), and in failing to consider the political as well as the environmental consequences of technological "solutions" compared to alternatives based on nature. In the words of Vandana Shiva (1993, p. 15):

> "Conceptually and empirically it is argued that the assumption of nature as a source of scarcity, and technology as a source of abundance, leads to the creation of technologies which create new scarcities in nature through ecological destruction".

The wider tensions behind these debates are highlighted in the difference in terminology used to define food independence. FAO defines food security as existing:

> "(…)when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 2005, p. 80).

The term food sovereignty has instead emerged from the Via Campesina farming

movement as an alternative, criticising the market references embedded in food security. It focuses instead on the concept of food entitlements for groups and individuals (Sen, 1981), and on the distinction between having access to food and how access actually takes place (Windfuhr and Jonsén, 2005). Via Campesina defines it in clear terms:

> "Food sovereignty is the right of peoples to define their own food and agriculture; to protect and regulate domestic agricultural production and trade in order to achieve sustainable development objectives; to determine the extent to which they want to be self reliant; to restrict the dumping of products in their markets; and to provide local fisheries-based communities the priority in managing the use of and the rights to aquatic resources. Food sovereignty does not negate trade, but rather, it promotes the formulation of trade policies and practices that serve the rights of peoples to safe, healthy and ecologically sustainable production" (FAO, 2005, p. 109).

The difference between the two concepts is at the base of much of the debate on the future of agriculture in Africa. The case of Kenya is striking: at one level, the country is a success story for its high profile in the horticultural export sector (McCulloch and Ota, 2002; Minot and Ngigi, 2004), while at the same time its food sovereignty is recurrently challenged during droughts and weak rainy seasons. During such periods, poverty and the limited options available to marginalised smallholders create extreme situations calling for a refocusing on resilience, indigenous drought-resistant crops, sustainable production and conservation methods (Oluoko-Odingo, 2010). The increasing controversies and tensions in the relationships of sub-Saharan African countries with neighbouring Gulf States and China, in regards to international land deals (Cotula *et al.*, 2009) are also important to note here. While some of these deals might indeed promote increased agricultural productivity for the areas at stake, the trade-off is the general limited power that sub-Saharan African countries have in negotiating with partners already heavily involved as funders of development programmes (although see Klopp and Lubumba, 2014 for a discussion of Kenya).

The challenge of a new approach to agriculture is therefore to overcome traditional dichotomies, and to rethink the diversity of support needed by different types of farmers across the continent (Scoones *et al.*, 2005). In other words, the future of agriculture is not a choice between smallholders or large-scale commercial farmers, or between international export or domestic trade: different types of farming can coexist within the same country or region.

However, there is a moral urgency to address the dramatic inequalities of access and balance of power embedded in the current globalised food system. The case of GM seeds is in this respect paradigmatic: pushed as an advantage for farmers, it primarily benefits the multinationals who produce the seeds, while challenging the independence of small-scale farmers.

While funding cycles as well as prevailing global economic interests keep pushing towards large-scale, chemical, genetic and costly *solutions*, the type of agriculture at the heart of this thesis is one of bottom-up *approaches,* respectful of the complexities of sustainability (Pretty, 1995) as well as of the alternative paths to development and agricultural growth embraced by farming communities. Debates on the future of agriculture in Africa have been swinging between two opposite, equally biased visions: a hymn to utopian rural livelihoods on the one hand, and the complete disillusionment with smallholders' role on the other. It is therefore imperative to revisit Uphoff's "four equations in need of revision" (Uphoff *et al.*, 2005):

> "Control of pests and diseases = application of pesticides or other agrochemicals.
> Overcoming soil fertility constraints = application of chemical fertilizers.
> Solving water problems = construction of irrigation systems.
> Raising productivity beyond these three methods = genetic modification" (Uphoff *et al.*, 2005, p. 329).

and to refocus on locally relevant, resource-efficient sustainable practices improving small-scale farmers' livelihoods and reducing food poverty (Pretty *et al.*, 2005). Without denying the challenges and risks linked to the increasing fragmentation of arable land, as well as the tendency towards the "romanticisation" (Collier, 2009, p. 62) of smallholders in Africa, the future of the continent's food is still in their hands, and in the realisation and celebration of Africa's richness and diversity (Unwin, 2008). Despite the growing focus on agri-business also for smallholders (Kirsten and Sartorius, 2002, 2007), recent studies on the productivity of smallholders, especially the ones integrating horticulture with small-scale livestock (for example Herrero *et al.*, 2011) place them on a par with if not ahead of, medium and large size farms.

2.5 Women in agriculture

The role of women in rural agricultural development is still underestimated. The very prototypical public image of a "farmer" is rarely that of a woman, despite the crucial role women play in food security, particularly in rural areas. Women are directly responsible for between 60% and 80% of all farming in sub-Saharan Africa (FAO, 1998). Additionally, recent patterns of urbanisation have impacted men more than women, further increasing the role of women in rural smallholder agriculture – what is referred to as "femininisation" of agriculture (FAO, 1998, unpaginated). Just as importantly, women continue to have reduced land rights – and therefore decision-making power when it comes to agriculture – as well as difficulties in accessing credit facilities (Munyua, 2000; Joireman, 2008).

Within this context, women remain hugely responsible for the food security and the well-being of their families, charged with multiple roles and responsibilities while mostly having unequal access to resources. Agricultural extension services have historically failed to consider the role of women in agriculture sufficiently (Ashby, 1981; Saito and Weidemann, 1990). The selection of contact farmers for initial training, typical of the training and visit extension system, as well as the organisation of residential trainings are mostly incompatible with women's responsibilities (Jiggins *et al.*, 1997), and have contributed to increasing the gender bias of extension (Alene *et al.*, 2008; Sweetman, 2008). Similarly, the limited involvement of women as extension agents has further marginalised their role as farmers.

The increased use of media and ICTs, as well as the concurrent reorganisation and diversification of advisory services since the 1990s, have provided new opportunities and new challenges for reaching out to rural women farmers. Extension services have gradually shifted to a demand-based model (Schwartz and Kampen, 1992; Swanson, 2008), driven more by a reduction in funding than reasons of efficiency. Lack of sufficient staffing and competences have resulted in further gaps in reaching out to farmers' groups and women in particular. ICTs were used at first primarily as drivers of efficiency at a time of budget cuts. Increasingly, though, ICTs are being tested in efforts to provide improved personalisation, flexibility and outreach to advisory services (Gakuru *et al.*, 2009).

The role of women in this context remains challenging, due to their limited access

to ICTs, literacy levels and concurrent scarcity of content available in suitable languages and formats (Macueve *et al.*, 2009). While literature on requirements for gender inclusion in agriculture through ICTs dates back over almost two decades (Munyua, 2000; Zijp, 1994), the reality on the ground is still profoundly challenging. Women are progressively gaining access to mobile technologies (APC, 2010) and making informed and creative use of the opportunities these bring (Buskens and Webb, 2009), but their role in agricultural development is still marginalised.

2.6 A brief history of agriculture development communication

> *"Farmers do not 'increase food production' because a development planning document says that it 'will be' increased (...) Farmers will increase their production when it makes sense for them to do so; when they are convinced that a proposed new technique will be materially safe for them to risk their very livelihood; and when their inherited wise knowledge of their soil and their climate tells them that the new seed or method of using land is safe"* (Childers, 1990, p. 2).

The quote above is a striking reminder of the difference between the roles of information access and communication in agricultural development. The debate on more appropriate and inclusive communication strategies in agricultural development dates back to the late 1970s, at a time when electronic ICTs were yet to be introduced and the most common ICT was radio. Until then, communication for development in agriculture was primarily inspired by the first iteration of diffusion of innovation theory (Rogers 1962), based on the dominant assumption that farmers will adopt a new technology as long as they receive adequate information about it. This view guided the development of subsequent waves of state-based extension services in developing countries. Diffusion of innovation inscribes itself in modernisation and top-down approaches to development typical of the post-war era, but traces of its influence in the field of communication for development survived well beyond the emergence of new development models from the 1970s onwards (Brendlinger 1992).

Questioning of the system started to emerge in the literature from the 1970s. Critics focused on three main aspects: differences between expected outcomes of diffusion and actual impact (Rogers, 1976); the failure of diffusion in achieving

equitable development, what is at times referred to as communication gap effects (Roling, Ascroft, and Chege 1976); and lack of appropriateness of the research methodology, failing to address fundamental questions central to farmers in developing regions about control and ownership of both land and tools (Bordenave 1976). Rogers himself opened the floor to new directions in development communication in the seminal paper "Passing of the dominant paradigm" (Rogers, 1976), acknowledging the relevance of self-development and welcoming the design of new flows of bottom-up communication disseminating knowledge and experiences coming from the field.

More radical critiques addressed the contradiction in terms of the tension between the institution of extension as top-down transfer of information, and communication as a mutually beneficial exchange where all actors can learn:

> "The error to which the concept of extension can lead is clear. It is one of 'extending' technical knowledge to the peasants, instead of making (by efficient communication) the concrete fact to which the knowledge refers (expressed by linguistic signs) the object of the mutual comprehension of peasants and agronomists alike. It is only with the co-participation of the peasants that communication can work efficiently, and only by means of this communication can agronomists successfully carry out their work" (Freire, 2005, p. 125, originally published in 1973)

At the heart of these debates lies a crucial shift in vision of what communication is in the context of rural development, and it is also a helpful distinction when applied to ICT4D. Communication was originally mostly seen as a one-way transfer from information-rich institutions to information-deprived rural farmers, and this underpinned the implementation of much agricultural extension work between the 1960s and 1990s. As Fraser and Restrepo-Estrada documented about the 1960s:

> "In FAO headquarters the technical staff and the extension specialists thought of communication as the use of mass media and audio-visual materials as a way of reaching more people, more effectively, and more persuasively with ideas and information generated by others who believed they knew best what people needed" (Fraser and Restrepo-Estrada, 1998, p. 47).

More recent critiques, particularly pertinent in the context of this thesis, concentrate on two aspects: a more collaborative relationship between farmers and researchers on the one hand, and the analysis of farmers' social networks on

the other. Opposed to the traditional Transfer of Technology (TOT) model (Chambers and Jiggins, 1987) is a more fluid interaction between researchers, extension agents and farmers, focusing instead on information and knowledge exchange as a central point, on joint experimentations and on a recognition of the value of indigenous knowledge. The work of Chambers has been over the years essential in pushing the boundaries of participation in rural development, paving the way for much more participatory research methods, for example questioning traditional barriers between researchers and farmers (for example Chambers, 1992, 1994, 2012). By putting knowledge in the centre place, the focus shifts from a supply-led model to one where farmers seek and lobby for technical support they consider more valuable (Roling and Jiggins 1998). One of the models explaining this two-way flow is the Agricultural Knowledge and Information Systems (AKIS) (Ramirez, 1997), following research from Solomon and Engel (1997). Central to the AKIS perspective is the two-way exchange of information, crucial for effective generation and transfer of relevant technologies. Concurrently, the analysis of farmers' sources of information and knowledge, and of farmers' social networks, highlights the complex web of relationships and communication exchanges both at horizontal and vertical level within farming communities (Okello *et al.*, 2010; Ramirez, 1997; Rees *et al.*, 2000; Sturges and Chimseu, 1996). These more nuanced approaches also help to contextualise the role played by the mass media, particularly radio and television (Mody, 1992; H. H. Odame, 2002): key means for the dissemination of new farmers' voices, but not operating in a vacuum – rather, as part of an eclectic system where multiple stakeholders contribute to the negotiation of appropriate practices and knowledge dissemination. Much of the work on participatory extensions and participatory communication practices in agriculture emerging from FAO in recent years (Balit, 2004; Coldevin, 1995, 2003) can be traced back to this new climate.

More recent approaches (Klerkx *et al.*, 2009; Leeuwis, 2004; Roling, 2008) concentrate on the new role of innovation, and of the communication and sharing of innovation, in a more interconnected development context. Kilelu and others (2011) explore the extent and wide variety of organisations and institutions involved in the agricultural development landscape of Kenya, realising how the word "extension" has changed meaning completely. Their review finds that a wide

range of not-for-profit organisations, as well as private entities now own, share and deliver information and support on innovation in agriculture, thus hinting to much more varied ways for farmers to satisfy their information needs.

2.7 Reconnecting with local knowledge

A growing body of literature (for example Burch, 2007) recognises the importance of local knowledge in advancing development. A key example of this is the prominence given to local knowledge by the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD), a global effort which involved over 900 scientists between 2005 and 2007 in analysing the relative relevance, quality and effectiveness of agricultural knowledge, science, and technology. Among the results of the final report (IAASTD, 2008) were an emphasis on local knowledge production and dissemination, as well as proposed incentives for scientists to work more with local people and institutions. A distributed, collaborative approach to agricultural innovation and knowledge sharing can affect long-standing problems in the clash between traditional knowledge systems and innovative systems, particularly how to combine agricultural innovation coming from institutional sources with existing, non-digitised traditional and tacit knowledge mostly relying on word of mouth and oral transmission. The important of indigenous, locally relevant sources is increasingly recognised:

> "(...) future research will need to focus more on the development and emergence of new development communication models (including indigenous models). The critical examination of content relevance, the role of new technologies, and comparative studies" (Servaes and Malikhao, 2007, p. 38).

The progressive change in the landscape of agricultural extension, together with the increasing recognition of mixed approaches favouring the interaction between diverse actors and multiple layers of scientific and traditional knowledge, opens opportunities for experimenting with the creative use of ICT in the agricultural sector, in parallel with more participatory, farmer-led innovation processes.

2.8 ICT in agriculture

Putting in perspective previous waves of development communication in agriculture, ICT is playing a major role in shaping the progressive unfolding of contemporary agriculture extension services (Ballantyne, 2007; Gandhi *et al.*, 2009; Munyua, 2007; Richardson, 2006). Recent trends in the literature on agricultural extension services (Ballantyne, 2007; Kiara, 2011; Lwoga *et al.*, 2010; Parkinson, 2009; Roling, 2008; Scarborough *et al.*, 1997; Swanson, 2008; Swanson and Rajalahti, 2010) recognise farmers' central role in research and innovation, as well as the opportunities provided by more participatory approaches, involving farmers, researchers and other actors. As a result, my research focused on farmers' extension communication networks, and on the contribution of ICTs to their effectiveness.

Much ICT4D scholarly research is centred around a specific tool or solution, and such a narrow focus often misleads researchers into patterns of research on the development of ICTs, as opposed to the relevance of communication practices (partially facilitated by technological advances) in contributing to developmental goals. In response to this criticism, one of my goals was to question the device-centric strand of ICT4D. There is no doubt that mobile devices *can* (Beardon, 2009) play a role in rural development, that the *potential* is there (Cranston, 2009), a statement constantly repeated in the literatures. However, more urgent and critical questions to answer involve what are the conditions needed to unleash such contributions; what is actually different and truly "new" in development communication programmes more heavily relying on newer ICTs and the tradition of programmes bringing together communication, media and rural development (Cardey *et al.*, 2004). Even more critically, whether the use of mobile devices generates a more inclusive approach and provides increased opportunities for the emergence of previously unheard farmers' voices (Grimshaw and Gudza, 2010).

Much more rigour is required in assessing the actual potential and the impact of mobile devices in the evolving landscape of services in support to farmers, whether extension, market support or otherwise: much research invests in creating new services, but without the sufficient time, resources and vision to

capture the actual impact that new tools and service are providing (Duncombe, 2012) .

As with all other technical fixes in agriculture, solutions primarily based on ICT implementations make little sense in isolation (Zijp, 1994). This raises a wider question around the most appropriate role that ICTs can play within the agricultural sector: at one level, multiple examples reflect on the improvement of extension services and on the potential for completely ICT-driven advisory services. However, the first and most important way in which farmers' lives are impacted by ICT is through new levels of personal interconnectivity (Zijp *et al.*, 1999): not necessarily an e-agriculture initiative, but the realisation of the potential of dual-way personal communication. Others see the development of ICTs in agriculture as a crucial cause for reform of the sector (Sideridis *et al.*, 2010) and therefore see training and adoption of ICTs as necessary to increase the number of farmers benefiting from the new knowledge economy.

Conversely, some of the literature focuses on the role of ICTs in optimising the delivery of information flows to rural communities, for example recent publications from FAO (Dixon *et al.*, 2005). A focus on this one-way relationship however risks creating new divides, between information providers and information consumers, while concurrently missing the opportunities of a "user generated content" approach to web 2.0. As Tacchi (2007) points out:

> "Despite the promise of new technologies such as the Internet to offer an interactive, participatory medium, the reality is that most often new technologies seem to be used to deliver information produced elsewhere to 'information poor' communities. The possibilities of engaging with new technologies through the local creation of content – for self-expression, information and knowledge archiving and sharing, advocacy and education – are underdeveloped" (Tacchi, 2007, p. 133).

This approach is particularly important in the context of rural agricultural development. In his seminal text "The Wealth of Networks", Yochai Benkler explains the disruptive paradigm of commons-based peer production (Benkler, 2006) as ICT-enabled networks of exchange, where all nodes can at the same

time receive as well as contribute valuable resources. When analysed under this paradigm, local content creation through ICTs and participatory approaches to agricultural extension open new opportunities to redefine knowledge exchange and the emergence of previously unheard perspectives in rural agricultural development. New dialogues and conversations featuring actors previously isolated open new occasions for meaningful knowledge exchanges and meaningful, participatory interactions:

> "There is abundant empirical evidence to support the importance of information and knowledge sharing. We should, however, assure that all the present emphasis on information and knowledge does not obscure the insight that at the heart of social development is communication in the form of dialogue" (Hamelink, 2002, p. 8).

Practitioners in rural agricultural development have only recently started to explore the combinations of ICT4D with participatory extension approaches, in the interest of establishing better linkages between research and implementation (Ballantyne *et al.*, 2010). Farmer-to-farmer innovation is more and more explained as a dynamic yet lengthy and iterative process requiring a collective, holistic approach (Waters-Bayer *et al.*, 2006). Innovation is a result of sharing, trial and error and multiple attempts:

> "Innovation processes can be enhanced by creating more possibilities for actors to interact" (Waters-Bayer *et al.*, 2006, p. 2).

New online platforms dedicated to agricultural knowledge sharing have been introduced in recent years – among them, FAO's e-agriculture.org has grown to become a very prominent one, boasting over 12,000 members as of November 2014. While the objective to create new linkages and promote a more effective exchange of information and knowledge is clear, it is less evident whether the range of individuals and organisations benefiting from these interactions are indeed those more in need of additional access, or whether this type of platform primarily reinforces knowledge sharing among pre-existing networks of researchers, academics and development workers already possessing privileged access to vast information resources. Partly inspired by this preoccupation, I decided to focus my research on communities and individually traditionally not included in such networks.

2.9 Video as a method for farmer-led participation

The dominance of text-centric uses of ICT4D, as well as the prevalence of text-base methods in research on ICT4D is a key theme, too often confined on debates on literacy (Geldof, 2010). My research seeks to go beyond the focus on written text to experiment with participatory methods of producing appropriate video communication material. In particular, the research concentrates on farmer-led innovation and the establishment of feedback channels of participatory communication among farmers and between farmers and the agriculture research and extension services which have historically communicated one-way with them. Recent debates on the "revolutionary" (Kleine and Unwin, 2009) aspects of multimedia ICTs should be analysed in the context of a much longer history of analogue media. While it is certainly true that the cost of ownership and operation of personal video cameras and other tools has never been as low as it is today, previous technological changes already allowed for a reduction in cost and therefore a boost to the production of alternative, not-for-profit content for education, cultural preservation and advocacy. Such changes in access have historically been touted as revolutionary and empowering:

> "There is indeed no other medium like video which offers ordinary people so much choice and therefore freedom, so much creativity and therefore self-assertion and growth, and so much collective knowledge and experience and therefore learning" (*Media Development* editorial, 1989).

The meanings of video are multiple: it refers not only to the production of edited visuals, but also to their distribution and further access. The use of video that sets it apart from previous forms of mass video-communication is the emergence of the VCR (Ogan, 1989) and successive new technologies, allowing for decentralised control over programming, and for the multiplication of distribution channels. What we see today with the flourishing of video-streaming, mobile videos and user-generated content in general is the evolution of a process which started for video in the 1970s and 1980s. The very availability of new technology for playback, coupled with the progressive reduction in costs of hardware for recording and editing videos, created the technical opportunity for the birth of "alternative video". While referring in the Western context to an alternative use in opposition to the traditional time-shifting use of television, alternative video has grown to represent alternative modes of production, content

development and distribution networks, encompassing what is otherwise defined as independent video, popular video, community video or neighbourhood television. The exploration of multiple degrees of participation, control and ownership of production hardware and editing skills has generated over time a wide range of different uses of the technology, and of levels of collaborative engagement with the evolving technologies. For example, the vast movement of community access television in the United States (Halleck, 2002) is characterised by a certain degree of backing from public authorities, while the Telestreet movement (Bazzichelli, 2010) emerged out of Italy in the early 2000s and was based on bottom-up, illegal re-appropriation of the airwaves by citizens concerned with the importance of creating alternative spaces for dissent as well as giving a voice to voiceless neighbourhoods. Such diverse experiences had in common a communal approach to mastering production tools and demystifying the technology behind video production.

2.9.1 Participatory video in development

Traditionally video had been used in development as a mass media in top-down approaches. The most recurrent original uses have been in education within modernisation approaches, for broadcasting messages produced by professional documentary filmmakers, portraying the view of external experts (Johansson and De Waal, 1997).

> "…[T]he technical development of electronic media does not necessarily move in the direction of centralizing networks, even though 'video pluralism' and 'television democracy' are at the moment not much more than anarchist visions" (Habermas, 1987, p. 391).

As Habermas's quote suggests, the traditional use of video in the context of mass media societies is more akin to classic theories of information diffusion based on top-down, mono-direction transfers. Video technology per se does not guarantee a change in directionality and a new decentralisation in the production and the distribution of messages, despite creating opportunities for new equalizing literacies (White, 2003).

Other uses of video, based on giving people a voice instead of a message, have happened and are increasingly happening, though only at a limited scale, and are

commonly defined as "participatory video". The definition of what participatory video aspires to be has not changed significantly since Snowden's (1984) original explanation:

> "As a catalyst for community action, video can assist in changing the human condition as well as describing it. Community workers can use it within a village to show individuals or groups what they already know. Used this way, video becomes a mirror. It is through such videotapes the community worker can help individuals or groups analyse what they are saying about their own hopes and problems" (Snowden, 1984, pp. 4–5).

Snowden is credited with being the initiator of participatory video, at first defined as the Fogo Island process. Snowden and his crew went to Fogo in 1971 to record events in a settlement in Newfoundland. Fishing, despite being the main economic activity, had become not sufficiently profitable, thus prompting experts to suggest the need for resettlement. The crew recorded the responses of communities and the proposals of the planners, then played the recordings to experts, subsequently filming their reactions and screening them to the original communities. The process involved a series of iterations, transforming visual media from a one-way, top-down means of communication to a facilitator of dialogue across a wide range of stakeholders. The result was a new way for communities to interact and get together, and concurrently a different way of exploring consensus and conflict within development interventions (Huber, 1999).

Participatory video is however a contested umbrella term (High *et al.*, 2012), as it means rather different things to different practitioner groups and scholars. As Shaw and Robertson (1997) put it, participatory video is a:

> "(...) group-based activity that develops participants' abilities by involving them in using video equipment creatively, to record themselves and the world around them, and to produce their own videos" (Shaw and Robertson, 1997, p. 1).

At the heart of debates are the different degrees of "participation" embodied by participatory video projects, a critique similar to the use of participation in development as a whole. For example, differences exist in the level of technical training and involvement of participants across different traditions, and therefore on their subsequent ability to independently control all elements of the video-making process (Mistry, 2013; Mistry and Berardi, 2012).

The distinction between process and product is an important element of participatory video (Kawaja, 1994). The literature privileges the role of participatory video as a process, while content is generally considered less crucial, or at least very context-specific. The role of content is traditionally limited in time and place, and often functional to the specific evolution of a local process: apart from its documentation role, it loses relevance and applicability once a particular situation or development issue is processed and acted upon.

This classification is however problematic, as it does not take into account "participatory" productions such as community media productions, whose role combines a focus on process as well as on content. Participation, as well as "community" media, might convey a misleading message about its level of inclusion: the actual extent of participation and/or community involvement is rarely addressed. Participation can happen both in terms of media production itself, and because of the equally important feedback mechanisms that participants can enact in regards to the content produced – relevant, depending on each case, for the process or for both process and content. However, the term participatory assumes – or rather hints to – a sort of universal participation which is at most unlikely. The concept of open content creation (Tacchi, 2010) addresses some of this terminological fragility, and provides a more flexible and honest account of processes involving variety of participants from a specific local environment.

Conversely, the vast majority of participatory video projects in the Global South employ a different concept of participation – one that brings closer various stakeholders, without fully addressing issues of ownership and ultimate control of the new media. Lack of clarity around ownership is not an issue uniquely relevant to PV. Nonetheless, it can fuel ethical concerns on who ultimately benefits from such processes, as the quote below brilliantly sums up:

> "Why do the 'experts' and the 'guardians of the wild' come here after having failed to conserve trees and wildlife in their own places of origin? They come here to support themselves. – S., a Maasai man" (Johansson and De Waal, 1997, p. 59).

Most accounts of participatory video projects reveal the presence and key role of an external facilitator, retaining some level of control on the technology and the methods employed. As a result, recurrent claims of open-ended processes need further critiquing and questioning, especially when projects do not fully transfer

ownership of the range of skills required for controlling the technological tools and the creative engagement necessary to achieve true empowerment, or conscientisation.

2.9.2 Participatory video and agriculture

Even though the use of video is definitely not new in agricultural development communication (Fraser and Restrepo-Estrada, 1998; Protz, 1998), the diffusion of more affordable ICT equipment in rural areas provides an opportunity for more widespread production and dissemination of local content. The trends of technological advances and consequent cost reductions were at the base of Bessette's (2004) recommendation of using video as community media suitable for group work. This trend has continued in the past few years, resulting in pocket devices capable of capturing high-definition video for less than £100. Video is therefore less and less confined to professionals, and consistently emerging as a powerful global digital language in the hands of hundreds of millions of people (Harris, 2008; Lie and Mandler, 2009; White, 2003), as well as facilitating the flourishing of participatory video practices (Chambers, 2010). Compared to radio, traditionally seen as the most flexible and universal rural mass media (Girard, 2003), video has both strengths and weaknesses: it provides a fundamental extra dimension of communication (Halleck, 2002), particularly relevant in the context of a practical field such as agriculture, but this comes at the expense of the cost and flexibility of distribution. Traditional television channels are not suitable for carrying community-produced content, because of the commercial models behind their operations, and the high technical quality required. Community-based TV stations are extremely rare in sub-Saharan Africa outside South Africa, while community-based and private local FM stations are the most common mass media in most rural areas of the continent. At the same time, while archiving videos on sites such as YouTube or Vimeo can increase fruition, online-only distribution is not recommendable nor feasible in the context of rural Africa, not only because of the limited infrastructure and Internet connectivity, but also because, as Van Mele puts it:

> "Farmers and extension officers are not like many of us in the West who can spend hours looking at YouTube movies in the hope to find what they are looking for"(personal communication, 2011).

Independently of the actual technology used, putting voice at the centre is a matter of process. The FAO began in the first part of the 1980s to replicate in Africa its successful participatory video programmes first developed in Latin America (Fraser, 1987; Gumucio-Dagron, 2001), using a methodology known as "rural audiovisual pedagogy" (Van Crowder *et al.*, 1998, unpaginated). This technique is based on the use of video as a form of communication to mediate between the information needs of rural communities and potential sources of expertise able to support them. Among the key unique features of video relevant to agriculture are the ability to overcome barriers of illiteracy, to render innovative farming concepts visually, to compress time and distances by allowing people from different rural areas to "interact" within the same video (as well as a whole crop cycle to fit in a short presentation) and to document and systematically organise information to improve its transmission from a source to an audience (Van Crowder *et al.*, 1998).

In some cases (for example, C. Lunch, 2004) the participation is focusing on the production of scripts using farmers' input and perspective. Such cases involve participatory research processes, trying to address the historic divide between scientists and practitioners, typical for example of agriculture. They are not however to be considered fully participatory examples, although they might be used by practitioners in farmer-led extension programmes. In other traditions, it involves farmers (or other participants) being actively involved in shooting videos but entails the presence of external technical roles for the editing of videos and final production touches. Elsewhere, the focus is on maximum technical participation and emancipation, with the intention of empowering participants to become independent video producers and, more generally, content creators.

2.10 Research questions

The chapter has built a trajectory linking together ICT4D, agricultural development and communication for development, making the case for a renewed focus on the "C": on communication as a two-way process creating opportunities for feedback and collaboration. Within this context, participatory video exemplifies a set of methodologies and principles aimed at increasing community cohesion and participation, whether focusing on creating video-making and editing capacity at the local level, developing scripts to be shot by

others, or developing an initial local video to be used widely for advocacy.

From this derives the proposition to adapt the participatory video paradigm and to explore using it as part of an integrated ICT4D strategy towards more participatory and inclusive farmer-led extension services.

The following research questions emerged as a result of my literature review and my first period of research in the field, as a way to capture the complexity of the themes at play, and to guide me through the subsequent phases of field research, which I conducted using participatory methods.

1) How does the emergence of locally produced video content influence the delivery of agricultural extension services?

- How does production and dissemination of videos impact the information officers' access to local information and knowledge in order to deliver extension services effectively?

- How can the production and dissemination of video-based open participatory content be effectively embedded within existing agriculture development structures?

2) How much does participatory video contribute to a more inclusive approach to farmer-led agricultural extension model?

- What are smallholders' main information and learning needs, and how do they relate to other challenges they face?

- Do smallholders value the use of video as a learning tool in their agricultural practices? Why?

3) How can ICTs become effective tools in the development of farmer-led agricultural extension services?

- What are the main challenges to ensure effective use of ICTs in the development and distribution of agriculture extension services?

- What are the main lessons learned and the implications for unlocking the appropriate use of ICTs in scaling up agricultural extension services in Kenya?

2.11 Conclusion

This chapter brings together three bodies of literature: debates on the meaning and on the role of ICT4D, the evolution of agricultural development communication, and participatory video as an example of participatory communication. An underlying theme is the future of agriculture, and questioning "what agricultural development" to seek for rural regions.

A promising theme emerging from the literature review is the tension between two drastically different views of innovation, one based on technological advancements – driven by a new Green Revolution for Africa and by the use of ICTs to increase the top-down diffusion of knowledge – the other based on farmer-led experimentation, on blending of traditional, indigenous knowledge with more formal sources of agricultural research. Participatory video and open content creation provide ways to explore the feasibility, inclusivity and limits of this second approach to innovation in practice.

The questions emerging from the literature prepare the ground for the analytical chapters ahead. The next two chapters will set the scene for the research in Kenya and present the methodology used in the thesis.

Chapter 3 – From one Kenya to multiple Kenyas

3.1 Introduction

This chapter sets the scene in the Kenyan context for the questions emerging from the theoretical framework presented in Chapter 2. It begins by explaining my personal reasons and motivations for conducting research in Kenya. It then addresses the widely celebrated status of the country as a leading ICT hub by putting that vision in perspective with other parallel readings and interpretations of the intersection between agricultural development and ICT in Kenya. By using the plural concept of "Kenyas", I seek to unpack the diversity of development trajectories and narrations about a diverse and multi-faceted country. In the second part of the chapter, I introduce the partner organisations for the case study at the heart of the research: Biovision Foundation and Katoloni Mission Community-Based Organisation (CBO). By summarising their activities and the relevance of their programmes in the context of ICT for agricultural development in Kenya, I explain the reasons for choosing them as partners for the empirical part of the research.

3.2 Why Kenya?

I chose to conduct research in Kenya because of the wide range of professional relationships and friendships I had developed in the country since my first visit in 2004, and then while living in Nairobi between 2006 and 2009, working initially briefly for the United Nations i-Parliaments initiative (http://www.parliaments.info/), then for approximately three years for Computer Aid International (www.computeraid.org), an international ICT4D NGO based in London and Nairobi. Prior to moving to Nairobi and beginning to work in e-government and ICT4D, I had already been to Kenya twice, for brief missions in 2004 and 2005 as part of my previous job with Slow Food International, an Italian-based organisation promoting agro-biodiversity conservation and advocating for the support of traditional and indigenous agriculture and food systems across the world. My involvement with Slow Food, coordinating the development of a network of so called "food communities" across sub-Saharan Africa, involving a variety of actors involved in local food chains, such as

agriculture-focused rural NGOs, community-based initiatives and cooperatives as well as fair-trade alliances, led to the establishment of a small but rather vibrant Kenyan chapter of the organisation. At a personal level this provided me with opportunities to visit and become familiar with inspiring Kenyan rural development organisations, with which I have since remained in close contact. It also helped me develop an awareness and research interest for the role of communication and information technologies in creating new networking and development opportunities for rurally based organisations. In June 2005, together with the Network for Ecofarming in Africa (NECOFA) Kenya (http://necofakenya.wordpress.com/), I organised the first national meeting of the network of Kenyan communities involved with the Slow Food movement, which took place in Machakos – the same town where I would return in 2011 and 2012 for my field research. During that meeting, farmers exchanged seeds, ideas and experiences, and the main topic debated revolved around models to access new markets, cutting intermediaries and increasing profits for smallholders. Seven years later, the same topic was recurrent in the interviews and focus group discussions I held with farmers' groups as part of my field research, as will be explored in Chapter 6.

For these reasons, I actively sought opportunities to focus on Kenya for my research. This resonates with my vision of the researcher in the field as a professional and a scholar committed to specific places and people for extended periods of time and as part of ongoing conversations that are mutually rewarding and evolve over time. There are a few advantages to doing research in new places, for example the fresh look that a researcher can bring when approaching a country for the first time, and the reduced risk of bias, potentially deriving from being too emotionally involved with a specific group of people or a location. However, the disadvantages can be much more substantial in my view, as my own experience of visiting groups and projects in other countries for a very short period demonstrated on more than one occasion: lack of sufficient time and local contextualisation can result in misunderstandings and missed opportunities for both the researcher and the partners. No matter how natural and transparent the connection of the researcher with local gatekeepers, much time is needed to understand the wider context of a country (Unwin, 2004), as well as the key

power relationships of local organisations and of the specific communities with whom the researcher is working. While it is certainly possible to conduct short-term research projects while ignoring much contextual information, it is less than desirable, and should be avoided whenever possible.

Some critiques of ICT4D denounce the urban bias of many projects (Gomez and Camacho, 2009; Odendaal *et al.*, 2008). However, my experience reveals the existence of another equally important bias: the failure to recognise the diversity of conditions and the different contexts faced by communities in multiple rural and peri-urban areas. In practice, most discussions on ICT for development projects in rural Africa underestimate the geographical as well as social diversities present within rural areas even within the same country, and suffer from a polarisation of discourses on urban versus rural development. Similarly, debates on agricultural development and on the role of ICTs in advancing rural development are reduced to single-dimensional, oversimplified reporting. Hence, my suggestion to explore the multiple meanings of Kenya's agricultural and ICT developments.

3.3 From one Kenya to many Kenyas

By using the plural term *Kenyas* in opposition to Kenya, I aim to represent the immense diversity of meanings, perceptions and readings of Kenya. While the need to avoid massive generalisations is common to all places and subjects, what I am referring to here is the collective picture that Kenya has grown to represent internationally, in regards to global development and the role of information and communication technologies. Kenya receives a tremendous amount of attention from international scholars and researchers. In researching for this thesis I came across many organisations, think tanks and research centres based in the country, or working primarily on Kenya. For the United Kingdom, the post-colonial ties with Kenya mean that the country is a key partner in both foreign policy as well as a focus country for research and development programme. From a geo-political perspective, Kenya plays a crucial role in a complex region, as it borders with Somalia, Ethiopia, South Sudan in the North. Relatively more peaceful and stable than its neighbours, its capital city, Nairobi, is headquarters to the largest United Nations office complex in Africa, the third globally after New York and Geneva.

All major media outlets have a correspondent in Kenya, who is at times the only person covering the whole of sub-Saharan Africa, as is the case with Italian public media network RAI. In short, there is a range of reasons behind Kenya's prominence in academic debates, international development circles and international press.

3.4 The agricultural Kenyas

Kenya extends over a surface area of almost 600,000 km², across a wide variety of agro-ecological zones. This makes the country an ideal farming hub, as many of the key horticulture crops cultivated in the area can be grown throughout the whole year in different parts of the country, ensuring harvests of key products in all seasons. Kenya holds a key position in the global production and trade of a series of crops: it is for instance the world's largest exporter of black tea (CTA, 2012) and a key horticulture player. However, the vast majority of the country's land (79%) is either arid, semi-arid or very arid, often with extremely limited access to water resources for personal and agricultural use. Only 18.5% of Kenya's land holds high or medium agricultural potential, and it is concentrated within Western and Central provinces of the country (Infonet-Biovision, 2012).

Figure 3.1 shows the distribution of agro-ecological zones within the country: the key areas for extensive agricultural production are Zone II and Zone III in green, rather small in surface area, while arid and semi-arid zones represent the great majority of the country (Zones V, VI and VII). The areas where the majority of field research for this thesis took place are officially in Zone V, but the extreme drought of 2011, which peaked during the second round of research, further affected the resilience of communities and called into question their preparedness to climatic shocks. At the same time, the country's population is growing steadily: it was 29 million in 1999, while it was counted at almost 39 million during the most recent census in 2009 (Kenya National Bureau of Statistics, 2010) and estimated at 45 million in July 2014 (CIA, 2014).

LEGEND
Zone I
Zone II
Zone III
Zone IV
Zone V
Zone VI
Zone VII
Water bodies

Scale 1:5,000,000

50   0   50   100   150   200   Kilometers
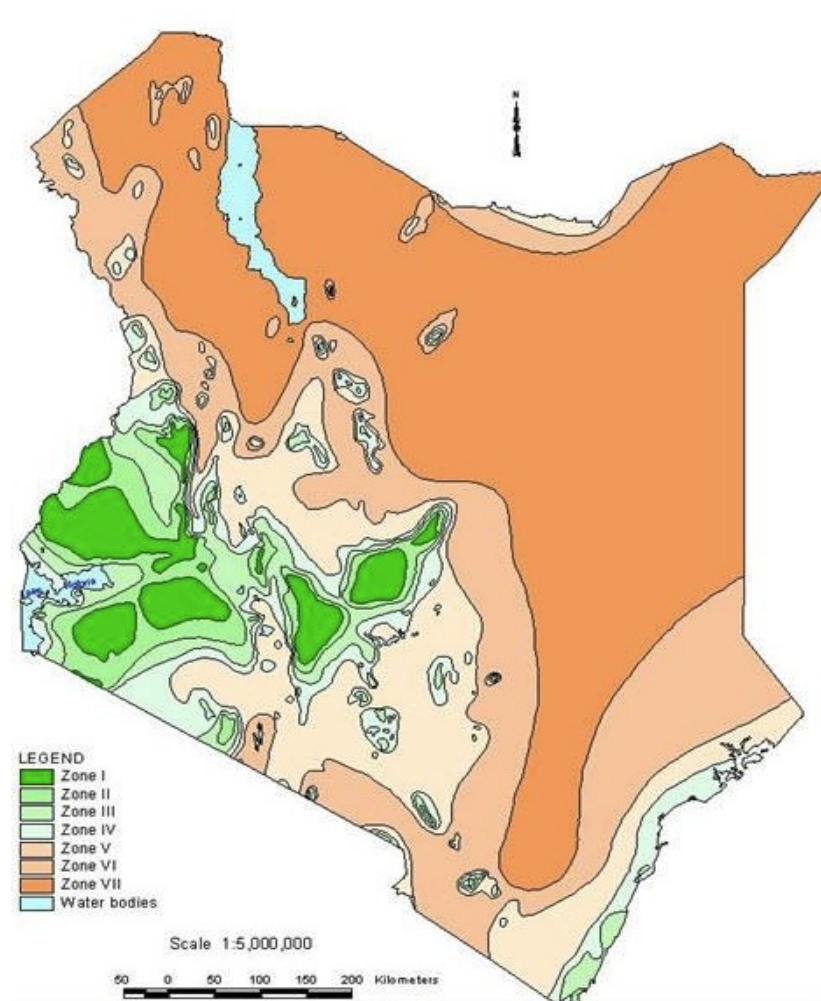
Figure 3.1: Map of Kenya's agro-ecological zones (Source: Infonet-Biovision)

Multiple challenges derive from these data: the increasing frequency of droughts affecting the region puts most of the country in serious difficulties when it comes to food security. Even though East Africa has a long history of droughts, which should have dramatically changed its level of preparedness and resilience to such shocks, the current change in distribution of rainfall – more and more concentrated in short periods, rather localised and with long dry-spells in between (Roncoli *et al.*, 2010) – increases challenges for small-scale farmers lacking access to irrigation. While multiple causes affect the development of a stronger agricultural sector, including land fragmentation due to population increase and the high prices of agricultural inputs, the changes in rainfall patterns are the single biggest factor causing disruption (Huho *et al.*, 2012). This situation

especially affects Eastern Kenya, traditionally an arid and semi-arid area. All the while, the population keeps growing, with increased requirements for food for the internal market, and therefore a need to increase productivity and efficiency of the agricultural sector. The Kenyan Ministry of Agriculture has an ambitious plan for the development of the sector between 2010 and 2020 (Government of Kenya, 2010) and plans to further review agricultural extension services (Government of Kenya 2012), but such grand plans often clash with rather mundane problems, such as mistakes and enormous inefficiency in the distribution of seeds and other resources produced by the research centres of the Ministry, as happened towards the end of the 2011 drought, when farmers in Ukambani, Eastern Province were provided with certified seeds compatible with maize production in the highlands of Central Kenya, but inappropriate and counter-productive in their area (see Figure 3.2).

Figure 3.2: A local paper reports on irregularities in seed distribution (2012)

The issue of increased population and the risks for environmental conservation and erosion, which I encountered in the Machakos area during my research and which were very important to my research partners, should however inspire reflection. Studies around the historical increase in population in the area have

explained that erosion could be overcome by successful terracing of the hilly terrain in the area, and that increased population pressure could actually be a direct factor in the increased conservation of the territory and an improvement of food production techniques (Tiffen *et al.*, 1994; Zaal and Oostendorp, 2002).

3.5 Challenges of agriculture extension services in Kenya

The agricultural diversity of Kenya requires multiple approaches to extension services. Commercial farmers and groups working in export-oriented value chains increasingly rely on high-quality privatised extension services. In contrast,, smallholders and farmers' groups, such as the ones at the heart of this thesis, have access to more generic and less efficient services.

Multiple factors limit the effectiveness and financial sustainability of Kenyan state-funded extension services. As Nyambo *et al.* (2009) summarise, extension officers face key challenges: (1) they are assigned large areas with widely-dispersed farmer groups; (2) they often don't have reliable means of transport; (3) they are rarely up-to-date with technical demands of the market, and are hence unable to provide satisfactory support; (4) they lack business and management skills for the groups they work with. Additionally, the low ratio of field staff compared to office staff makes for an inefficient system.

The gradual, ongoing shift to demand-driven extension services delivered in a more integrated way via NGO/private services alongside state-run ones offers a partial solution to this set of problems, as it encompasses a much more diversified set of actors able to provide more targeted, locally-relevant and complementary levels of support along the market value chain (Kilelu *et al.*, 2011). At the same time, farmer-to-farmer extension services are increasingly adopted by organisations of all kinds (Franzel *et al.*, 2014), as an opportunity to further improve outreach efficiency, while reducing costs and increasing trust amongst farmers. Questions however remain on the availability of sufficiently knowledgeable farmers to be involved in such programmes.

Organisations are also increasingly exploring the use of ICTs to complement or substitute frontline extension delivery activities. While communication

technologies, including the ones used experimentally as part of this thesis, may contribute to optimise the delivery of extension services, recent research (for example, Kilelu *at al.* 2011) highlights the limits of agricultural extension systems based primarily on the brokering and transferring of information and points to the need for much more integrated approaches, considering innovation the result of the interaction between multiple players.

3.6 The multiple Kenyas of ICT developments

Kenya has become one of the main African hubs of ICT development, and by extension of ICT4D as well. Nairobi's status as a global tech-hub started as a wave of media hype for the IT industry's new expansion hub (Zachary, 2008) and the development of a techno-discourse promoting Kenya as a leader in the African ICT sector (Cavallo, 2014). However, looking beyond the hype, when living in Nairobi in 2009 I wrote:

> "Is there a disconnect in vision between the flashy billboards of Waiyaki Way and the few computer screens covered with dust of many rural cyber cafés?" (Vallauri, 2009a, p. 4).

This still holds true today, and points to the intrinsic inequality of Kenya ICT policies over the years (Bowman, 2010; Waema, 2005; Wanjiku, 2009), particularly the urban bias of its development and the lack of sufficient openness and competitiveness in the ICT market until very recently. This said, the range of developments fuelled by the growth of the mobile sector has been impressive. Not only have major global players of the digital economy such as Google and Nokia Research set up African headquarters in Nairobi since 2009, but the country is a recognised international leader in mobile payments and has been inspiring others across the world with its much celebrated M-PESA service. According to the Communication Commission of Kenya (CCK), the number of Internet users in the country has increased from 3.4 million at the end of 2008 (CCK, 2009) to 8.5 million at the end of 2012 (CCK, 2013). Though significant, this still represents only a small minority of the country: almost 80% of Kenya's 40 million population is not connected to the Internet.

The unique mix of vision, availability of funding, thriving connections with the Kenyan diaspora and entrepreneurial skills are at the base of the opening of

technological hubs (M. Graham and Mann, 2013; Hersman, 2013) such as the iHub, the m-lab and Nai-lab, as well as iconic software developments like Ushahidi (Okolloh, 2009). The country's main telecommunication provider, Safaricom, not only leads the efforts for mobile broadband coverage in the country, but was also the first in the world to distribute subsidised smartphones for less than $100 (£65). However, this represents only one side of the coin, only one of many Kenyas. Even investors express doubts about this continually reiterated prophecy of Kenya – and Nairobi in particular – as a capital of global ICT speculation. In the words of journalist Jonathan Kalan:

> "Nairobi is still in the ascendant phase of its hype cycle, so failures have tended to be overlooked. The impact and tech crowds share an interest in promoting a romanticized narrative that technology can solve Africa's woes" (Kalan, 2012).

Mobile money and the introduction of relatively low-cost smartphones into the Kenyan market are two good examples of the inequalities overlooked by a vision of Kenya as a digital hub. The M-PESA story (Morawczynski, 2009) is a good example of this. It is indisputable that Michael Joseph, CEO of Safaricom until 2010, succeeded in achieving with M-PESA the "McDonald's effect" (Joseph, speech at Mobile Money 2009 - http://www.masress.com/en/dailynews/105151) for mobile payments, whereby wherever they are, users can always see an M-PESA agent. As of September 2012, there were over 54,000 mobile money agents in Kenya and over 19 million subscribers to the service (CCK, 2013). Arguably, however, this happened as a result of a missing regulatory environment (Omwansa, 2009), which ended up reinforcing the dominant position of Safaricom in the sector, at the expense of creating a vibrant, competitive and inter-operable mobile payment sector. Curiously, the most recent CCK report does not even state the market share of the M- PESA service compared to others, but based on Safaricom's own published data, 14.5 million users on its network were active M- PESA users as of March 2012. The evident market dominance of one single company has resulted in a pricing structure that for years benefited the transfer of larger amounts of money, while being much more costly for small transactions, typically used by the vast majority of users. Rural Kenyans adopted the service nonetheless, but it is fair to ask who truly benefited and still benefits from such a dominant player in the market. In the words of journalist and Kibera Map mapper Douglas Namale (2011):

> "(...) is it true M-PESA has helped reduce poverty or it has simply lessened the means of money transfer mechanisms? To try and attempt to respond to this question, let us look at it from two perspectives. First, the inventor of the idea, Safaricom, is making close to Ksh. 20 billion profits annually, but the kiosks owners who operate the business on behalf of the company are simply making about ksh. 2 per transaction made though the company deducts ksh. 30 per transaction. On the same note, for every ksh. 20 scratch sold by Safaricom agent/vendor, you only make Ksh. 1" (Namale, 2011, March 22 blog post).

Similarly, techno-optimistic perceptions on the Kenya ICT success stories are common even among academic discussion lists, as the case of the launch of the Huawei IDEOS phone in 2011 demonstrates eloquently. The IDEOS was the first "low-cost" smartphone powered by the Android operating system, whose popularity in the Nairobi *digerati* class suddenly gave global ICT4D enthusiasts a pretext to talk about the $80 smartphone, without appreciating that the initial relative popularity of the device in Nairobi tells us little about its penetration across the country. This is especially true in rural areas, where such phones might be unsuitable due not only to their cost, but also to their severely limited battery life. Informally discussing with a young Kenyan professional in her twenties in March 2012, I came to know about the phone's unofficial nickname: "idiot", because, as she commented:

> *"it always leaves you without any battery when you need it most"*
> (Personal communication, 2012).

When, a few months after the launch of the handset, a reporter from MIT's Technology Review enthusiastically reported on an alleged sale of 350,000 units of the phone in less than six months (Talbot, 2011), this sparked even more enthusiastic comments in the respected TIER (Technology and Infrastructure for Emerging Regions) mailing list, such as:

> "I feel like I have been waiting for this day for since 2003. Finally, a decent extensible Internet access device for $80. 350,000 sold already in Kenya. A nice combination of Moore's Law, Chinese manufacturing, and open-source software (Android), plus some localized apps as well. And the price will drop some more...
> A truly great enabler for developing regions; now we need (more) content and apps that make sense. The ecosystem is started, obviously sustainable, and will grow, and all of Africa will benefit"

(Brewer, 2011).

The rumour was eventually dismissed when the following year Safaricom's new CEO, Bob Collimore, admitted having sold 170,000 - less than half that number (https://twitter.com/#!/bobcollymore/status/172736353132494848). However the point is not (only) about numbers: it is about the perils of assigning such a strong symbolic value to a specific consumer product, missing the contextualisation of what that product might actually mean to the vast majority of Kenyan citizens, particularly those living outside the main cities.

3.7 "Silicon Savannah" and Kenya's multiple futures

The ICT sector and its subgroup of ICT4D organisations, projects and services, however, has over time benefited from being part of a well promoted and recognised cluster – recently referred to as "Silicon Savannah" (Gathigi and Waititu, 2012; M. Graham and Mann, 2013) after a new grand project promoted by the Kenyan Government. The mission of the Government's ICT Board of Kenya's (now merged in the new ICT Authority) in 2013 included:

> "Positioning and promoting Kenya as an ICT destination (locally and internationally), especially promoting Business process Outsourcing (BPO) and Offshoring" (http://www.ict.go.ke/index.php/theboard – accessed in May 2013, no longer online).

This focus on BPO for Kenya as a great source of future growth and new jobs is questionable because of the limited international competitiveness of the country as a global hub when compared, for example, to India, but it shows the government's commitment in trying to use new communication technologies as a driver for economic growth. Aside from questions of equitable development, nowhere is this grandeur more visible than in the controversial project for Konza (http://www.konzacity.co.ke/), Kenya's "techno-city", currently in early building stage of building a few kilometres from Machakos town, thus very near the area where I conducted field research. Comparing the current reality of the area with plans for this so-far virtual city is rather shocking. When I visited the site of Konza in 2012 it was still a dusty area, in a semi-arid part of Ukambani, not far from the dried-up dam (see Figure 3.3).

Figure 3.3: Dried-up dam near Kola, Machakos District, August 2011

The contrast with plans for Konza City could not be greater (see Figure 3.4).

Figure 3.4: Model for Konza Technology City. Source: Kenya ICT Board

Yet I started to understand a completely other meaning of the planned "techno-city" when talking to one of my translators in March 2012, a member of a youth

group producing seedlings to be used for fences and other ornamental plants. To my surprise, he was very excited about Konza, and he told me:

> *"It's great, for us it means we will have a lot more work. Can you imagine? A whole new market for our seedlings, for our mangoes and for all our products. Many farmers are gearing up for Konza the Techno-city"* (Personal communication, March 2012).

Once again, an iconic symbol of a possible future for Kenya's ICT development (not necessarily for ICT for development, though) assumes very different meanings, depending on people's personal context.

Kenya is also a "young" country – as are most sub-Saharan African countries. It celebrated fifty years of independence in 2013. To speak about the development of the "new media" and ICT sector in the country is not only to discuss advances in the mobile sector or the development of fibre networks, but also to realise that during the same past fifteen years, all other "traditional" media taken for granted elsewhere were progressively entering the local scene: for example, local FM radio broadcasting in vernacular languages took off only in 2000 (Mbeke and Mshindi, 2008).

3.8 ICT in agriculture in the Kenyan context

The dichotomy between realities and dreams/expectations exists also in the landscape of "e-agriculture" initiatives taking place in Kenya. When I began monitoring the sector, I wanted to understand the meaning of the term and the assumptions associated with its usage by local and international organisations working on ICTs in rural agricultural initiatives. This primarily meant separating initiatives based on the vision underlying their use of ICT: on the one side, those seeing ICTs as drivers of efficiency (whether in terms of market information, information or extension services), while maintaining a top-down approach (Unwin, 2009); on the other side, those exploring ICTs as enablers of new and more participatory networks, trying to facilitate the emergence of previously excluded (or unheard) voices, and attempting to bring together traditionally fragmented value chains and research stakeholders. In this respect Kenya is not different from other places. The majority of initiatives I have come across concentrate on ICTs as conveyors of efficiency and transparency, therefore

primarily on the informational aspect of ICT4D: optimising the existing flows of information, potentially affecting information asymmetries and enhancing market efficiencies. This is not a trend uniquely associated with most recent mobile developments in the country: Kiplang'at describes in very pragmatic, efficiency-driven ways the expectations regarding the introduction of previous communication technologies in Kenya:

> "IT also provides new means for helping the rural poor bypass obstructing agents and go directly to the source of the information they need. For example, tea or coffee farmers can use telex and fax to bypass middlemen and other agencies and communicate directly with researchers of their choice, and with market representatives" (Kiplang'at, 1999, p. 115).

The availability of large numbers of mobile phone users in both urban and rural areas has however led to an acceleration in the development of services, whether relying on phone calls, short message service (SMS) or mobile Internet connectivity. For example, the Kenya Agricultural Commodity Exchange (KACE) came up with SokoniSMS in 2006, the first SMS service to appear on the Kenyan market targeting farmers directly, providing easy access to market prices of key crops across the main market cities in the country. Along the same time, Drumnet (http://www.prideafrica.com/ourwork.php) was set up, using a mobile-powered system to connect farmers with input dealers, micro-finance and buyers for their crops, initially for export and then for the local market (Ashraf *et al.*, 2009; Okello *et al.*, 2010). More recently, similar services have been introduced, the most famous of which is M-Farm (http://mfarm.co.ke/), aiming to support farmers by aggregating both demand and supply of agricultural products, as well as providing access to up-to-date market prices. Other mobile services include iCow (http://icow.co.ke/), a mobile application launched in 2011, initially providing support to farmers in managing the fertility of their cows, and progressively adding new services, such as locating veterinary surgeons.

As for services targeting farmers with advice, mobile developments have included access to helplines, such as M-Kilimo (http://www.m-kilimo.com) and NAFIS (http://www.nafis.go.ke), providing farmers with a personalised voice gateway to questions and answers on agricultural issues. The direct use of ICTs in the delivery of extension services is however still fragmented and in rather early stages. Arid Lands Information Network (ALIN, http://www.alin.or.ke) is a

Kenyan NGO started in 2001, which has been substantially supporting rural communities, particularly farming communities. It is a rare case in the Kenyan landscape of e-agriculture, as it has been exploring multimedia use of ICT with a clear vision of increasing the range of farmers' voices represented, including by training its staff and volunteers in using the production and dissemination of video to engage farming communities in telling stories that matter to them. The inspirational role that ALIN's work played in my thesis is discussed more in detail in Chapter 5.

3.9 From Kenya's e-agriculture landscape to a case study

My plans for field research reflected the understanding of the intertwined nature of issues affecting ecologically sound rural agricultural development and the long history of interventions attempting to work in this direction (Pretty, 2005). Additionally, rather than focusing on initiatives generating from practitioners in ICT tackling rural agriculture development by themselves, I wanted very specifically to concentrate on programmes emerging from organisations primarily involved in agricultural development, exploring creative uses of ICTs to achieve not just "ICT objectives", but rather developmental objectives.

The goal of the thesis thus became to investigate information and communication needs and practices of smallholder farming communities in regards to ecological farming practices. As derived from the previous chapter, I use "ecological" as an umbrella term, encompassing innovative farming and post-harvesting techniques aimed at improving the efficiency, productivity and profitability of small farms with minimal to zero use of chemical inputs, with the dual objective of reducing farmers' costs and limiting environmental degradation.

The peculiarities of the case study introduced in the next two sections provided me with an unusual opportunity to engage with a range of stakeholders involved in the use of ICT in rural agricultural development, with a vision of the future of agriculture in the country in line with mine.

3.9.1 Infonet-Biovision

Infonet-Biovision is an agricultural development programme of the Swiss foundation Biovision, based at the International Centre of Insect Physiology and Ecology (*icipe*) in Nairobi, Kenya. Infonet was originally set up in 2005. It focuses

on rural agricultural development, with the goal of increasing awareness and uptake of organic and sustainable practices for smallholder farmers across Kenya. The programme consists of two main activities: the authoring and maintenance of an extensive database of locally relevant resources on organic and low-input agriculture published on the Internet (http://www.infonet-biovision.org/), and its dissemination through information officers as well as via CD-ROMs distributed to interested parties (Bruntse and Amudavi, 2013). The database of agricultural information resources, developed in partnership with local and international scientists and experts, contains prevalently textual information in English, often complemented with photographic galleries. It covers topics such as environmentally friendly methods in the identification, prevention and sustainable control of pests; appropriate measures for improving plant health of the most important crop species and soil; technologies and approaches to secure and increase food production and income while protecting the environment; and animal husbandry information for a variety of animal species.

I have known Anne Bruntse, the first coordinator of the Infonet-Biovision initiative, since 2004. At the time, Anne – a farmer and researcher in agricultural development – was a member of the Slow Food movement, the organisation for which I used to work. She was volunteering to run the Nairobi chapter, trying to promote the issues of organic food production and local consumption among Kenyan members. Originally a farmer from Denmark, Bruntse has lived in Kenya for over 25 years. Over the years we kept exchanging views on farming and communication technologies, progressively ending up working in the same field: what I would call ICT4D, and what she would call agricultural development. It was through Anne that I came to learn about the initiative.

At the beginning of 2010 Infonet established a network of 18 information and extension officers across Kenya's Western, Central, Eastern and Coast provinces. They were each provided with an XO laptop from the OLPC Foundation (http://laptop.org) loaded with all the content from Infonet's database, as well as with additional materials produced as part of the wider Farmer Communication Programme (FCP) run by Biovision in Kenya. The contents included were a collection of all issues of "*The Organic Farmer*" (TOF,

http://www.organicfarmermagazine.org), a monthly magazine written in English of which thousands of copies are distributed around the country and which is also downloadable from the Internet; and forty episodes of *"TOF - Radio"*, a radio show produced in Kiswahili by local Biovision staff and broadcast weekly on Kenya Public Radio. The aim of the initiative was to disseminate information to farmers and to inspire their adoption of ecological and sustainable agriculture and livestock management methods and technologies. Specifically, the goal of the pilot phase of the project was to verify the suitability of specific technological solutions to empower a new generation of community-based information officers in providing timely and cost-efficient support to farmers' groups. Given the novelty of the project, Biovision decided to test a number of alternative approaches with different partners, including with existing community-based organisations, established stations of the Kenya Agriculture Research Institute (KARI), partner NGOs, and small private entrepreneurs providing extension services. I started developing an interest in the initiative, as its approach to the relation between farmers and sources of information and knowledge sharing was in line with my theoretical approach. As the then programme coordinator put it:

> *"Farmers are tired of always being told what to do. Enough of that. That's why we decided to provide them with the information, and let them decide how to use it. They know better"* (Bruntse, May 2010, personal communication).

The Infonet programme is part of a recent but established trend (Munyua, 2007) in agricultural development using ICT tools to design more participatory agricultural extension services. Prominent examples of concurrent initiatives exploring this area of work in development regions include the Digital Green project in India (Gandhi *et al.*, 2009), audio podcasts in Zimbabwe (Grimshaw and Gudza, 2010) and the emergence in many countries of mobile-based livelihoods services for farmers (Donner, 2009).

Almost a year into the programme, Biovision decided to evaluate the work conducted in the first phase, to understand strengths and weaknesses of the various approaches and to inform plans for a follow-up phase possibly including the extension of the scheme to additional communities across the country. The Infonet-Biovision team commissioned me to undertake a study to better understand the current state of the programme and how it helped target farmers.

Additionally, Infonet-Biovision wanted to explore the potential need for complementary platforms and approaches to improve information dissemination, creating feedback systems and scaling up their efforts. Last but not least, the programme requested advice on how to document their impact pathway and change in the farmers with whom they work.

We agreed that I would have access to all the data collected during the exercise and would be allowed to analyse it further and use it in the context of my thesis, while at the same time preparing a comprehensive report on the state of Infonet, including recommendations for future directions and technological options for their projected scaling-up (Vallauri, 2011).

This paid consultancy provided me with a rare opportunity to engage practically on the ground with an organisation that appeared very much to satisfy the requirements that I had wanted to select in deciding on an empirical context for my research. In a way, the project selected me, more than I selected the project: while I was looking for opportunities for engaging with a practical initiative in Kenya, I was open to a variety of contexts, and this proved to be a convincing one.

The assessment of the project's impact, the analysis of the existing technological infrastructure and of potential opportunities for using mobile phones, provided useful inspiration for my subsequent field research. Some of the findings emerging from the evaluation specifically helped me to contextualise farmers' information needs. For example, I learned about the limited *direct* access of farmers' groups to the content provided by Infonet – despite it being the main stated objective of the initiative – and their dependence on information officers as infomediaries: intermediaries involved in searching for appropriate information and repackaging it (mostly orally) for dissemination in local languages. This provided the opportunity for designing a participatory video programme, as explored in Chapters 4 and 5 below.

3.9.2 Katoloni Mission Community-Based Organisation

I originally started my research by undertaking a survey of the whole Infonet-Biovision programme across a wide range of locations in Western, Central,

Eastern and Coast provinces of Kenya. In subsequent rounds, I focused my attention on a specific aspect of their activities, namely the work of one of their delivery partners, Katoloni Mission CBO in Machakos district, Eastern Province (see Figure 3.5).

Figure 3.5: Machakos District on a map of Kenya. Source: Wikipedia

I chose to concentrate on this CBO for further research because of its particular structure: Katoloni CBO features four extension officers supervised by a local coordinator, working in close contact with researchers from the local station of KARI Katumani. The four information officers are employed part-time and are each assigned to visit nine of the farmers' groups belonging to the CBO every month, with visits, in-depth training sessions and shorter follow-ups. Their work is supported by four additional volunteer information officers, each based in a cluster of farmers' groups in one of the main locations where the organisation operates.

Katoloni CBO was founded in 2004 by the charismatic coordinator Regina Muthama. The organisation expanded to include over 150 groups as of 2011 and

over 200 by the end of 2012. Groups member of the CBO are based in 13 locations of Central and Kalama divisions in Machakos District. Information officers are in charge of three locations each, apart from one who is in charge of four. As a result of the growth of the organisation, starting in 2011 locational "sister" CBOs were created, each comprising of 25 to 30 groups for ease of management. To be a member of the CBO, a group is expected to pay a one-time subscription fee of KSh 400 (£3.10) and a monthly fee of KSh 100 (£0.77) per group.

Thanks to the direct support of Infonet-Biovision and of KARI, Katoloni CBO was able to open an information and training centre in May 2010, their "Farmer Information Hub", within the campus of KARI Katumani research station. In the words of the manager, John Mutisya, who also coordinates the network of agricultural extension visits by officers:

> "The Katoloni info-hub is a farmer owned and run information centre. It is composed of farmer groups which gain membership by registration and it is manned by a manager who coordinates information officers in their fieldwork activities with these groups.
>
> As an information centre, it has established an information management system through which it generates, stores and disseminates information. On top of this is the dissemination of information on sustainable agricultural practices in dry land but it is also involved with other issues such as HIV/Aids and Drug abuse, Human rights /Gender mainstreaming, Environmental conservation (soil and water management, tree nursery Establishment) etc, Value addition on plants and animal production, Group dynamics −conflict resolution, Livestock production (e.g. local poultry, dairy goats /cattle, bee keeping and Development of a business/enterprise plan among others" (John Mutysia on the Katoloni CBO website, http://katolonifarmersinfohub.blogspot.co.uk/p/about-us.html).

Figure 3.6: The participatory research team at KARI Katumani, July 2011

The organisation experiments with a peer-to-peer, farmer-led approach to information sharing, in which officers operate within their own local community: they work as part-time extension officers, while continuing to live and practice farming within the area. Choosing to work in partnership with Katoloni CBO provided me with an opportunity to focus on a more manageable geographic area, and on a specific model out of all the farmer-led agriculture extension methodologies employed by Biovision, thus allowing for more in-depth analysis and better understanding of the local context. The particular structure of the team and the institutional support around it appeared as a promising way to support farmers in their sharing of knowledge, for two main reasons. First of all, differently from individual officers in other parts of the country, this model allows Infonet to cover a specific area in more detail, making their efforts more relevant and visible to the local communities with whom they work. Even more importantly, by working as part of a team, officers are not left alone in taking decisions and revising their practices. The peer-mentorship and the opportunity to compare and complement their work, for example through joint field visits,

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trainings and CBO-level events, provides unique strengths and reduces weaknesses, for example the officer-to-officer communication gaps I observed during my first research trip. I encountered a similar collaborative set-up when visiting the Lengo Agricultural Centre in Eldoret County, however Katoloni CBO appeared better equipped to experiment further with new communication flows and the production of video, also because of its proximity with agricultural scientists working in the area.

3.10 Conclusion

This chapter has provided a multi-dimensional description of the contradictions as well as the opportunities at the intersection of Kenya's information and communication technology sector with its agricultural development sector. I have used the term Kenyas to articulate more effectively the diversity of views and perspectives around the boom of the IT industry in the country, in an effort to provide visibility to other narrations normally sidelined by the dominant enthusiastic technology discourse enacted in the country by the press, investors and entrepreneurs. The "version" of Kenya at the centre of the research presented in this thesis is more diverse. While acknowledging the increasing interplay of developments of the digital economy even outside of the main Nairobi metropolitan hub, it focuses on the multiple realities of semi-rural and rural areas of the country, including the geographical differences and the threats to rural populations deriving from limited access to water and increased uncertainty around weather patterns. Just as importantly, this remains a country with dramatic inequalities, including very limited access to the Internet, despite the high penetration of mobile networks and services associated with them. The introduction of the case study clarifies the main reasons behind my choice of research partners, by focusing on an organisation with a country-wide programme in support of the diffusion of information on organic and low-input agriculture and a local partner interested in creating participatory knowledge resources to supplement its model of farmer-led agricultural extension. The methodology used in the three phases of the field research will be explained and contextualised in the following chapter.

Chapter 4 – Methodological approach

4.1 Introduction

This chapter outlines the methodological approach underlying the three periods of field research at the core of this thesis. After introducing the key elements of the research plans, I contextualise them in the light of the personal and professional journey that brought me to this specific sub-theme of ICT4D. I then present the five main methods employed throughout the research and the reasons behind their choice. A further aspect of the chapter based on my direct experience is a reflection on the role of postgraduate researchers when conducting research in partnership and collaboration with multiple stakeholders, paying particular attention to questions of ethics in the field.

4.2 Field research objectives

Following the themes emerging from the literature review in Chapter 2, and in recognition of the special opportunity provided by being a part-time postgraduate research student, particularly being able to conduct research over a longer period of time, I opted to base the most substantial part of my practical work on an experimental adaptation and implementation of participatory media development in a semi-rural context.

The choice of a single, extended case study allowed me to follow the evolution of an existing programme through different stages, and to contribute to a critical analysis of the role of ICTs in its activities, while at the same time contextualising it within the wider sector of agricultural development and ICT. Additionally, the research's format and time-frame provided an opportunity to feed back some of the initial research findings into the programme's actions, and at a personal level, to shift from an external role to a much more engaged, participatory and active one. The three sessions of field research were conducted in different periods of the year, namely during the key short rain season (October-November 2010); in between the two rainy seasons in 2011 (July-September) and during preparation for the growing season in 2012 (March-April). At the heart of the project was an emphasis on participatory action research. Not only did I gain more insight into

the reasons behind programme choices, priorities, challenges and opportunities; more importantly, I became openly involved as a practitioner and as a researcher in negotiating and experimenting new actions and reflecting on their implications. As will become clearer later in the chapter, this work is inspired by participatory action research methods and practices, defined broadly as research done:

> "(…)with, for and by persons and communities, ideally involving all stakeholders both in the questioning and sensemaking that informs the research, and in the action which is its focus" (Reason and Bradbury, 2001, p. 2).

Research primarily based on single case studies is criticised because of the assumed weakness for generalisation and for its supposed descriptive, narrative style (Miles, 1979). However, critiques of case study research are flawed, because they are based on five common misconceptions (Flyvbjerg, 2006): the supposed superior value of theoretical knowledge to practical knowledge; the impossibility of generalising starting from a single case study, therefore making single case studies unsuitable for scientific development; the difficulty in summarising case studies; the likelihood of results being in line with researchers' original views; and the suitability of case studies to generate hypotheses, more than to create theory. Even though the comparison between multiple case studies might allow for more consistent generalisations, they can be equally affected by researcher bias. My experience with this single case study provided distinctive advantages, primarily the opportunity to explore the interplay between the involved actors in much more depth and for a much longer period of time. Additionally, my views as a researcher only guided me to remain open-minded while exploring the different dimensions of the Infonet programme, maintaining a reflective and reflexive approach. As for the value of theoretical knowledge, my approach favours a mix of theoretical and practical knowledge, as an extremely useful way to test theoretical knowledge and to contribute to its further development. As a result, case study research appears a promising, rigorous and attractive way for the researcher to gain valuable insights and be able to extensively feed them back to the involved stakeholders.

The actual case study evolved from an initial exploration of the use of a range of ICT tools in farmer-led extension to a much more focused participatory research process on the production and use of video in agricultural development. As such,

it builds on extensive literature analysing projects conducted in rather different geographical and institutional settings (Chowdhury *et al.*, 2010; Chowdhury and Hauser, 2010; Nathaniels, 2006; Van Mele, 2006, 2010; Van Mele and Braun, 2005; Zossou *et al.*, 2009, 2010).

By choosing collaborative and participatory approaches, I attempt to use appropriate research methodologies to explore the suitability of farmer-produced videos as a complementary strategy in support of community-based agricultural extension practices in a specific organisational environment. By switching the focus from a specific technological tool to the analysis of the production and distribution of content in a rural agricultural setting, the study seeks to contribute to debates on the role of communication for rural development, contextualising the use of technological tools to achieve specific communication objectives. As mentioned in the theoretical framework, much ICT4D research concentrates on a specific technology tool, almost desperately attempting to prove its developmental potential, as though trying to correlate a developmental outcome with a specific tool. My approach for this project was radically different: when I began working on it, I had no specific preference for exploring the role of video, which only emerged as a promising area of work after the first phase of the empirical research.

4.3 The research journey

From the very beginning of my MPhil, I have reflected on the perceived and effective divide between research, action and change. Coming back to the academic world as a committed practitioner, I intended to explore opportunities to combine sound and rigorous research, as informed by progressively immersing myself in the literature, with an involvement in initiatives attempting to combine the use of ICTs with the empowerment of the very communities they were set to support. At the time of joining Royal Holloway for my postgraduate studies, I was a research officer with the British NGO Computer Aid International and based in Nairobi, Kenya. My work was at the intersection of research and *development*, intended as the development of new projects and products as opportunities for the organisation to further its work in ICT4D in sub-Saharan Africa. By visiting, observing and reading about *successful* and more often successfully *communicated* and hyped-up ICT4D initiatives, my goal was *quickly* to

understand what *was working*, what *was not* and to come up with *technical* recommendations and guidelines for future work. Combining the two affiliations proved to be challenging and yet extremely rewarding, in two main ways. Within the first few months of the academic programme, spent in London, many of the certainties at the base of my previous research work faded, leaving space for a more doubtful, critical examination of the role of the researcher in a developmental context. This period prompted profound questions on the reasons behind specific developmental acts and projects. Ultimately, this awareness helped me to situate myself as a researcher in a more reflective and comprehensive way. Just as important, however, was the recognition of the power of doing and experimenting, by combining practical projects, rigorous documentation, collective testing, critical reflection, all feeding back into further practice. The initial temptation of letting criticism spiral exponentially, to the point of precluding further action and engagement with the ICT4D practitioner community, eventually gave way to a more conscious and powerful vision of the role of the academic researcher in participatory action research initiatives (Bessette, 2004). Hence, my decision to ground my academic field research with "real world" initiatives attempting to pursue goals in line with my research and professional interests.

4.4 Research partnerships and funding

This research was undertaken deliberately with the FCP of the Biovision Africa Trust, a not-for-profit trust established under the Kenyan law in 2009 by Biovision in partnership with *icipe*. In order to clarify the terms of our partnership and make it official, Infonet staff and I collaboratively wrote an initial Memorandum of Understanding (MoU) (see Appendix F) covering the relationship during the months of the first session of field research, and the obligations for each party in regards to both the external evaluation, and future use of the findings. The agreement allowed for potential extension of the partnership for future rounds of field research associated with my degree to be discussed in a second document.

The participatory video project began with a planning meeting at the end of May 2011, during which I presented the main findings of the evaluation conducted

several months before on behalf of Infonet-Biovision, and made the case for a partnership with the team of information officers and Biovision FCP, based on the interest already expressed by members of Katoloni CBO and the promising experiences they had already had with video. The team agreed to work collaboratively to this end and to sign a second MoU, available in Appendix H, setting the stage for an open, participatory and pragmatic style of work, whereby all partners would substantially contribute to the success of the programme.

Biovision would primarily cover the equipment costs in the first phase as well as the logistical costs of running an initial training of the information officers. Katoloni CBO would help by selecting information officers for the project, supporting them in taking part in the research and providing logistical support so that I could contact and meet a wide range of farmers' groups who belonged to the organisation. In a joint role as practitioner and researcher, I would be responsible for all technical decisions, selecting hardware and software solutions, ensuring the practical viability of the set-up at the Farmer Information Hub, then conducting training sessions with the information officers and facilitating their learning and successive joint production of videos and their inclusion among the training materials used in their work. I committed to documenting both phases of the training/research periods, sharing research plans as well as findings with both partners and ensuring that the videos produced during the research would be openly sharable by partners.

Funding for the field research has come from various sources: Biovision had hired me as a consultant for the evaluation I conducted during the first phase of the research; the second phase was funded through a postgraduate grant from the Royal Geographical Society; the third phase was partly self-funded with Biovision partly covering living expenses and local transportation. All of the technical equipment was paid for by Biovision. The level of support coming from the partner organisation was substantial and ultimately made the research possible as well as grounded in the reality of an existing development programme. The precautions taken in the two MoUs however provided me with all necessary freedom to conduct research independently.

4.5 Challenges and opportunities of collaborative research

I chose to accept the opportunity of working with Biovision, despite the clear difficulties and ethical challenges that it involved. Conducting field research in partnership with an implementation agency is a very tempting option, particularly for otherwise self-funded students (Hollow, 2010). Despite the obvious challenges deriving from being directly employed by an organisation with its own agenda, other authors (for example Batterbury, 1997; Devereux and Hoddinott, 1993) also highlight the actual advantages of a direct affiliation. It creates an immediate identity for the researcher, which can be beneficial, especially in case of short rounds of field research such as this one. Additionally, contributing to an ongoing programme provides an opportunity for some of the research findings to feed back into the programme, not just as a formality, but as a vital and practical deliverable of the work done. Successful partnerships can reduce the risk of researchers ending up purely extracting knowledge, and instead supporting with their research the communities involved with the projects (Marshall and Taylor, 2005). Concurrently, the affiliation with a recognised organisation provides the researcher with increased access to a variety of actors and social settings, not necessarily easy to achieve when working independently.

There are, though, risks in undertaking research through such partnerships. First, the very word "partnership" means different things to different people and organisations (Geldof *et al.*, 2011). Development organisations applying ICTs in specific areas might not be in a position to question the true role of technology in their enterprise (Feenberg, 1999), and might not be prepared or able substantially to alter future directions of their activities, because of existing commitments to donors, staff shortage or skill limitations across personnel and local partners. Practitioner organisations can benefit tremendously in terms of visibility and prestige from the affiliation with academic institutions – and the reverse is true as well. The actual collaboration is often much more problematic, particularly when partners are interested in different layers of analysis. Personal relationships can also bring additional difficulties: in my case my long-term contacts with Mrs. Bruntse, in charge of the programme at the beginning of the study, proved very insightful. However, internal reorganisation of the programme meant new directions and an organisational culture to which I had to adapt, including

meeting and collaborating with new members of the local team. Most importantly, I started collaborating with Dr David Amudavi, who joined Biovision as coordinator of the Farmer Communication Programme – including Infonet as well as other projects that Biovision supports in Kenya, such as the Organic Farmer magazine. Dr Amudavi provided challenging and critical comments to my research, both during our meetings and by reviewing the technical reports I submitted to the team after each session of field research.

4.6 Partnerships in the real world

Previous professional experiences have warned me against the often startling difference between the sharp, one-dimensional public image and external communication of an organisation, and the complex, multifaceted reality of working as an insider. The politics of conducting a baseline evaluation in partnership with the project's implementation team, as well as the tight timeframe required for the completion of all tasks involved, might have at first sight seemed irreconcilable with the depth of analysis and rigour involved with research at postgraduate level. Transparency and openness regarding the different interests of the various stakeholders (Unwin, 2005) is a crucial requirement, but might not prove sufficient in achieving mutually beneficial and successful collaborations.

As a researcher I felt more inclined to accept the challenges and attempt openly and transparently to negotiate any possible contentious matters, while at the same time reflecting on the difficulties of working in a "real" project, rather than embarking on an independent ad-hoc research project designed with the primary goal of forming the basis of a thesis. In the words of Howard (1997, p. 21):

> "In most cases, however well-meaning, it is the researcher who really benefits from the research".

While it was inevitable that I would benefit from the research, I tried to share my technical and research skills extensively with all research stakeholders, in order to provide a learning experience for everyone. Additionally, I was aware of the limitations of coming to work in the field for short periods of time, and the associated risks of completely missing the density of meaning associated with the places and people being researched (Adams, 1979). In order to reduce this risk, I

engaged with partners socially within and beyond the typical research activities, for example by visiting them at home, sharing meals while at the same time sharing my ICT skills and fixing some basic computer software problems they experienced. For example, on more than one occasion I helped information officers with reinstalling software drivers to enhance the performance of old Pentium III PCs they had received for use within their specific community. As discussed more extensively in Chapter 6, lack of targeted IT support and sufficient IT skills often resulted in mismanagement of the hardware, for instance computers whose screen would perform poorly, or that lacked any sound when watching videos.

4.7 Timeline of research in the field

The research deliberately used a varied set of methodologies throughout the different phases in order to capture different aspects of the use of technologies by farmers and information 'providers'. This section of the chapter first outlines the timeline and the articulation of the research project. The field research comprised three distinct periods between October 2010 and April 2012 (see Table 4.1).

Table 4.1: Summary of the periods of field research

Periods	Timeframe	Objectives
First Phase	October – November 2010	- Evaluation of Infonet - Emerging themes - Visits to multiple types of groups
Second Phase	July – September 2011	- Participatory video training - Production of initial videos - Testing of videos with farmers
Third Phase	March – April 2012	- Additional training - Reflection on videos made - Reflections on video distribution - Production of elaborate videos - Further feedback from farmers

4.7.1 First phase: review of the Infonet-Biovision initiative

A first phase, conducted between October and November 2010, was designed as a review of the ongoing work of Infonet-Biovision throughout the whole of Kenya, with the dual goal of compiling an evaluation of the programme, and at the same time learning in as much detail as possible about the perspectives of all involved stakeholders, with a particular focus on farmers and information officers. Infonet-Biovision tested a series of alternative strategies in support of the delivery of a laptop loaded with agricultural information: from the provision of paid Internet access to a contribution to the salary of the information officers. Understanding the results of such different approaches was central to the organisation's plans for future iterations of the project. The only way to comprehend the diversity of experiences was to visit most of their project sites in person. With the goal of capturing the realities of the complex set of stakeholders involved in the initiative, I proceeded to design a mixed approach, including a range of quantitative and qualitative methods (see Table 4.2) leading, among other things, to exploring farmers' agricultural knowledge and information networks (AKIS) (Munyua and Stilwell, 2010).

Table 4.2: Summary of all data collected during the first phase

Method	Numbers
Questionnaires with farmers	238
Interviews with information officers	15
Focus groups with farmers' groups	6
Interviews with project staff	3

4.7.2 Second phase: introduction to participatory video

The second phase, between July and September 2011, concentrated on the role of video in farmers' training and communication, and consisted of eight weeks of participatory action research around the experimental introduction of video practices and recording devices in the existing training routines of a cluster of information officers and selected farmers' groups. Group interviews with information officers were accompanied by extensive practical video-making sessions, as outlined below and in Chapter 5. Additionally, farmers were polled through a mix of methodologies, including focus groups and questionnaires, at

times after screening an initial selection of produced videos (see Table 4.3).

Table 4.3: Summary of all data collected during the second phase

Method	Numbers
Videos produced by information officers	15
Days of video training	15
Group interviews with information officers	3
Group interview with farmer leaders	1
Focus groups with farmers' groups	21
Questionnaires with farmers	64

4.7.3 Third phase: reflections and new directions in video-use

The third phase was conducted between March and April 2012, and was based on an initial assessment of the work conducted by the team in the previous period, to understand participants' strengths, weaknesses and the resulting opportunities to be further explored. It started with an assessment of the progress in video production and usage, and continued with an exploration of alternative appropriate modalities to integrate video in information officers' working routines (see Table 4.4).

Table 4.4: Summary of all data collected during the third phase

Method	Numbers
Videos produced by information officers	4
Days of video-editing training	5
Group interviews with information officers	2
Focus groups with farmers' groups	7
Interviews with individual farmers	2

4.8 Data collection methods

This section presents the range of quantitative and qualitative methodologies employed, as well as the motivations for choosing them. This mixed approach highlights the complexity of conducting participatory research, and the need critically to reflect on the experience through multiple perspectives and tools (Hearn *et al.*, 2009; Lennie, 2006). The central role of video-based

methodologies is discussed in Section 4.9.

4.8.1 Semi-structured interviews

Information officers play a central role in the structure of the Infonet programme. I conducted individual interviews with as many of them as possible during the first round of research, in order to learn in detail about their experiences with the programme, including their familiarity with the existing ICT components, such as laptops and software. Given the wide differences in terms of approaches used by Infonet across the country, including collaborations with extension officers from the Ministry of Agriculture, women's groups and experiments with other community groups, I visited 15 of the total 18 sites in October-November 2010, only excluding the information officers that were either not available at the time of my research trip, had just relocated or left their position. This is how I came to 15 interviews. All informants provided incremental and complementary insights into the functioning of the programme. Each interview lasted between one hour and 1 hour 45 minutes. In two cases the interviews lasted well over two hours, as I interviewed multiple officers together, as a group interview. The interviews were also used to gather feedback on possible improvements and to establish whether and how both programme and tools fit within their working routine and schedule. Conducting in-depth interviews is the most accurate method for the researcher to explore the worldview of the interviewee in detail (Gaskell, 2000). Questions followed in all cases a comparable order, starting with a section designed to capture the information agent's vision for the future of the agricultural sector in her or his region, before deepening the focus on the Infonet programme and, eventually, on the specific ICT4D tools employed in their work (details in Appendix D).

As part of the process, I also conducted informal as well as more structured interviews with key project staff based in the organisation's headquarters in Nairobi, at different stages throughout the research process. The main reason behind these narrative interviews was to explore in more detail the staff's collective understanding of the goals of the projects, the history of the intervention and the motivations behind some of their technical and content decisions. Repeating the interviews at different stages of the field research helped

to contextualise the evolution of priorities within Infonet's management: originally the priority was to create a vast database of useful information on organic agriculture resources for Kenya and East Africa in general, while a focus on the transmission and diffusion of this body of knowledge to information officers only came at a later time.

4.8.2 Focus groups

I originally planned to run focus groups with representatives from the visited farmers' groups whenever possible. The obvious practical advantage of focus group discussions is that they allow researchers to facilitate the exchange of views across multiple participants in a limited amount of time (Flick, 2009), an important factor given the time constraints I had, particularly in the first round of research. However, more profound methodological reasons prompted me to explore the validity of focus groups to learn more about the farmers' experiences with the programme. First and foremost, I was interested in establishing a dialogue among farmers themselves and between the farmers and the researcher (Fontana and Frey, 2000; Morgan *et al.*, 1998), to explore the relationships between the adoption of new farming practices and the facilitating role of ICTs. Additionally, the focus group structure along recurring themes and routines can be used to compare attitudes across different groups, an important feature in the context of this project, helping to generalise findings. Depending on the setting of the focus group, it could have been helpful – but not prescribed (Gaskell, 2000) – to run them with interviewees who previously did not know each other. However, this proved impossible in the context of this research, given that focus group discussions were employed during visits to farmers' groups, where everyone knows everyone else. As a result, I decided to select participants in a flexible way, according to the farmers' group to be visited: in the case of groups primarily consisting of women, for example, I would not attempt to run a separate focus group with men, and vice-versa. There were two main reasons for such an approach: the lack of sufficient time to conduct more than one focus group discussion per each of the visited locations, and the overall small number of men in women-led farmers' groups, and of women in men-led groups. Such small numbers would have made it difficult to run two meaningful focus groups featuring both genders. Similarly, when visiting a mixed youth group in Western

Kenya, I took the opportunity to host a focus group with young men, while a visit to a rare farmers' group composed primarily of men provided the opportunity for a focus group with older male farmers all of similar ages.

As a result of this selection process, initial focus group discussions provided very rich insights, but lacked a consistent comparative structure. Further use of this methodology took place in the second and third rounds of field research, as a way to learn in more detail the context of group members of Katoloni CBO, their information needs and their initial reactions to screenings of videos from the participatory video programme.

After testing various options, I settled for conducting discussions outdoors wherever possible, mostly sitting on the ground, as in Figure 4.1 below, or under a tree. This proved efficient and rewarding for two reasons: focus groups conducted indoors were often partially conditioned by existing furniture and impractical sitting arrangements. Additionally, when sitting on the ground in a circle, the power divide between a foreign researcher and members of the local community was at least partially reduced, resulting in more relaxed and open conversations. The map of all project sites visited in the first phase is available as Appendix F.

Figure 4.1: Focus group in Machakos district, August 2011

The main dilemma of choosing a sampling strategy in qualitative research

involves deciding between sample breadth and depth, between representativeness and relevance. Acknowledging that they cannot be both achieved in the same piece of work (Flick, 2009) makes further selections less contradictory. In the present case, the need to provide representativeness from across the range of project sites, and the constraint of having to do so within a rather limited period of time (Hoddinott, 1993), influenced and guided most other decisions during the initial phase of research. In the follow up phases, one of the implications of working with Katoloni CBO was that the geographical area to cover was much more manageable. Sampling the groups to visit and to interview, however, posed other challenges: while Katoloni CBO only covers a small portion of Machakos district, it nominally included close to 200 farmers' groups by the time I completed the research in the field. However, both information officers and the Information Hub manager played an important role as gatekeepers in introducing me to specific groups as opposed to others. As a consequence, the groups I engaged with were generally among the most actively involved with the organisation.

4.8.3 Questionnaires

In addition to focus groups and visits, I utilised questionnaires heavily in the first period of research, as a way quickly to gather background quantitative data about farmers' conditions and attitudes. The intent was to generate a baseline around specific issues: whether farmers practiced agriculture as primary or secondary activity; their ownership and access to mobile phones and other ICTs; their sources of agricultural information and their relative ranking; their views on the most pressing problems they face for their activities, such as access to markets, market price information, transport infrastructure, farm input availability or others for them to indicate.

The main reason behind the choice of questionnaires as a method was linked to the partnership with Infonet-Biovision, and their request that I should evaluate some quantitative aspects of their existing programme. This was also the start of my own research. Biovision wanted to have a large basic survey of all those involved, and a questionnaire lent itself ideally to this scenario. A large portion of the questionnaire was designed with the intention of capturing farmers'

experience with the programme, in an attempt to assess the programme's "impact pathway", as stated in the terms of reference for the evaluation contract. Conceptualising impact through a series of quantitative indicators proved extremely problematic, and ethically challenging, first and foremost because of the lack of any earlier quantitative data collected before the beginning of the initiative. Even the terminological choices of the partner organisation reveal a difference in terms of research culture: while in academic terms a baseline is supposed to provide data against which the progress of a project can be assessed, in the case of the evaluation report for Infonet, I was asked to "produce" a baseline of the change incurred since project inception, without any previous data to compare it with. By analysing a range of official documents of the programme, I distilled the main areas of influence Infonet intended to have, and proceeded to create a series of indicators that sought to capture them. Due to the different objectives of my evaluation of Biovision's work and of my academic research, I decided to limit my use of such data in the context of this thesis to a few elaborations on some relevant indicators, which are included in Chapter 6. The final questionnaire was the result of pilot-testing a draft of research questions with a group chosen because of its proximity to Infonet's headquarters in the outskirts of Nairobi (Figure 4.2).

Figure 4.2: Farmers testing a questionnaire in Kabete, Nairobi, October 2010

Following the pilot, and subsequent discussion with the group, the original questions were modified, trying to simplify the formulation, according to the comments of all relevant stakeholders. Initial problems with the Kiswahili translation of the document were also assessed in the final version. The final versions of the first questionnaire are included in Appendix A and B in English and Kiswahili respectively. Sampling for the questionnaire was, again, problematic, due to the rushed schedule of the first round of research required by the partner organisation. While 238 completed questionnaires is an acceptable 68% of the target I had set of 350 respondents, the original intention was to collect 25 responses from each project site. This proved difficult in a number of places, because of logistical problems and occasionally because of the small number of farmers mobilised by the local officers. As a result, some of the project sites were over-represented, while in others places very few or no farmers could be polled (Table 4.5).

Table 4.5: Number of farmers surveyed in 2010 per group

Date	Site	Groups surveyed	Number	FGD
Oct 22nd	Kabete	Kabete Rabbit Breeders	test only	Y
Oct 25th	Kisii	Osweta women group	8	N
Oct 26th	Mbale	Jikoni self help group, Lyduywa adult class	37	Y
Oct 27th	Busia	Sikoma ushirika self help group, Lwero cassava self help group	41	Y
Oct 28th	Kakamega	Luvambo adult education	7	N
Oct 29th	Majengo	Bunandi Farmers CBO, Diversity self help group, Singi CBO, Orepa youth group, Deeper life Women group, Matendo group	24	Y
Oct 30th	Eldoret	Kapsurtoi youth group	7	N
Nov 1st	Machakos	Mbilini self help group, Neetana uketike, Kiinya nainyuke	45	Y
Nov 2nd	Kinango	Dumbule women group, Juhudi women group, Jaribu women group	8	N
Nov 3rd	Dunguni	Dunguni farmer field school, Fungua macho farmer field school	11	N
Nov 4th	Watamu	/	/	N
Nov 5th	Mtwapa	Polepole women group, Mapato, Kidutani, Mtepeni	17	N
Nov 10th	Mwea	/	/	N

Nov 11th	Kinangop	/		/	N
Nov 12th	Gatuto	Amka self help group, Mwimenyi self help group		23	Y

Note: the column FGD refers to whether (Y) or not (N) a focus group discussion was held in that location.

An additional questionnaire was used during the second phase of the research, in order to quickly poll the reactions of specific groups of farmers to the initial videos produced and screened to them. It was used on two occasions: at an official CBO monthly meeting, in order to gather perspectives from representatives of a wide range of groups involved, and subsequently following the screening of initial videos to a cluster of groups in Ngelani location (Table 4.6). The full questionnaire in English and Kiswahili is available in Appendix J and K. This second questionnaire, despite being shorter and simpler than the first one, provided further evidence of the limits of this quantitative tool when exploring the reasons behind a preference or a ranking. Participants had no difficulties in identifying their favourite video, but were rather vague in explaining in detail why they took a specific decision. Focus groups and individual interviews provide much more sophisticated ways to deepen the understanding of farmers' choices and preferences. While questionnaires provide the obvious advantage of speed and replicability, the limited consistency and lack of depth in replies by many of the polled farmers suggests that more direct interactions, whether one-on-one interviews, or even group interviews and focus groups, can provide the level of detail and engagement required by participatory action research. Quantitative methods are however consider by some researchers important and relevant in the context of participatory action research (for example Chambers, 2007)

Table 4.6: Respondents to second questionnaire, August 2011

CBO meetings	Respondents
Monthly CBO meeting, August 18th 2011	39
Cluster of Ngelani farmers' groups	25

4.8.4 Informal visits to farmers' groups

On some occasions, particularly in the first round of research, focus groups and questionnaires could not be completed due to unforeseen logistical problems – such as transportation breakdowns and excessive rains, as well as misunderstandings with the local officers in charge. In other cases, they were considered not appropriate, due to the small numbers of farmers gathered, and more importantly because of the limited involvement showed by information officers during preliminary interviews. In such circumstances, I opted for a more informal courtesy visit to the farmers' groups involved. This always provided extremely valuable insights, not only regarding their participation and interest in the Infonet programme, but often also in regards to more fundamental struggles faced, such as access to markets, relationships with traders and contracts with companies buying their products for the export market. I applied similar methods in subsequent research periods, when visiting on my own groups which were not specifically recommended by my research partners or actively involved with their programmes. Crucially, the interaction with group members during farm visits quickly dismantled the uniform image often given of a community or of a farmer's group – by highlighting the importance of power relations within members of a specific group, and their role in group decisions and cohesion. This aspect will emerge much more in detail in Chapter 6.

4.9 A focus on video

The decision to concentrate on video in the context of this thesis was driven by the powerful combination of audiovisual information (Juma, 2011) conveyed by the medium, and by the observation of farmers' interest in visual media experienced during the first round of research, confirmed by conversations with both farmers and information officers. Additionally, as a method of enquiry, I considered video because of its potential to address the disproportionate power normally given to the written word in both practice and academic research on ICT4D. Audio was not taken into much consideration because farmers rarely referred to the existing podcasts carried by information officers in their laptop. Specifically, in the context of rural agriculture, video-based communication appears to be an appropriate strategy to help overcome literacy and language divides. While most farmers already have access to radio programming, video and

television programmes are still available to a minority of rural households, hence the interest in testing their value. Additionally, according to Kindon (2003) and Zossou *et al.* (2010), video has the potential of proving to be a particularly effective method to engage with female communities, as it provides further ways to engage, also for low-literate group members.

Within this research project, I decided to avoid my own direct textual or semiotic analysis of the videos produced, for two main reasons: first, the videos were not necessarily meant to target myself as a researcher or a viewer, but were primarily intended for other farmers; also, my limited textual competence in local vernacular languages would have seriously reduced my ability to engage with the content first hand. Instead, I decided to work with farmers' groups and information officers in exploring their own experiences with the produced content, both in terms of their direct engagement in producing it, and of their reactions as viewers. This was explored by employing a mix of individual interviews, group interviews and focus group discussions both in the second and in the third phase of the research.

Video was mainly used as a participatory way for information officers to producing agricultural content in local languages (see Figure 4.3). A selection of videos produced by the team at Katoloni CBO is included as two DVDs included with this thesis.

Figure 4.3: One of the information officers shooting a video on horticulture

Additionally I used video to record impressions and occasional snapshots on the progress of the research, both during the trainings and in the successive collaborative shooting and editing of videos. Video was both the object of the research and also one of the reflective methods employed, a sort of complementary diary of the project.

4.9.1 Video diaries

In addition to participatory video production, this research explored the role and suitability of video as a platform for participants to document the research experience, through the production of a series of snapshots and short videos on the progress of the research, featuring the information officers, the involved communities and myself as the researcher. While this was not meant completely to substitute a written research diary, it was chosen as a way to bring together additional elements that do not necessarily make it into a research diary. For example, an information officer making a video of myself explaining the functioning of a video-editing feature can provide useful additional information documenting the learning process. Information officers were asked to engage in a similar process of documenting their own experience with the project audio-visually, in an attempt to verify the suitability of the medium compared to their usual reluctance in submitting written reports, as explained in a subsequent section of this chapter. Multiple challenges – especially the limited time available to participants and the other commitments they had with the organisation – prevented this tool from completely succeeding, although some of the information officers successfully recorded and shared with me a few occasional updates on their experience with the research programme in the summer of 2011. As a result, the method was dropped in the last round of research

4.10 What type of participation, and what for?

The focus of much participatory video (PV) work is on the process behind it, and not necessarily on the actual content of the videos produced as an outcome (Harris 2008; N. Lunch and C. Lunch 2006). Participatory video is often seen as a strategy to build community linkages (Chavez 2004) and learn about a community throughout the process. In the context of this thesis, I considered

participation with a different degree of community involvement: the project involved communities already engaged with each other at some level through the work of Katoloni CBO. For example, information officers taking part in the project were themselves members of some of the communities with which the organisation is working. While the open-ended participatory process was important, the actual production of visual documentation of farmers' techniques and challenges was a key deliverable of the project. My experimental interest was in empowering existing community-based information officers, in actively utilising video as a strategic communication tool for increasing the effectiveness of their work. With "empowering", I refer to the intention of gradually shifting the power relations of participants from passive consumers of predetermined content, to that of active citizen media producers, involved not only in the selection of topics to be explored, but also in the management and control of the tools necessary to produce new content. This was done through three main steps: first, by exploring the opportunities of using video in their traditional participatory agricultural extension work through group interviews and focus group discussions; second, by conducting trainings in basic video production and editing; and third, by engaging the wider community of the farmers' groups already supported by the information officers at Katoloni CBO, collectively to prioritise between possible uses and topics of videos to be produced, and to explore viable ways for the dissemination and sharing of the content produced. Participation played a crucial role, but in a significantly different fashion from the typical PV projects. While the production of script-less videos is traditionally considered an essential feature of PV (C. Lunch, 2004), the project was informed by the important complementary role of scripted and script-less videos in agricultural development (Chowdhury *et al.*, 2010). In some instances, farmers and information officers approached issues to be covered and styles of production adapting from the Zoom-In-Zoom-Out methodology developed through research in Bangladesh and Benin (Van Mele, 2006; Van Mele *et al.*, 2007). This strategy involves choosing the topic of a video production by first focusing on specific needs and communication interests of a community (zooming-in), then producing it in ways to make it relevant to a wider set of communities (zooming-out). Information officers would in such cases prepare a script, however mostly to guide the interviews they conducted, and not to attempt to elicit highly specific

answers from their interviewees.

The novelty of the approach adapted and tested as part of this research is that it relied on training a group of information officers in all the technical aspects of video-making, only partially aided by my role as researcher, facilitator and technical adviser. Peer learning thus formed an essential element of the process, with the intention that this might help ensure that the initiative would be more sustainable in the longer term. Video production, even when following participatory methodologies, often happens through the mediation of external forces: for example, by employing film crews who ultimately control the editing if not even the shooting of videos, or by concentrating on a short-term delivery of a specific video production, ignoring the potential for participatory video-making to continue beyond their presence. In this case, my role as a researcher was carefully communicated as providing only temporary support by sharing a range of technical skills to information officers and some of the groups they work with. However, the team would be completely in charge not only of deciding what topics, farmers' groups and individuals to feature, but also of attempting to integrate the video practices within their existing working schedule. Ultimately, the initiative wanted to investigate whether information officers working with farmers' groups could become autonomous producers of their own videos. This is an element rarely taken into sufficient consideration: the introduction of new technological tools often brings new tensions and dependencies, instead of new freedoms, due to the insufficient familiarisation and appropriation of the tools involved. In the words of Rheingold (2004, p.255):

> "One of the things that makes technology dangerous is that most people never learn where tools come from, what they were originally designed to do, and how people have evolved, appropriated, subverted, perverted, and augmented them from their original purposes and designs."

4.11 Language in field research

I have regrettably never learnt to speak Kiswahili beyond a few basic sentences. However, my extensive experience and close friendships with Kenyans, in particular with some families living in semi-rural parts of Kenya, has taught me a lot about the rhythm and style of communicating efficiently yet respectfully,

including a number of para-linguistic elements involving the use of specific words, the role of pauses and silence and ways of expressing familiarity and respect that go far beyond simple competence with the spoken language (Briggs, 1986). The literature does not have a clear and final answer to the importance of learning local languages. While in theory this might positively impact the quality of data that a researcher can access (Francis, 1993), the reverse is also possible: a researcher with weak language skills working without a translator might be severely limited in her interaction with the communities studied (da Corta and Venkateshwarlu, 1993). This resonates well with the dual perception I have witnessed in the past of the use of Kiswahili in Kenya by foreigners: while at times it is enormously appreciated, in other circumstances it can be considered conflictual, since it might be interpreted as the researcher thinking that the respondent is unable to speak English.

In the context of my field research, my limited skills in Kiswahili undoubtedly reduced my ability fully to interact with farmers during focus groups (see below). However, given the linguistic diversity of Kenya, Kiswahili alone would not have been enough: during the first phase of the research alone, I encountered groups of farmers who would much rather communicate in either Luhya, Kikuyu or Kikamba – local languages prevalent, respectively, in Western Province, Central Province and in part of Eastern Province – than in Kiswahili. In subsequent periods in the field spent in the Machakos area, Kikamba proved more appropriate than Kiswahili with many of the communities I interacted with. The same difficulty did not affect my interactions with information officers, who were in most cases very confident in using English. Translation proved necessary in the communication with most farmers met, and even if I could have spoken fluent Kiswahili I would still have required translators fluent in Kikamba. Generally, each group would include a few English speakers, but relying on their role as bridges could have easily turned them into gatekeepers. Two paid Kenyan university students were therefore hired by Infonet for the first phase of the research. Following my request, one male and one female student were hired to facilitate focus group translation accordingly. The choice of having translators of both sexes was conscious, in order to prevent possible hesitation in focus group discussions translated by someone of the opposite sex. The students' role was very

important not only when interacting with farmers, but also to translate, progressively adjust and administer questionnaires.

In the second and third periods of field research, I then hired a male translator, a different person in each period, proficient in both Kikamba and Kiswahili, chosen following the recommendations of the team at Katoloni CBO. In both cases the translator was a member of one of the farmers' groups loosely involved with the organisation, but never of a group directly involved in the research.

4.12 Ethics in the context of this thesis

This research raises complex ethical questions. I have already mentioned some of the challenging aspects of doing field research in partnership, particularly the different agendas and time-frames of all involved stakeholders. Associated with this is an underlying, although unexpressed, belief in the practitioner's world: that the project at stake is delivering something "good", that it certainly might be improved, but always under the understanding of a generally positive framework. This assumption contrasts with the rigour of independent research, which cannot exclude (nor presume in principle) that an initiative might be causing more harm than good.

The very essence of "harm" is in itself hugely problematic, as it cannot be assumed to be universal, just as much as the very concept of ethics cannot be universalised (Madge, 1997). There is however a second equally important layer to this: that of the ethics of conducting research *per se*, and the questioning of the role of the researcher, particularly when interacting with sensitive research participants, such as children (Hay, 1998). Research ethics directly affect power relations between the researcher and the researched (Madge, 1997), and can have wide implications, such as the creation of false assumptions and expectations in the subjects of the research, often deriving directly from lack of clarity and irresponsible behaviour by the researcher (Wilson, 1993).

My initial affiliation as a consultant hired by the implementing organisation provided me with an immediate identification as a powerful stakeholder aligned with the Infonet programme. This was not only clear to information officers, even though I introduced myself to them as an independent researcher, but also to

individual members of the farmers' groups visited in October-November 2010. The affiliation with the Infonet programme and *icipe* was rendered even more obvious by the practical manifestation of the partnership: the fact that we moved around using large – one might say disproportionately – branded 4WD vehicles. Much less obvious to the visited communities was my dual role as consultant and researcher, reflecting on the evaluation exercise, and building unexpected research trajectories as a result. In order to be as transparent as possible, I always took time to introduce myself very clearly on all occasions, stating my academic affiliation and the general goal of my research to all my interviewees. Additionally, at the beginning of every interview or focus group session, I made sure to reiterate my complete intellectual independence from the Infonet programme, while reassuring participants of the confidentiality of the communications. I achieved this objective by avoiding associating the name of an individual with a specific quotation in the analysis and publication of the research results, preferring instead to mention only the name of a group and its location when referring to quotes.

Despite these precautions, the researcher, as well as any development worker, does not operate in a power vacuum (Buskens, 2011), and his/her intent might therefore clash with practical power manifestations such as the chosen means of transportation. Reflecting on that first round of field research, I could not help thinking what would have been my own reaction if a "team of researchers" had arrived at my home with a similar vehicle. Ironically, the high-tech approach to transportation showed its technical limitations on many occasions, as the 4WD car repeatedly got stuck in mud, and once stopped altogether on the way to a field visit. The picture below eloquently captures the contradictions as well as the actual challenges of transportation in rural areas.

Figure 4.4: Biovision/icipe vehicle stuck in mud, October 2010

Learnings and reflections from the first phase inspired me to revisit the importance of negotiating and having as much control as possible on practical manifestations and logistics of the field research, and further convinced me of the advantages of participatory frameworks aiming to reduce disparities among and between research stakeholders. While I had avoided some typical inequalities linked to the presence of a foreign consultant, by making sure that the whole team would be sleeping in the same affordable, basic accommodation, I decided to take this further in organising subsequent rounds of research. In the second round I deliberately chose not to have my own vehicle, instead relying on *matatus* (the local minivans used as mini-buses) and motorcycles as means of transport whenever possible, and avoiding the use of dedicated drivers, which could lead to further distancing me from the rest of the community. This approach was rather efficient and very affordable, yet it resulted in a number of rather unsafe situations, especially as matatus are often driven at dangerous speeds and with up to twice the number of passengers legally permitted in Kenya when in rural areas. As a result, in the third and final round of research, I rented a small car and used it as much as possible to speed up transfers to visit farmers' groups as well as to give free rides to participants, a very welcome courtesy.

Due to the kind of research and the methods employed, consent for participation

was not a problematic issue in the first phase of the research, particularly when interviewing information officers, who were generally very eager to share their experiences and perspectives, in part because they perceived it as part of their duties under the Infonet programme. The relationship with farmers was at least partly mediated through the information officers, who had asked them to be available for visits from the central office. This of course presented a bias in the research, because it limited the access that I had to those who had not been chosen by the information officers. In general, farmers who did attend the meetings, were ready to contribute to the research, arguably also in light of their relationship with the information officers. However, at the beginning of each focus group, interview or questionnaire session, I explained the purpose of the research to the farmers and reminded them that they were free to participate or not. Farmers did agree to join in the proposed activities, apart from a couple of cases whereby one declined to be involved in the questionnaire and left. The intermediation between researcher and "researched" farmers' groups proved challenging at times only during the first round of research. In some cases, my lack of direct communication with farmers' groups prior to visiting them led to misunderstandings about the reasons behind the visit: more than one of the groups assumed they were visited to receive some training, and the sight of a foreign consultant only increased their expectations in this respect. In three circumstances, I decided to skip questionnaire and focus group sessions altogether, and concentrated instead on informal exchanges, as a way to reduce potential tension.

An additional ethical concern regards the sharing of research results with the communities involved. While in principle I agree with the importance of feeding back the results to the communities who participated (Wilson, 1993), my affiliation as a consultant with a research partner forced me in the first period of research to feedback primarily to Infonet-Biovision staff, by way of producing a research report not actively shared (to my knowledge) with the farmers' groups who took part in the study, nor published or posted on the organisation's website. This was a further reason leading me to designing subsequent rounds of research in a much more open, collaborative and participatory way, sharing research objectives as well as results with the local partners it would be conducted with.

4.13 Openness of the research process and technological choices

Throughout the research process, I have attempted to remain loyal to the principles of openness and transparency, considering ICT4D not only as my domain of study, but also in the sense of the practice of my role as a researcher. Whenever making a technological choice, whether relating my tasks as a researcher, or the practical side of field research, I strove to respond to the following criteria:

- – Is it necessary?
- – Is it inclusive and accessible?
- – Is it free and open source?
- – Does it support open standards?

Such considerations might at first appear trivial, but deserve attention for three sets of reasons. First, while an important original promise of ICT4D was its potential for furthering inclusion and accessibility to knowledge, research in ICT4D often involves or takes for granted without problematising, the introduction of new devices, or the assumption that they will become more easily available in the near future. This is typified by research such as the AIR radio, the development of a new device allowing rural Kenyan women to record their comments to a radio programme and relay them wirelessly to a radio station (Sterling *et al.*, 2007). By contrast, my research and the project analysed in this thesis tried systematically to question the adoption of specific technological products, concentrating instead on the functions performed, and on the empowering creative use of what is already available. When the experimentation required the acquisition of ICT tools, the guiding principles were their appropriateness, defined in terms of four key variables: affordability, adaptability to the context of use, energy requirements, and expected durability (Van Stam and Van Oortmerssen, 2010).

Second, the design of many ICT tools ignores the predominant environmental constraints linked to usage in rural areas. Portable equipment is for example often not designed to cope well with dusty or wet environments, and is not compatible with traditional batteries (such as double or triple A ones). Limited

resistance to specific environmental conditions might seem a secondary factor, until one has experienced directly the decay of ICT equipment in African rural areas, where technical assistance and repairs might be not readily available. Another example is the importance of choosing appropriate formats and compression codecs to share video material, in order to guarantee compatibility with most common video player software for all computer operating systems, as well as for mobile devices. Additionally, the concept of durability is linked to the planned obsolescence built into much user electronics and ICT tools. A cautious approach to the introduction of further ICT devices also responds to the increasing awareness of the limits to development of ICTs (Mobbs, 2010), linking environmental concerns about the sustainability of the ICT industry, availability of rare metals and the prospects of peak oil, and its consequences for future expansions of ICT, and ICT4D as a result.

Third, in terms of the licensing of the communication content produced, all video materials produced by the project are released under a Creative Commons license (http://creativecommons.org/) and available to be watched on YouTube, allowing further editing and distribution, provided that original attribution and further open licensing status are ensured. A physical copy of the same videos can be obtained locally from the team who produced them, as well as via the headquarters office of Biovision in Nairobi. This is a central point, as it links with the free and open nature of the content originally provided by Infonet, and with the understanding with the group working for Katoloni CBO: the research objects are not the exclusive domain of the researcher, but are built collectively on the premises of shared ownership. The meaning of openness and its implications in the context of the thesis were extensively explored with research stakeholders whenever appropriate, by discussing possible conflicts and personal advantages linked to this. All interested parties gave permission for the publication of the videos and their further sharing. Applied to this research, Buskens' (2011) criticism of the concept of openness can be exemplified in the double meaning that an open research process entails: for the rural communities involved, and for the researcher. While aware of the personal advantages for the researcher of conducting such research in an open and collaborative way towards online audiences and external "observing" bodies, I still believe in the ultimate

advantages of openness for the sake of research, and therefore, for all stakeholders involved in the research project. On one occasion in August 2011, one of the groups I visited challenged me to explain what the real intentions of my work were, fearing that my goal was to produce videos of farming communities without paying them, and to gain a personal advantage abroad through them. This episode made me realise the fragile nature of relationships in the field, and inspired me to further clarify my position in subsequent occasions. At a personal level, my involvement in an open process documented and shared online increased the visibility of my work and provided additional opportunities to connect with others working on similar issues. Concurrently, this transparency provides opportunities for improved and timely feedback by external observers, ultimately benefiting the quality of the research, and of the practice it is based on. However, I made a conscious effort not to take direct advantage of the day-to-day nature of the empirical work: I chose not to share on the Internet the chronicle of the research activities in an attempt not to influence the visibility of the initiative and the communication choices and strategies of the local team.

Just as importantly, I made a conscious decision only to use Free, Libre and Open Source Software (FLOSS) during the research process, and to make direct contributions to the improvement of such applications whenever encountering problems, by submitting bug reports or help with documentation efforts. This applies not only to the tools used in the process of my dissertation writing, completely written with the LibreOffice word processor, Zotero academic reference archival for Firefox and by using the TAMS Analyzer qualitative analysis, but also for the software used in content production during field research. As it will be mentioned in more detail in Chapters 5 and 7, I have for example contributed with bug reporting and suggestions for the improvement of OpenShot (http://openshot.org/), the FLOSS Linux video-editing application I used more extensively during the course of the research. This decision is relevant not only in terms of reducing the cost of conducting research, but more importantly as it contributes to the emergence and strengthening of research commons, both in terms of research data and tools with which to analyse it. While much debate on the role of free and open source software within ICT4D might be criticised for its ideological stance (van Reijswoud and De Jager, 2008), the

development of open applications for the international research community is a valuable contribution to the democratisation of research and knowledge. The proliferation of free research tools and of accurate documentation of the ways in which they can be used by researchers worldwide is a fascinating development which could potentially reduce the licensing fees that universities pay for software and increase the resources available to researchers on the ground.

4.14 Hardware and software used in the project

The four information officers participating in the project were each trained to use and subsequently provided with a portable, compact digital cameras able to capture high definition videos. Given the experimental nature of the project, two models of cameras were bought and tested: Sony DSC-W570 (http://www.sony.co.uk/product/dsc-w-series/dsc-w570) and Kodak ZX5 (http://support.en.kodak.com/app/answers/detail/a_id/31388/kw/zx5). The decision to choose this particular type of "mobile device" was due to the good performance achieved by both type of cameras: able to take higher quality videos compared to most smartphones, and being priced much more competitively than any good quality camera phone available in Kenya. Additionally, none of the information officers or of the farmers involved in targeted groups owned phones with suitable cameras, so there was no reason to prefer the adoption of smartphones. The Sony camera was chosen because it is distributed officially in Kenya and is therefore covered by local warranty and support. The Kodak camera, although imported, was chosen because of its advertised resistance to water, dust and shocks, all desirable qualities when working in rural environments. At the time of procurement, the price paid for the four cameras was £430 – approximately £107.50 per camera. Cameras were fitted with 8GB and 16GB Secure Digital High Capacity (SDHC) cards, able to record over two hours worth of videos before offloading to a computer for editing. Every information officer was also given an 8GB Universal Serial Bus (USB) flash drive to store finished videos and to play them and potentially share them on other computers.

In order to keep the set-up simple and to enhance portability, tripods for the cameras were initially not procured. In preparation for the final round of research, however, participants requested that they be provided with some tripods to assist more formal video shooting sessions. Two Velbon DF-40 tripods

(http://www.velbon.biz/product/cx-df/df.html) were therefore procured at £25 each. Information officers using the Sony camera also requested an additional battery pack, to increase the flexibility in use.

As for the farmer information centre, it was equipped with two desktop computers, one mounting an Intel Pentium 4 processor, the other a Core 2 Duo processor. Each were equipped with 2GB of Random Access Memory (RAM) and with the popular Ubuntu Linux distribution (http://www.ubuntu.com/), in one case in version 10.10, the other 11.04. The decision to install an open-source operating system was deliberate, and motivated primarily by the availability of a range of free video-editing tools much more comprehensive than any free software available for Microsoft Windows. In addition to the afore-mentioned OpenShot, for example, Devede (http://www.rastersoft.com/programas/devede.html) was used to author DVDs with selections of the videos produced. Ubuntu was chosen for two reasons: not only is it the most widely adopted version of Linux in Kenya, but it also happened to be already installed on the laptops available to information officers, thus reducing their learning curve in using it. While both computers were initially considered sufficiently powerful for video editing, following the initial training the team decided to concentrate on using the one powered by Core 2 Duo processor, as the other one would not provide smooth playback of clips during editing.

4.15 Conclusion

This chapter explained the reasoning behind the methodological choices for the field research, presenting the theoretical context behind them and detailed account of their relative contributions. The field research comprised three sessions employing a mix of quantitative and qualitative methods. A central focus of the research project was the active experimentation of the use of video as participatory content production for development, as a response to the limited suitability of other more text-centric content formats used in ICT4D. The research methods employed reflected the main areas of enquiry emerging from the conceptual framework: the rural appropriation of audiovisual ICTs in agricultural development; a critique of the mobile phone – centric discourses of ICT4D; the connection between a smallholder's view of development and the role of

technology in ICT4D. The chapter also explored the tensions and ethical challenges between conducting academic research and collaborating with non-academic institutions, particularly practitioner organisations such as Biovision. This chapter, together with Chapter 3 introducing the Kenyan context and details of the case study, sets the stage for the analytical chapters ahead. Subsequent chapters will be analysing the main themes that emerged from the field research.

Chapter 5 – Participatory video practices and their role in farmer-led extension

5.1 Introduction

This chapter explores the information officers' experiences with collaboratively learning the basics of video production and experimenting using it within their work routines. By chronicling two rounds of empirical work with video facilitated by the researcher in 2011 and 2012, it analyses the experiment according to five key aspects: the changes in expectations and the perceived meaning and functions of video; the language choices made by information officers; the topics covered by the videos produced and the perceived meaning of innovation; the emergence of new local voices and the relevance of the content as well as of the process in the context of complementary initiatives in the Kenyan media. The chapter begins by explaining the choice of medium and format for the project. It then documents the process as well as the range of content produced throughout the two periods of field research. In the conclusion, it assesses the rhetoric of free user-generated content and the necessary factors for the successful establishment of an autonomous, self-sustaining participatory video unit.

5.2 The desire for visual content

While interviewing members of the Infonet-Biovision network of information officers in 2010, I progressively learned about the limitations and the challenges deriving from the technological tools as well as the digital content provided to them. For example, information officers were consistently reporting their limited confidence with the tools at their disposal; the technical limits of the equipment they used, such as the small screen, poor audio performance and poor battery life of the laptops provided to them; and their consequent need for further training. Some of these challenges formed the initial reflections for my more extensive analysis of technical decisions within ICT4D initiatives, at the core of Chapter 7 ahead. However, additional challenges started to become more evident. For example, while ICTs increase information officers' direct access to a wealth of information resources, they do not automatically improve the effective sharing of information, and they require local testing, adaptation and appropriation. During

the course of my initial visits to information officers and to the community groups they served, the lack of visual materials was mentioned often. When asking information officers about the shortcomings of the existing tools at their disposal, the paucity of visual prompts was recurrently cited as problematic, as this extract of a conversation with an information officer in Western Kenya well synthesises:

> *"Content in other formats would be very useful. For example, if you wanted to encourage people to work hard, if you had a video of a successful group in the laptop, then they would feel they'd need to work harder"* (Officer 3, male, Western Kenya).

The interest in drawings, rarely utilised in the Infonet-Biovision platform, emerged out of an interview with an agent in Central Province:

> *"The drawings have really helped in understanding. (...) If only they could be more step-by-step"* (Officer 5, female, Central Kenya).

However, it was the following telling anecdote that pointed me to the potential of organising a participatory video programme. When I first interviewed information officers at Katoloni CBO in November 2010, they explained that during a joint training workshop in September 2010, one of their colleagues visiting from the Kenyan Network for Dissemination of Agricultural Technologies (KENDAT), spontaneously began to film the making of an indigenous egg incubator with his digital camera. He then shared an unedited, rough cut of the footage with the team at Katoloni CBO Farmer Information Hub. The video immediately became popular among farmers visiting the centre, due to its simplicity and the immediate applicability of the content. This sparked further interest among local information officers, who identified an opportunity to test using video in their work. Similarly, field staff from the Ministry of Agriculture in Kilifi, Coast Province, identified the sharing of agricultural videos as a promising way forward for the Infonet-Biovision platform. During a group interview, they identified farmer-led innovations as an overlooked area which could benefit from a video programme:

> *"There are many innovations from farmers that we do not know yet. Some of them are not even captured by our research scientists. It would be great if we could collect them and catalogue them with videos that we can share during our activities"* (Information officer 15, November 2010).

5.3 The project in practice

Empirical research in the field took place during two periods: July-September 2011 and March-April 2012. What follows is a brief timeline of the main aspects of the training:

First week

- All new software and hardware was installed in preparation for the actual beginning of the training the following week.
- Preliminary meetings were held with staff of Katoloni CBO to sort out logistical details

Second week

- The first basic video making course takes place. Officers produce their initial, very basic short videos. For example, officers make short movies about each other, including answering the question: "if I were the President".
- The initial team learned the basics of video editing with a very simplified software, (a proprietary software included with the Kodak cameras used in the project), in order to learn about cut, timeline, drag and drop, adding a title and credits.
- At the end of the basic training, information officers are each assigned a digital camera they can keep.

From the third week

- Core information officers begin learning more detailed video-editing software.
- Having realised that the available video-editing instruction manuals are not very clear and appropriate for the team, I start developing "screencasts" of the main functionalities of OpenShot: videos detailing the necessary steps to complete each key action with the software, complete with my voice-over, forming an initial library of video tutorial for the team.

From the fourth week

- Some information officers begin experimenting more elaborate video-editing techniques, such as transition, cut-aways and additional sound tracks.
- Information officers realise the risks of making a movie just about "a group", without a specific agenda or a script.
- Information officers begin experimenting with more elaborate script-making, as well as discussing what to do: what stories to cover, what makes sense.

Eight week

- At the end of the period, information officers experiment with involving a farmers' group in the critiquing of a previously made video and in participating coming up with a script to tell their own story. Challenging but very rewarding.

Figure 5.1: Information officers jointly designing the script for an upcoming video, July 2011

Second round, March-April 2012:

- At first, it seems the team has forgotten quite a few things. From my diary:

  "Video editing: it feels like we're starting again from scratch – at

times. I know very well it's not true, but at times that's how it feels like..." (from my diary, March 7th 2012)

- While in the first period, no one had a tripod, in order to reduce the amount of equipment to be carried around, information officers begin using one to improve picture quality.
- Information officers decided to reduce the number of videos they produce, concentrating on more successful stories, and to make videos longer, more detailed and fully subtitled.

5.4 Other sources of agricultural video content in context

The importance of video in communication for agricultural development is not a new phenomenon, as explored in Chapter 2. While it relates to recent ICT4D debates because of the extreme reduction in the cost of recording, editing and distribution equipment fuelled by digital media, it has a much longer tradition, both in traditional, top-down mass communication for development literature and in participatory research debates (for example Hornik, 1988; Mody, 2008). Generalist approaches to video and television production and distribution are an established reality in Kenya, where the themes around rural development have in recent years received particular attention in television series. The most famous example is "Makutano Junction" (DFID, 2010), a series touching on key topics affecting the lives of rural Kenyans, including health, agriculture, business and education, using a combination of old and new media (including text messaging and printed brochures) to allow viewers to follow up on a specific topic after the television broadcast. In March 2012, at the time of my final round of research, the same production house, Mediae, began broadcasting the first season of "Shamba Shape-Up" (http://www.shambashapeup.com/), a reality TV show centred specifically around smallholders' rural agriculture. Shamba Shape-Up represents a motivational, large-scale effort, bringing together a host of partners from the private sector, including multinationals involved in seed production as well as fertiliser producers.

Video is used by KARI, mainly for institutional purposes – to summarise the activities of a funded development programme, targeting project's stakeholders more than actual farmers. During my research, I came across a few videos by

KARI who would have been useful for the team, but were only available online. I downloaded them and shared them with the information officers, although it was ironic that they would not have access to these videos otherwise, despite being based within one of the most prominent KARI research stations.

Similarly, the Ministry of Agriculture's Agriculture Information Resource Centre (AIRC, http://site.airc.go.ke/) – once a prolific producer of Kenyan agricultural extension videos – is no longer in a position autonomously to produce its own educational material. During a visit to the production facility in July 2011, an officer explained to me that due to budget cuts, the video unit, still operating as a traditional, expensive TV crew, using old technologies, such as heavy professional cameras involving high costs of production, was only able to document the activities and the official visits of the Minister of Agriculture for Kenyan media. In addition to this, they now provide their technical services to clients interested in producing agricultural video content. For example, at the time of my visit, the unit was producing a video promoting the adoption of greenhouses for growing tomatoes, funded by the multinational corporation Syngenta (see Figure 5.2).

Figure 5.2: Video by AIRC/Syngenta promoting greenhouse adoption

The video was released under the AIRC and published on their YouTube channel (http://www.youtube.com/watch?v=obsLwew-NT0), despite bearing the views of the funder, thus implying a tension between the content to be distributed and the sources it relies on. Aside from considerations of content, state-based extension officers would rarely have access to the videos produced by the AIRC for dissemination in their contact with farmers' groups, nor do they have access to equipment to efficiently screen them.

An important source of inspiration for my video programme was the work carried out by Kenyan International NGO ALIN. At the time of conducting my field research, Alin had already opened 10 *Maarifa* (Knowledge in Kiswahili) Centres across Kenya, similar in scope to the Farmer Information Hub run by Katoloni Mission CBO, including one in Mutomo, Eastern Kenya, active since 2007. The organisation focuses on supporting information officers (they call them "infomediaries") in their work of dissemination and simplification of information resources (Mugo, 2012). ALIN had experimented with the use of video to document the activities of some of the resourceful farmers' groups in its network, including in the Mutomo area, using low-cost cameras similar to the ones used for this project. When I visited ALIN's staff to learn about their work in 2011, they shared useful insights:

> *"The main problem with these cameras is with sound. You will have problems with cutting off distortion caused by wind. Also, for dissemination we use iPods mini: farmers come to our centres and use the devices to watch the videos"* (Personal communication with Susan Mwangi, ALIN, July 2011).

ALIN provided me with a copy of most of their videos, normally only available to visitors of their resource centres and online (for example at http://www.youtube.com/user/ALINmedia or on http://blip.tv/tvalin). I used their videos during brainstorming sessions with the team at Katoloni Mission CBO, but only after two weeks from the start of the programme, because I first wanted them to start experimenting with video-making without the influence of any strong pre-existent model. I then also screened some of the same videos to farmers' groups during an initial round of interviews and focus groups in order to explore their initial reactions, choosing the ones that information officers had

considered more relevant to the local context, either because of the use of local languages or because they portrayed challenges and appropriate solutions adopted by groups from the same geographical area.

Videos from ALIN were generally appreciated by information officers, who enjoyed the relevance of some of them, particularly the ones from Eastern Kenya chronicling the farmers' responses to droughts, appropriate and relevant to the experiences of farmers' groups in the drier areas served by Katoloni CBO. Had I not acted as a bridge and supplied the team with a copy of these videos, they would not have had any opportunity to access them, short of visiting the community centres managed by ALIN. Despite the online availability of the videos, unlocking offline access to the existing content remains a major issue, one that could be addressed by complementing digital media release with physical distribution networks.

5.5 The meaning of video

Informed by participatory video tradition spanning from the work of Fraser (1987) to Mistry and Berardi (2012) as well as by work on open content creation pioneered by Tacchi (2012), I set up a training programme aiming at providing participants with basic video shooting and production skills, with the intention of facilitating the creation of an autonomous participatory video production unit. This meant that the goal of the researcher as participant was not to facilitate aggregate video production on behalf of a community. Rather, it was to stimulate and support the collective learning of basic media production skills that the team could use not only during the period of the research, but especially beyond the duration of the project, in independent and autonomous ways. With "autonomous", I envisioned that future production of additional videos after the end of the project would not rely on the presence of an external researcher or technician, but could be directly managed by the local team of information officers at Katoloni CBO. This approach is similar to the concept of the Indian "community video units" (High *et al.*, 2012, p. 38). This plan resonated well with Biovision's understanding of its communicative gaps, as well as its limited human and financial resources for exploring this area with a more structured, top-down approach.

In my original funding proposal to the Royal Geographical Society (available in full in Appendix G), I wrote:

> "The project will investigate the effectiveness and implication of using low-cost digital participatory video in documenting, diffusing and promoting farmer-led appropriate agricultural innovations (...)".

The words I chose at the time highlighted my specific interest and focus on the creation and dissemination of video to be used by information officers in their work routines. However, the reality proved rather different, especially because of my progressively deeper understanding of the needs, working routines and expectations of the local partners. While my direct focus did not change throughout the process, both the team at Katoloni Mission CBO and I gradually became aware of the wider meaning of the use of video.

By the time I joined the group to start working on the video project in July 2011, they had already increased their range of motivations and expectations for taking the work forward. The most obvious reason for producing their own videos was to extend their experience of sharing the limited amount of documentation with some of the communities they worked with:

> *"I borrowed three videos from here and i went to one primary school around. One was about passion [fruit] growing, indigenous incubator, rearing of chicken. When I went to the school the pupils and the parents were impressed – I never knew they could be so convinced in the way they were by video. That was October last year, now they're growing passion – something I never knew they were serious about – and some adopted the indigenous incubator. And they've started to add value to mangoes, and they're keeping chicken as a business. They never did that before. They're now very serious, they call me all of the time and ask me 'when are you bringing more?' And that opened my eyes, I saw there was an untapped potential for video coverage education"* (Patrick, July 2011).

Similarly, the first experiences the team had with professionally produced videos suggested their role as "ice breakers" during meetings with farmers' groups and their increased accessibility compared to other forms of communication:

> *"[Showing] video, we've been doing it, but just with videos from AIRC in the office, and what I have learned is that whenever we screen them, people are learning. When we talk about the pictures,*

people are capturing the content they see better, they can't forget easily in comparison to the theory that we do here. Videos stick in their mind. As a result of the literacy level, some don't understand well, some forget easily. Afterwards they engage in questions and answers, and this is working" (John, July 2011).

Video is also seen by information officers as a way to document and archive their work with groups:

"It's a way of documenting what we are doing, and we can also get other resources from other people. Just by seeing what they're doing, and they also see what we are doing" (Regina, July 2011).

"It would be very important to make us recall the particular activities that we have done previously" (Margaret, July 2011).

However, participants quickly became interested in a range of other possible meanings of video for the organisation, frequently hinting at the role played by video in creating marketing opportunities:

"I think video is a way to market our organisation, because people from other countries will see what our organisation is doing" (Christabel, July 2011).

The issue of the promotional use by Katoloni CBO of the videos produced creates an important shift in the perceived power of video: it is no longer exclusively a tool to improve the effectiveness of extension work, but instead it becomes a marketing and potentially a fundraising instrument. In the literature on participatory video, marketing is only rarely taken in consideration (N. Lunch and Lunch, 2006, p. 13), and in any case with a different meaning: the promotion of ideas from a previously voiceless group. In the case of Katoloni CBO instead participatory video provides an opportunity to create new channels to promote the work of the farmers' groups:

"Video can do marketing. After people see what you've already done, for example with local poultry keeping, and there are some hotels – and you can market your products using video" (Regina, July 2011).

These expectations fit with the ongoing tension in PV between the process of producing a video and the focus on the content/output of the process, as I explored in Chapter 2. In the case of Katoloni CBO, the interest of the team of information officers as well as of the manager is mostly on the final outcome. In addition to this, Katoloni CBO has a peculiar vision on the development of the

groups it works with, based on active competition between them:

> *"I think this programme featuring videos from other groups, will be able to be motivating groups, and keep that atmosphere of competition. In a way or another, most of the groups that are serious will be able to improve in their activities. Seeing other groups doing something somewhere, this will be able to motivate them and encourage them in working harder. So at grassroots level you might find that groups are serious and taking the videos they might see seriously – this might be able to help them work harder in their project and improve their livelihoods."* (John, September 2011).

The new skills progressively learned by information officers also open up new opportunities for collaboration with partners, highlighting weaknesses that could be resolved by improving video-based documentation:

> *"At KARI, they are doing a lot of research, but they don't document it in videos – like soya, terracing, soil conservation...new ways to make terraces to first conserve water. And also natural incubator...There is a lot that is been done by farmers, but it is not documented by KARI, so we should partner with them and do nice video coverage"* (Patrick, August 2011).

The case of KARI is particularly interesting, as it is an organisation devoted to research, and yet only occasionally disseminating its findings using video, primarily as an attempt to report on international collaborative research projects, and not sufficiently targeting the rural communities surrounding its research centres with its video productions. The Katoloni CBO team's proximity to KARI Katumani creates an unexpected opportunity to use KARI as a "playground" to test some of the team's ideas on the potential of video in their work. It also quickly generated expectations and practical requests from KARI for the team to document all of their ongoing projects: a challenging opportunity, and yet a sign of the perceived need for low-cost video-making across the region.

Not all of the functionalities mentioned by Katoloni CBO information officers ended up working over the research periods. However, all of them highlight opportunities – whether potential or tangible – that would never be possible were the team simply to have adopted agriculture videos produced elsewhere. The localisation of production, combined with the new skills acquired by information officers, generates a whole new set of relationships between the team and the other stakeholders with whom it works.

5.6 Language choices in the videos

Videos can reduce the distance between a speaker and her or his audience, limiting the need for an intermediary, a bearer of a message. They also provide more direct ways to communicate: using storytelling and falling into traditions of oral testimony, which have historically been stronger in rural societies. The visual language breaks barriers that would be normally untouched by written communication, by combining a message with the visual context and supporting the enhancing and reaffirming of the points being made. Video also documents, clarifies messages by providing tangible visual cues and can provide visual confirmation of the existence of a community or practice – although appearances can be deceptive. However, video as a language does not automatically solve the problem of what might be the most appropriate languages to be used, particularly in multi-linguistic environments such as Kenya. Kikamba is the most widely spoken language in the rural areas around Machakos, even though Kiswahili is also very common, while English is used in the area by a minority of people. The issue of appropriate languages was revisited on multiple occasions during the field research. For instance, during the first round of research, groups of farmers were polled across the country, having the choice between a questionnaire in English or in Kiswahili. While Kiswahili was much more common than English on that occasion – 160 took the questionnaire in Kiswahili, while only 53 took it in English – participants were often not at ease in completing the questionnaire even in Kiswahili, either for their limited command of written Kiswahili, or because of their preference for vernacular languages, such as Kikamba in Eastern Province, Dholuo in Western Kenya or Kigiryama in the North Coast. As a result, while facilitating the initial planning for the video programme and in the subsequent first round of training, I asked the participating information officers what language they would consider more appropriate to use in the production of videos. All participants were comfortable English speakers, but aware of the limited use of producing videos in English. The choice between Kikamba and Kiswahili was however not easy, and the team could rarely reach consensus when discussing about it during group interviews. One of the officers motivated his preference by explaining it this way:

> *"Let's start with Kikamba, it will be easier for our farmers to start following. We might consider Kiswahili at a later stage, when*

farmers are already used to our videos" (Anthony, July 2011).

Others were less convinced, most notably Ruth:

> *"Some of the communities I work with are mixed, and the majority of farmers are not local and would not speak Kikamba to each other. They would prefer Kiswahili"* (Ruth, August 2011).

One of the main reasons at the base of exploring the production of local visual content in the research project emerged through feedback received from both information officers and farmers groups visited during the first phase of field research in 2010. Both categories complained about the lack of content in local languages and directly accessible to local groups. Visuals open up a new communicational dimension, increasing opportunities for dialogue and comprehension independently of the degree of literacy. During the initial series of interviews and focus groups held with farmers' groups in the area, only in one case could a group remember having been exposed to a video on agricultural issues in the vernacular language, but could not remember any details of how they had gained access. After having produced a first set of videos by August 2011, it seemed therefore appropriate to explore further the farmers' preferences for language to be used in future videos. In order to stimulate comparisons, three videos were screened: two shot by staff working at the CBO, alongside one produced in Kiswahili by another organisation, Arid Lands Information Network (ALIN), working in similar areas of agricultural development. Following the screening, respondents were asked for their language preference in case additional videos were to be produced.

Table 5.1: Language preferences for videos

CBO Meeting	Respondents	Kikamba	Kiswahili	English
August 18th 2011 - leaders	39	20 (51%)	16 (41%)	4 (8%)
August 24th – members of groups in Ngelani	25	20 (80%)	3 (12%)	2 (8%)

As shown in Table 5.1 above, participants to the first meeting revealed a slight preference for subsequent videos to be produced in Kikamba, but were at the same time open to the production of videos in Kiswahili. As for the participants

who attended the second meeting in Ngelani (see Figure 5.3), their preference was strongly in favour for videos in Kikamba. While the number of respondents was in both cases quite low, this result highlights a trade-off in between the reduced potential costs of producing videos in Kiswahili and using them in a range of contexts across the country, and the reaction of the actual target audiences.

The main question is whether videos are targeted primarily at members of the first group, or of the second. In case they are to be particularly aimed at farmers traditionally left out of other streams of communication, and therefore to complement the range of information sources available to farmers independently, without external mediation, then the preference expressed by users in the second screening in Ngelani would be more directly relevant. Additionally, while the polled participants preferring Kiswahili can be assumed to understand and speak Kikamba at least to a certain extent, the opposite does not necessarily hold true: several respondents in Ngelani required additional support from information officers to translate some of the questionnaire into Kikamba in order to complete it. While the use of visuals can facilitate communication beyond literal language divides, it can not completely work when the language used is unknown to the vast majority of people watching. In two occasions during focus group discussions I played a video mainly shot in English, to establish participants' level of understanding of English and their confidence with it. While focus group participants followed the images with interest, the limited level of engagement in the conversation which followed suggested that their understanding and confidence in what they had just watched was not on par with similar screenings of videos in Kikamba.

Figure 5.3: Farmers in Ngelani, Machakos, attend first video screening, August 2011

5.7 Translations and subtitling

When I began designing the programme, I did not take into consideration the immediate need to add English subtitles to the videos that information officers would be producing, and therefore chose a video-editing software solution not particularly optimised for this need. However, the Infonet-Biovision team working in the Nairobi office suggested that subtitling should be a priority in order to increase the visibility and usability of the videos beyond the initial area where the project was taking place. Unfortunately, Openshot, the Free and Open Source Software utilised for video-editing, is hampered by a poor user interface for entering and editing subtitles. As Figure 5.4 shows, when attempting to add subtitles, users are prompted with a rather complex set of preferences, due to the fact that subtitles are conceived just as one possible form of "titles". As a result of this limitation, users are required to specify the type of "title", the font colour and its level of transparency for every new sentence they would like to enter. Additionally, while OpenShot allows creative users with extensive computer skills to generate complicated 3D titles using external softwares and plugins, it does not provide basic management of simple features, such as an option to easily improve contrast and readability through a dark banner on which to display subtitles; the easy import of a subtitle typed in a different software; or an easy-to-create

subtitle track allowing users to quickly add translated dialogue without having to re-enter basic settings for each new sentence.
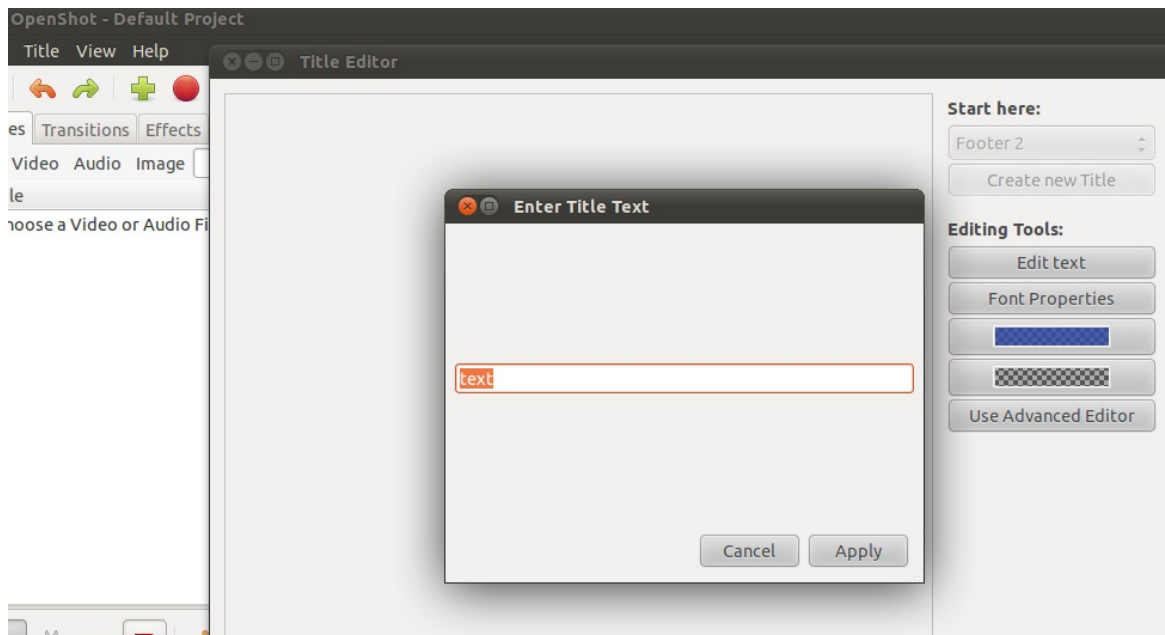
Figure 5.4: Screenshot of OpenShot's titling and subtitling function

These limitations were only discovered during the course of the project, and I occasionally contributed my experiences with the community of users and developers of the software, in one case suggesting alternative designs that could increase the usability and flexibility of the software and make it more competitive with commercial alternatives. As further discussed in Chapter 7 of this thesis, while the open source nature of the software provides an opportunity directly to interact with its lead programmers, this does not however necessarily guarantee the development of a solution and does not make up for having the required feature built in from the onset. Moreover, this scenario also highlights the key importance of using software in the first instance that delivers on as many of the likely needs of a project as possible, so that when external decisions force a change this can be accommodated relatively easily.

Despite these challenges, information officers progressively learned to add subtitles to the videos they were producing: a skill they needed to practice also to add titles, credits and names of the people interviewed in their productions. Subtitling however proved particularly difficult for one main additional reason:

being a confident English speaker does not imply the ability to produce quick and straightforward translations from another language into English. Often information officers were rather hesitant when finalising English subtitles, both in terms of the spelling of English words they rarely used in writing and because of the synthesis required during subtitling of a video, selecting the essential words to describe a concept. During July-September 2011, I assigned the translation of the first batch of videos to my paid translator, to limit the number of tasks that information officers would need to focus on. However, at the beginning of the final period of research in 2012 the local team jointly decided to handle translations, as a way to explore how they would be able to become autonomous and sustainable in future production. As a result of the complexity of the task and of the difficulties experienced by the team, subtitling became very time-consuming, reducing the amount of time available for the production of further videos. In between translation, synthesis and application of a layer of subtitles, on a few occasions this doubled the time required for the editing of the videos, already affected by the frequent power outages experienced at the Farmers' Hub.

The paradox of this activity is that it also ended up subtracting precious time from conducting outreach activities that would have increased the visibility of the videos produced to the original intended target audience: the farmers groups part of Katoloni CBO. The translation of the videos into English responded to other priorities: the potential sharing of the material produced within the wider Infonet network, starting with the team at the headquarters in Nairobi; as well as the use of the videos by Katoloni CBO and partners as a way to promote the featured organisations and individuals both nationally and – especially – internationally. By sharing the videos on the Internet, it was hoped that they would contribute to raising the profile of the organisation, or to inspire collaboration and funding opportunities. Information officers were persuaded of this new use of their videos, particularly after discussing with farmers following the screening of some of the initial videos. This comment by John was typical of the conversations held with the team in 2012:

> *"I perceive out of comments from farmers [that videos can be used] as a way to promote what activities Katoloni groups are doing, and this can draw the attention of people who might be able to fund some of these activities. For example, if a particular donor*

out there gets some information in a blog, a website or a video of a group which is doing really well, this could be an added mark. Someone came along in our office – from JICA [Japan International Cooperation Agency] – was very interested in what we are doing, we gave them the website information and links about us, it's a way to promote some of the activities that are factored in the videos" (John, March 2012).

Proponents of the use of professionally shot videos in agricultural development mention the reduced usability of "low-quality" alternatives produced in local languages without a precise *a priori* script as a key reason limiting scalability. For example, Van Mele (2010) maintains that such videos are harder to translate, and therefore do not scale well compared to more structured approaches, such as the zoom-in-zoom-out (ZIZO) technique (Van Mele, 2010). Van Mele's claim is based on the assumption that a video on a specific innovation should be produced once and then translated into all relevant languages for regional distribution. This assumption does not however take into sufficient consideration the importance of documenting the diversity of indigenous innovation and the resilience and creativity of local farmers creating context-specific solutions (Waters-Bayer *et al.*, 2006). While a video on rice para-boiling, the example referred to by Van Mele, might have universal application within West Africa and therefore justify the high costs associated with professional video productions, coverage and local sharing of multiple other innovations would not be viable if relying only on professionally made videos. As a result, the two types of video productions coexist, bringing different, complementary benefits.

Based on the empirical research carried out as part of this thesis, the role of a translator might however be better suited to a third party, as it requires additional competences to video-making, as well as advanced literacy in the language chosen for translation. In this respect, proponents of ZIZO rightly indicate that pre-producing a very detailed script reduces the uncertainties around recording a video and its future translations. In the case of Katoloni CBO, even when a detailed storyboard was prepared ahead of producing a video, it rarely was followed in its entirety, as meeting with the farmer or the group to be interviewed resulted in sharing of further indigenous knowledge which information officers wanted to capture. Assigning translation and subtitling

duties to either a professional translator or a staff member in charge of media and communication at headquarters might prove effective, bringing together the need for aggregating content produced by different nodes of a network, translating it, uploading on the Internet and arranging wider distribution. This was suggested to Biovision in my final technical report to in June 2012 (part of the report is available as Appendix M).

Figure 5.5: Screenshot of mango grafting video on YouTube

Two of the more complex videos produced during March-April 2012 by the information officers, including the one in Figure 5.5 above, were published on Biovision's YouTube channel (http://www.youtube.com/user/Infonetbiovision), and received quite a bit of visibility on the Internet, totalling 848 and 1,120 views respectively by the beginning of May 2013. These numbers tells us very little about the type of viewing as well as the type of demographics reached, other than the countries where the videos were watched from.

Table 5.2: YouTube Analytics of a video by Katoloni CBO

Country of the viewer	Number of views	Estimated minutes watched	Average view duration (min)
United States	167	524	3:43
Kenya	155	566	4:23
United Kingdom	74	276	4:19
India	68	91	1:34
Saudi Arabia	58	102	1:58
United Arab Emirates	25	47	2:47
Canada	20	93	5:12
Germany	20	16	1:10
Philippines	18	84	4:40

Certainly, they do not provide any useful information on the access and fruition of the content by the intended original audience of farmers' groups in the Machakos area, accessing the Internet prevalently at low speed in Internet cafés and only occasionally via pay-as-you-go mobiles, with no incentives to watch Internet-streamed content. Quantitative evidence of the actual fruition of the produced content beyond digital networks is much more complicated, as it is hard to estimate the average number of people watching the video per each of the copies distributed, in addition to the public screenings organised by information officers either at the organisation's office spaces or during their ongoing programme of visits. The challenge of new voices does not end the moment in which they are captured – rather, their prolonged challenge is to ensure that the new captured voices find an audience and a visibility (Couldry, 2009; Tacchi, 2012).

5.8 Content, innovation and the emergence of new voices

I made a conscious decision to avoid analysing the content of the videos produced by the information officers myself. Instead, I preferred that the team sought feedback from group members of the CBO and progressively shifted their priorities and choice of topics as a result. In other words, the analysis of the videos was to be done by the participants rather than the researcher (Underwood and Jabre, 2003). My personal judgement would have been almost irrelevant for

at least two reasons: my limited technical knowledge of the topics covered in the videos produced and my relatively extensive video competence and therefore typical expectations in terms of style, narration and quality of the shots. Despite not making any decision on style and content, as a participatory researcher I still had a strong influence on the team of information officers by sharing some of my own competences and by eventually screening a selection of agricultural videos from other sources as examples to inspire them following the first two weeks of experiments with making initial videos. Aside from the introductory videos about themselves, all subsequent videos contributed to re-defining the concept of "innovation" as embraced and appropriated by the team. What is actually innovative in the topics portrayed by the team? Information officers produced three types of videos as part of the project:

- videos inspired by their proximity to KARI, showcasing research projects and facilities at the research institute, such as the one about their meteorological service, included in the first DVD;
- videos documenting the main activities of some of the groups they work with, for instance the one about Masaani Self Help Group, active in maintaining a tree nursery (included in the first DVD);
- videos about success stories of individual farmers from the Machakos area, such as one featuring a successful mango grafting farmer (included in the second DVD).

Table 5.3: Summary of all videos produced during field research

Type of video	Numbers produced
Introductory/autobiographical	4
About activities at KARI	4
About local farmers' groups	6
Individual successful farmers	3
Other videos	1
Total number of videos completed	18
Shot but not edited	5

5.9 Making videos as a new form of learning and reward

The active production of videos by information officers marks a profound shift from all previous uses of ICTs in Biovision's strategy: the team at Katoloni CBO is for the first time leading the collaborative creation of new content, with the goal of diversifying and enhancing the training materials they use with new, locally relevant visual products. Previously, information officers working in the team had gained respect and visibility in their communities due to their access to and use of ICT tools such as OLPC laptops fitted with information on organic farming. They were seen as important people by the local communities because of the highly recognisable green laptop they would bring to meetings. Their local appropriation of the tool had meant at times finding ways to integrate it in their teaching routine, for example by using it to share pictures of specific crops or plant diseases available in their offline database, or by playing a podcast in Kiswahili on organic farming during group meetings. In other occasions, they ended up finding new, unexpected uses for the laptop, such as using it to teach young children basic typing skills, as an information officer in Kisii, Western Kenya, revealed during an interview with me in 2010. However, their involvement with the technology was at the time essentially as one-way distributors of information: relaying content aggregated and edited by others elsewhere. ICTs were only partially supporting their role of educators: providing new sources, but not allowing them to use their unique expertise and perspective as infomediaries to capture, document and share the multiple local sources of indigenous knowledge and creativity they encountered through their work. Extension officers' actual role linked to their use of ICTs is rarely explored in the literature: the main references are to their limited readiness to use ICTs (Oladele, 2011) and to the persisting gaps between extension and adoption of agricultural innovation despite the use of ICTs in extension (Sulaiman V *et al.*, 2012). My research with the team at Katoloni CBO however highlights the emergence of a more nuanced set of pedagogical skills linked with their creative use of ICTs. While the "traditional" approach of the Infonet-Biovision information officers revolved around accessing the Infonet database on the OLPC, video-making provides new opportunities to learn collaboratively: not only about making videos, but especially about the range of skills involved in telling a story visually, including the need for asking specific and extensive questions to an interviewee farmer in order to capture not just the story

of her success, but also the reasons and the practices behind that success. Making a video about a farmer's experience with drip irrigation, for example, becomes a new opportunity for a team of information officers to learn more about the topic directly from a valuable, local source, to reflect on it and to use their own voices to synthesise the story into one of their own, for the benefit of other farmers and groups who will access it during screenings or online. It is not just the voice of the farmer or group portrayed to become accessible and amplified, but also the voice of the new video-makers, choosing the stories to focus on and the interviews to conduct to inspire their communities. Margaret's words at the end of the first phase of the video project are particularly striking as they hint at the importance of using video in her relationship with farmers and groups alike:

> *"To me I never thought one day I would have held a camera, not even a video camera, and went around with it, taking pictures and videos of my groups. That's really wonderful. (...). Now work has been made easy. If it is a group that we have filmed, we can go back and see what is the current situation, and will be able to see what they have learned. We have became like "tourists". We find ourselves first carrying around a laptop, then going around with a camera! This is something that is really encouraging for our farmers"* (Margaret, September 2011).

5.10 Time constraints, workloads, financial sustainability

This section examines the costs, the key resources and the financial sustainability of engaging farmers directly in the co-production of visual documentation to be used in trainings.

> *"It was a tough journey, one month, but we have achieved a lot, experienced a lot. Video needs patience, it involves a lot of planning, transport, thinking, a lot of your time, so in the future we need to create time for video, because it needs a lot"* (Anthony, April 5th 2012).

These words by Anthony, from a group interview held on the last day of research, capture the essence of the effort of the whole team and the extent of their commitment throughout the entire research project. His words also stress the significant amount of time invested by the team in learning and practising video-making. It might appear trivial, but this is a key learning from introducing new ICT tools and practices in an environment: things take patience and time. Working long hours in partnership with the four main information officers and

with the farmer's hub manager provided me with a unique insight into their heavy workloads, their long hours spent travelling to reach the office and the groups they provide support to. It also shed light on the trade-offs they needed to make, including getting home to their families late and often after dark, as they committed to producing videos for many more of the hours they normally are paid for.

After the end of the first period of video-making programme in 2011, the team "went quiet" and stopped producing new videos right after completing the editing of existing ones. Why did this happen? At first, this could be interpreted as a major flaw in the project: as soon as the researcher leaves, participants lose interest and the project becomes idle or ends. Two months later I had an opportunity to travel back to Kenya in between field research periods and to visit the team and discuss their challenges and progress. A different narrative emerged on that occasion: when I asked information officers what had stopped them from continuing the production, they primarily explained that they had been extremely busy with all the activities they had left behind during the hectic weeks of the training. Also, as a result of new funding opportunities explored by the CBO, they were asked to produce additional written documentation of their work and – very simply – ended up drafting documents and doing extra administrative work using their best computer, which was otherwise the preferred device for video editing. Some of the information officers continued to shoot video materials, but none of them had sufficient time to edit them extensively. A similar pattern happened during the last period of joint research and after its completion: information officers were on this occasion not able to dedicate all of their working time to the video programme, and after the completion of the research, they did edit some of the pending videos, but had difficulties with uploading content on the Internet and progressively reduced their with video making activities.

Going back to the question at the beginning of the section, this experience suggests the need for more realistic and manageable expectations of participatory research and in particular of the competing responsibilities of research participants. Crucially, it highlights the issue of the true costs and the sustainability of producing and distributing user-generated content. One of the

objectives of my research was to use participatory video and open content creation as low-cost ways for local communities to generate video content relevant to them. Information officers were not paid for the content that they produced: they were paid their normal salary, and had Katoloni CBO's approval to spend most of their working days actively participating in the video programme. Unsurprisingly, at the end of both research periods, information officers returned to their monthly normal schedules of agriculture extension visits. Members of the team continued to use the cameras assigned to them, taking personal as well as professionally relevant videos, but the amount of time required to edit them as well as the limited availability of sufficiently powerful computers became a steep challenge. While the production of free user-generated content makes perfect sense in the context of a research *pilot*, its implications are that this type of initiative can only realistically be sustained, replicated and scaled-up if subsequent video production routines become internalised among monthly deliverables for the team, similarly to the agreed minimum number of groups that officers are required to visit every month. In other words, this type of initiative can only be sustainable if the actual cost of producing videos is budgeted for by the organisation advocating for the programme, by allocating paid staff to deliver on it. Table 5.4 illustrates the cost of producing videos according to typical daily rates in the area: each video could cost approximately 7,500Ksh (approximately £58).

Table 5.4: Summary of costs for the production of a new video

Activities	People involved	Time (days)	Cost (Ksh)
Research and script	3	0.5	900
Shooting and transport	3	1	2,400
Editing	2	2	2,400
Subtitling	2	1.5	1,800
		Total cost	7,500

As part of my final report to Biovision, I highlighted these difficulties and suggested a possible solution in case the organisation decided to actively support video production among its information officers. The way forward could involve nominating one of the information officers the "video production coordinator", charged with facilitating the production of an agreed number of videos per

month.

The question about what business models would be more suitable for sustainably integrating user-generated agricultural content into the budgets of agencies goes beyond the scope of this thesis, but certainly merits further research.

5.11 Challenges and opportunities of pilot research projects

Despite the participatory nature of the project and the strong collaborative environment jointly created with the team of information officers at Katumani, I often found myself doubting the limitations of my approach. Throughout my career as an ICT4D practitioner, I consistently criticised the weaknesses of ICT initiatives focusing on the provision of access, instead of creating an exit strategy ensuring the continuation of a programme and its financial sustainability. Therefore, it might be somewhat ironic that in the case of the project analysed in this thesis, my role as participatory researcher resulted in facilitating, documenting and studying one more pilot project, instead of focusing on an existing initiative. I could have chosen to focus on an organisation already producing its own videos – such as ALIN in Kenya – thus reducing both the complexity of the project (such as conducting video-making and editing trainings) and the chances of the new approach to end up as just another pilot. Instead, I preferred to engage with Infonet-Biovision and Katoloni CBO to be able to explore new forms of participatory communication and their role within the context of their existing activities. I mitigated the risks of irrelevance often associated with pilot projects by choosing to concentrate on skill development and sharing among the team members, particularly emphasising their own personal opportunities linked with owning and mastering the use of the cameras assigned through the project. As part of the encouraged, but unexpected consequences of my approach, information officers soon began to use the cameras for a range of additional purposes, including taking pictures of plant diseases as reminders for follow-up, as well as engaging in activities not directly linked with their professional roles: whether documenting the advantages of solar lights in rural communities, filming sermons of a local pastor, or taking short videos of their own families. The open-ended nature of the initiative, promoting personal skills that can be used beyond the workplace, is an answer to criticism

of the waves of ICT4D concentrating on developmental issues, without sufficient contextualisation with human development goals and personal aspirations and desires, as expressed vividly by Okolloh (2011). The personal involvement and dedication of the whole team, and the range of mutual learning that happened during the field research are eloquently captured in this paragraph from my research diary:

> *"What I will never forget about this day is the extreme dedication of my five research colleagues, all of them. The image of the dark office at 19.30, only lit up by the computer screens with the Ubuntu linux logo is worth more than many audio recordings. I am interviewing them, and once again I am deeply moved by their desire to transform this adventure in a profession"* (from my research diary, April 5th 2012).

While doubts on the tangible value for the farmers information officers of this research pilot, no matter how participatory, are difficult to be completely resolved, the final words by Anthony, the officer who spent the most time learning video-editing techniques, sum up the typical sentiments expressed by team members throughout the whole project, and helped me resolve my ethical dilemma in between academic research objectives and participatory action research. When reflecting on the learning journey, Anthony summarised the interplay of desires and expectations of the team but also their hope and intention to put all their new learning into action:

> "Myself I really learned a lot, it is a project that I really needed, and I hoped that one day I could be involved in such a thing. Thank god you came, and in the future it would help us a lot to have more training on video editing. We'll continue with the project, with support from Infonet, visiting our groups, and this tool will simplify our work" (Anthony, April 5th 2012).

5.12 Conclusion

This chapter has analysed the main aspects of the participatory video project, explaining the technical choices as well as the type of process chosen. The experience in the field has provided consistent evidence of a range of functionalities performed by participatory video production in the work of Katoloni CBO: documentation and diffusion of organic farming methods remain important, but they are in no way the only positive outcome. Participatory video

serves other important purposes: it creates more visibility and a higher profile for the organisation, and provides the team involved with peer-learning opportunities to improve how they document, report and share local stories more effectively. The production of local visual content also reinforces the relevance of a story, by contextualising it to the realities of the nearby communities, using a local language never used by other providers of agricultural videos. Information officers participating in the open content development process have an unprecedented opportunity to shape the actual meaning of "local" as well as "innovation" in farmer-led extensions and to co-create videos in line with their vision of the local future of agriculture. These themes will be explored more in detail in the next chapter. Lastly, information officers can for the first time use their experience as witnesses of local innovation to feed it back to headquarters and contribute to future developments of agricultural extension content on Kenyan sustainable agriculture practices.

The field research also highlighted some of the challenges associated with the actual production of videos and training needs behind it: in particular, the amount of time required to edit videos, the difficulties in translating and subtitling them and the steep learning curve for information officers with limited IT training. In comparing the suitability of locally produced participatory videos with others produced by professionals, researchers or the media, it would be unfair to simply concentrate on the time required to producing them and on the quality of the final products achieved, particularly in the context of a PV project. This said, the practical advantages of user-generated videos do not translate into a sustainable, replicable practice without rethinking professional roles and workloads, taking into consideration remuneration for the time spent by information officers shooting and especially editing videos. While creating the conditions for an ongoing collaborative and autonomous video production unit might in the long run be cost-effective compared with procuring video materials prepackaged elsewhere, it requires substantial investment: not only in terms of sufficient training, but also for logistical costs as well as the salary of those involved in the production. This is in essence the difference between creating an academic (or otherwise) pilot project, and making it successful and long-lasting.

Chapter 6 – Farmers' experience with locally made videos and the emergence of new voices

6.1 Introduction

The previous chapter has explored the changes in the role of information officers prompted by the opportunity to engage in the participatory video programme at Katoloni CBO. However, video production is just one of the components of the programme, and videos alone, without a local audience, would only be used as marketing tool to promote the CBO within international development and other actors. This chapter therefore analyses farmers' direct experience of the PV programme and contextualises it with their challenges and information needs as expressed during the first round of research.

The chapter begins by highlighting the key challenges experiences by farmers. It then focuses on key aspects of farmers' experience with the videos: the redefinition of what is "local", the importance of proximity, a new take on the meaning of innovation, and the emergence of new voices. It also touches upon farmers' role in providing iterative feedback for the production of participatory videos.

6.2 Farmers' challenges in adopting new practices

During the first phase of my research, I sought to explore the barriers to adoption of new farming practices, as learned by farmers through the information officers involved in the programme. The respondents to my initial questionnaire strongly favoured access to capital, which received 96 mentions out of 239 people responding (see Chart 1). Access to finances is clearly seen by farmers' groups as the most substantial limit to their capability to put in practice the information and new techniques they have learned about.
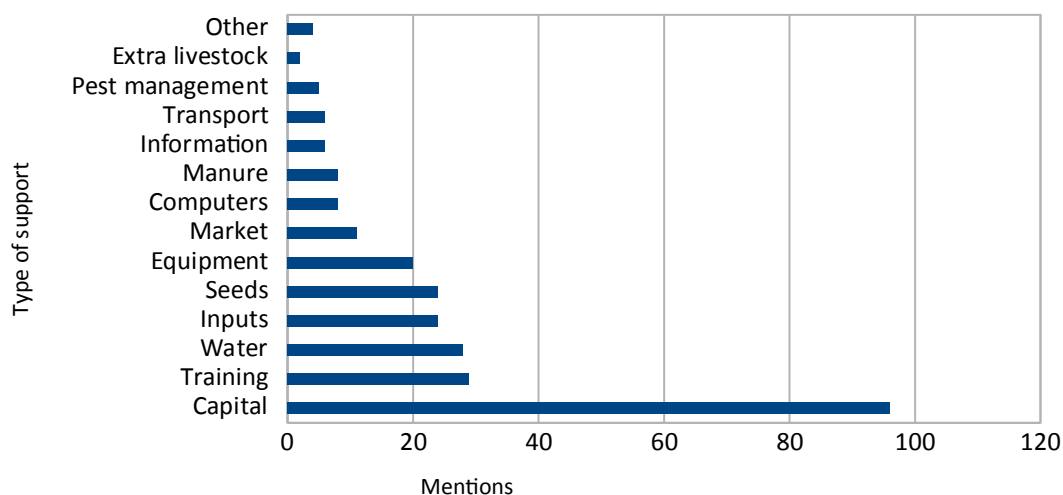
Chart 6.1: Range of additional support required by farmers (November 2010)

While the transition towards organic farming and the adoption of low-input practices broadly advocated by Biovision is meant to help farmers achieve satisfactory harvests while reducing their dependency on costly chemical pesticides, many of the farmers polled saw the cost of procuring equipment, seeds and all costs associated with starting a new farming activity as a major obstacle. Access to additional training (29 mentions), to water and related equipment (28), farming inputs (24) and seeds (24) were also popular answers, although mentioned by a much smaller number of farmers.

The difficulty in accessing crucial resources such as water can obviously limit the efficacy of any support programme, including participatory video. When I visited the Hills Bee Keepers, they explained:

> *"The advantage of watching local videos is that because we are in the same environment, those projects we see in the videos, we know we can definitely also do. When we watch these videos we feel encouraged. But our big problem here is water. Most of these projects need water, but for us it is scarce."* (Iveti Hills Bee Keepers, March 2012)

Katoloni CBO encompasses groups living in very diverse conditions, due to geographical position, access to water, land ownership, proximity with the groups where the information officers are from. For example, areas such as Kate Kakai, a mountainous, dry land located half way in between Machakos town and the headquarters of the CBO at Katumani, suffer from environmental degradation,

both due to the mismanagement in previous decades and changing weather patterns.

6.3 The importance of local videos and the meaning of "local"

One of the objectives of working on the production and dissemination of local, context-specific content was to be able to explore farmers' range of perspectives and perception of accessing video documenting experiences from groups sharing a number of constraints and opportunities similar to theirs. My first finding was the need to explain the meaning of "local": my assumption was that local would mean something or someone living in the same catchment area of Katoloni CBO, or at most within the wider Machakos area. When interviewing farmers, possibly because of the word used by the translator I worked with during field research in 2012, I learned that they would use the word local to mean "known to them", preferring a relational definition to a purely geographic one, so defining another local farmer, or local group, as one that they had at least heard about before, if not already met.

The second finding were the gaps in between having heard of a farmer, or of a new farming technique experimented by someone within the CBO; having had a chance to meet the innovator at an event or CBO meeting; and having had the actual opportunity to visit the farmer and perhaps take part in an on-site demonstration to learn more about the innovation. Only a few people would have the privilege to be able to travel to another group based at a longer distance that what they could cover by walking. This became progressively clearer after meeting group representatives during CBO gatherings, attending a meeting of group leaders from one of the locations served by the CBO, as well as after conducting over twenty groups during my field research in 2011 and 2012. When screening videos featuring the work of fellow members of the CBO, the number of people directly knowing the farmers portrayed was limited, and even more limited the number of people who had had a chance to visit their farm or project. While group leaders were generally more aware of other active groups in the CBO, their access to knowledge wouldn't necessarily guarantee their fellow members' awareness of specific innovative farmers or practices.

Joseph Ndivo, a successful farmer grafting mangoes, explained to me that he

stopped providing free training to other farmers willing to learn about his work, and charged instead a fee for providing an introductory course. Tangentially, this was a successful farmer, with his own land, having retired to Machakos after a career working in Nairobi as a public servant. He subsequently agreed to be filmed by a crew of information officers from Katoloni CBO, as he understood that the knowledge he would share in that way could become a vehicle of further marketing for his own training services, ultimately bringing new customers to his farm.

The price of training wouldn't be the only, or even the main, barrier to accessing new information: the cost of transport was consistently mentioned by farmers as a cause of limited awareness for a specific local practice. For instance, in March 2012 I visited the Iveti Hills Bee Keepers, who at the end of 2011 lost most of their harvest of honey due to theft of bee hives and inadequate harvesting equipment. During a group interview with them, following a screening of a video on bee-keeping in another part of the CBO, featuring more advanced bee-keeping practices and equipment, they explained that they would have liked to visit the group that had been filmed by the information officers, but had not yet had a chance, due to the travel costs. A first use of local video therefore involves providing farmers with an initial summary, an introduction of the work of a successful group or farmer, increasing their curiosity and desire for relevant information.

In this respect, another dimension of "local" is the accessibility of the groups portrayed in the videos. Whenever appropriate, I asked the farmers filmed to provide their contact information – which was always their mobile phone number – to help simplify sharing of information and foster peer-to-peer relationships among farming communities. The farmer information officers would then add the information in the final credits to the video, thus making it much easier for farmers to contact each other. This feature proved very popular, as the following example highlights.

During a visit to a community of grain traders in Kathonzweni, a group I had known of since my first trip to Kenya in 2004, based approximately 80km south of Katoloni CBO's headquarters, I witnessed their difficulties at a time of profound drought and failure of their crops in August 2011. While their millet

crop had completely failed, they were immediately very interested in the video produced by the agricultural information officers on poultry keeping, due to the compatibility of this activity to extremely dry areas. By the time I returned to Machakos, they had already contacted the group leader, Anthony Musimi, by phone, trying to learn more about his innovation on natural medicines as a substitute to vaccines for the chicks, and were considering paying him to travel to them and train them on this topic. While the meaning of "local" might be partially different when discussing with farmers based 80km away, the similarity of their ecological conditions is a good enough indication that local videos can provide a useful starting connection to develop deeper relationships. More broadly, a video produced by farmers, for farmers, becomes a tool to connect farming communities in a peer-to-peer way, decentralising knowledge collection and dissemination, while allowing for the emergence of new networks of peer-learning support. In the case described, my role as a participant researcher actively facilitating the screening of a video in a new community cannot be underestimated: farmers would not have had a direct way to procure a copy of the video locally, and might not have been in a position to even know that such an initiative existed. However, this does not reduce the importance of the availability of valuable, locally relevant content in creating new opportunities for farming communities to gain access to new information and create new linkages and learning moments.

Similarly, during the first period of video making in 2011, the group was contacted by another CBO operating approximately 20km from its headquarters, interested in learning more about the type of videos screened to farmers and the opportunities to access a copy of the videos. During a meeting with the managers of the organisation, the interest and excitement for local videos became clear, and brought further confirmation of the need to strengthen distribution and sharing networks for the content generated. At the same time, I was surprised to meet an organisation working so near to Katoloni CBO, similarly in support of local farmers' groups and interested in the use of video and equipped with a portable TV set-up to bring video screenings to farmers' groups, and to learn that the organisation was not known to the management of Katoloni CBO, for whatever reason. Once again, neither geographical nor purpose proximity guarantees sharing of information or of resources.

6.4 Preferred topics for participatory videos

> "Localized information is most effective when it becomes the subject
> of analysis and debate within a community, and when groups form
> to take action." - (Fraser and Restrepo-Estrada, 1998, p. 275)

Sessions with farmers allowed me to explore in more detail the key elements of why farmers are attracted by local videos, particularly learning that access to a video about an activity similar to one already practised, can inspire a group to improve on its farming methods:

> *"When watching local video, you compare, I understand much of the activities undertaken in the CBO...there are standards for this things. The way I farm, it's not the way another farmer does. So there's much comparison. It's important in the sense that it will make you improve in your undertaking. If you watch the video of someone who did it better and has made progress and gone far, you realise you can also do it better (*Rafael, March 2012*)*

In order to better understand farmers' relations with the initial set of videos produced or screened by Katoloni CBO, I organised a series of screenings in August 2011, followed by a questionnaire, in two locations within the catchment area of the organisation. The three videos screened covered three distinct topics: the two produced by the information officers featured the weather forecast station at KARI Katumani and a successful poultry farmer member of the CBO. Both videos were very simple in narrative structure, synthesizing the main learning and experiments done by the information officers during the first month of the project. The video produced by ALIN was about responses to climate change in the nearby region of Kitui. It was technically more complex: featuring more advanced editing cuts, voice-over by the narrator and sequences where women were working together while singing songs, providing an elaborate soundtrack for the video (which information officers would be inspired to include in their subsequent videos). Participants were asked which of the three videos screened they preferred and which they liked the least, and why. They were subsequently asked to identify three pressing topics they would have wanted to see featured in future videos produced by Katoloni CBO.

Table 6.1: Preferences in the video screened, August 2011

Video	Preferred by leaders	Least preferred by leaders	Preferred in Ngelani	Least preferred in Ngelani
Poultry keeping	23	2	18	3
Meteo service	5	13	3	7
Climate change	9	10	1	10
All	3	/	3	/
None	/	5	/	11

The table above summarises quantitatively the preferences expressed by participants in the two screenings. The video about poultry keeping collected the highest number of preferences – especially in Ngelani, where it was preferred by 18 out of the 25 people polled. The most recurrent reasons mentioned by participants for choosing this video were: its relevance to their community, either because the community was already considering or had already began a poultry project; *"because it brings income"*, *"because it is easy"*, *"because only a small space is required"*, *"because local herbs are readily available and can save our chicken"*. In the rare cases in which the same video was deemed the least preferred, the reasons behind it was primarily the lack of new information for those already practising it and the lack of good market prices for chicken in the area.

The video on meteorological service was overall the least preferred: those who liked it cited as reason that they learned how localised weather forecast can help them in choosing the most appropriate variety of seed for a specific season. Most participants however focused on a negative aspect, by complaining that they could not *"put in practice"* the video, since they do not own the expensive tools required to monitor the weather in their community. This element highlights a defect in the communication structure of the video, which arguably focused too much on showcasing the different instruments used at the local meteorological station, and not enough time in exposing the link between timely awareness of seasonal forecast, the related choices in terms of seeds and fertilisers and the potential impact on harvests. The video was however the very first experiment of

collaborative storytelling by the information officers, and as such served primarily as a training exercise.

As for the video on responses to climate change, it received a mixed response, despite being the most advanced technically and in terms of storytelling. Analysing the explanations for its poor rating, some geographical elements emerged: the fact that Ngelani is the least dry of the areas covered by the CBO does not tell us much about the quality of the video, rather about its appropriateness in a specific context. Also, the video showed how to make earth dams, while some of the participants did not have large enough fields of their own where to practise what was learned. The general preference given by farmers to the video on poultry, a relatively simple video, sharing the experience and the advice of a single poultry farmer, resonates with the fundamental contextual importance of the videos screened, and of the necessity for a focus on activities truly at the heart of the community's sustainability.

However, there is an additional element worth enquiring: Table 6.2 shows that when asked about the type of videos they preferred, farmers in both of the groups polled expressed a preference for videos about other groups within Katoloni CBO – more popular than videos from elsewhere in Kenya, abroad or even about other innovative farmers from within the wider region of Ukambani (Eastern Kenya).

Table 6.2: Type of future videos preferred by different groups

Type of video	Group of leaders	Ngelani group
Videos about Katoloni CBO groups	24	18
Videos about other innovative Ukambani farmers	24	10
Videos about farmers from other regions in Kenya	17	13
Videos about farmers from abroad	5	7

The wide interest of Katoloni CBO groups for locally produced content about local groups suggests that video can play a role not just in the sharing of appropriate agricultural practices, but at the same time in increasing awareness about specific local contexts, potentially facilitating further collaboration and strengthening of

the groups' collective agency.

One interesting aspect of the interaction between information officers and farmers was farmers' ability to sistematically provide feedback about the quality of the videos screened. This is not just to be intended as a critique, or a ranking in between a more or less preferred video. Rather, it involved sessions during which farmers would begin asking questions about a specific video, thus providing very useful information in regards to the knowledge gaps and the areas that a subsequent video should address. In one case, information officers used this approach while in the process of editing a video about bee keeping, asking a group of bee keepers to provide feedback and suggest further inclusions. This is another case of a feature only possible through participatory video, and it can contribute to the collective learning of both farmers and information officers.

6.5 Videos as a way to compare living conditions

A recurring theme in focus groups discussions prompted by the screening of locally produced videos in conversations with farmers' groups was their comments and comparisons between their life conditions and the ones of farmers portrayed in a video. A typical example of such conversations came from a visit to a farmers' group in Kimwa Kimwe location, after I screened the ALIN videos about Mutomo, a very dry area in Kitui, about one and a half hour from Machakos, detailing local measures adopted by the communities in the area in response to climate change. What surprised and interested the farmers who watched the video was not the explanation of a new skill – rather, they were shocked about the living conditions experienced by some of the people filmed in an area which was not "local" to them, but equally not that far from home. During one of the exchanges on this topic, two farmers commented:

> *"He! Have you seen their house? You know, I can't really complain about how we do here now that I've seen how they live there!"*

> *"I know! It is now such a dry season for us, but it can't compare with the way they are living in Mutomo"*

Compared to my initial meetings and focus group discussions with farmers, when I had chosen not to screen any video, farmers were generally much more interested in engaging in conversations after watching videos. While this is

partially to be expected due to the novelty of accessing video on laptops with groups new to the technology, farmers' conversations after the screenings appeared consistently genuinely inspired by the successes and innovations of others in worse conditions. This reaction confirmed the relevance of Katoloni CBO's approach to create a supportive, but at the same time competitive environment for groups, establishing positive peer-pressure, partly inspired by positive examples captured in video. It also helped me to reflect on the general bias of information access for rural groups. After visiting the group, I wrote in my field notes:

> *Maybe we all know about Obama, but even in this area we don't know much about Kitui, as not that many people have been able to travel there (September 5th 2011)*

During the summer of 2011, watching television newscasts about the severe drought that Kenya was going through at the time, I was constantly reminded of the fragility of the local ecosystem and of the challenging conditions for farming communities in the dry areas of the country. However, the perspective portrayed by television news crews was never comparable to the type of frank, direct and simple videos produced by either Katoloni CBO or ALIN. Additionally, while I had access to TV news in my hotel and in the restaurants in downtown Machakos, only a few of the farmers I was visiting for interviews would have frequent access to television.

6.6 Participatory video as an innovation sharing tool

When discussing with groups the merits of video in communicating farmers' innovation, I progressively realised the different meaning that "innovation" embraced depending on the context. An "innovative" practice was not necessarily a breakthrough in farming research. Innovation in research, such as the work conducted at the local KARI-Katumani research centre where Katoloni CBO is based could have appeared as rather inaccessible to most farmers: generally unaware of the exact developments happening in the campus. This is understandable, as, for instance, trials for more drought-resistant crops or the potential improvement of mango varieties are not of immediate value to farming groups, compared to the availability of simple answers to a lot of their questions.

The local confirmation, or proof, that a practice, no matter how simple, actually could work within the local context is extremely valuable, particularly at a time when changes of weather patterns, concentration and intensity of rains affect the compatibility of crops and varieties. In this respect, "local" actually means "ultra-local", or even more: known to you. The importance of local videos is they are productions about groups and individual farmers one can locally identify with due to personal proximity or access. When I showed farmers videos of other neighbouring groups with Katoloni CBO showcasing a positive development in their practices, they were immediately interested, also for the potential opportunity to follow up directly, possibly in person. This relates to the need for a renewed trust in sources of information and support – at a time when, as mentioned in Chapter 3, the Ministry of Agriculture had just been involved in distributing the wrong type of drought-resistant grain varieties to local distributors, while agricultural input resellers are often a prominent source of information, despite their bias due to their own interest. Throughout the whole field research, my interviews as well as the questionnaire with farmers indicated that farmers value other farmers in their area as a key source of information. Hence, the increase of local information and examples linked to the availability of videos expands the visibility of local voices otherwise silent and unrepresented. For groups largely relying on extreme subsistence farming, the ray of hope resulting from a positive example in an area near to theirs cannot be underestimated.

In a way, an "innovation" has little to do with a new practice: what becomes innovative is the practice of actively sharing good, positive news, inspiring others to persevere, implement and remix/adapt a different method or activity successfully adopted in a nearby community, while attempting to find a market for the new products.

In regards to the specific content produced during this programme, in the videos featuring successful farmers, the innovative element was usually the blend of a relatively new technology with a local successful implementation: for instance, Joseph Wambua Ndivo, the above mentioned mango farmer and bee keeper in Mumbuni, is an innovator because he knows how to graft three high-value

varieties of mango on the same generic tree, thus being able to harvest good quality mangoes from all his trees, irrespective of the amount of rain. Margaret Muia's story is inspiring instead because of the excellent results she obtained with drip irrigation, paying off the set-up costs in less than two harvests. Similarly, Anthony Musyimi, a successful farmer practising poultry keeping, shares his tips for maintaining the animals healthy and clean, by showing his homestead where they are kept and by adding *Aloe Vera* to the water drunk by the chickens (all three videos are included in the dvds part of the thesis).

The sharing and promotion of local innovations (Waters-Bayer *et al.*, 2006) is intrinsically intertwined with the emergence of new voices: the participatory production of a video about a previously virtually unknown farmer generates new conversations between the farmer and the information officers, and subsequently among other farmers' groups when they can access the video, using the pretext of potential video coverage to show off their activities and "compete" through their relative achievements. Local innovation combines indigenous knowledge with the local creativity and entrepreneurship of an individual farmer or a group. By capturing it in a video, not only does it become easier to share it with other groups in the area, it also creates further legitimisation and recognition for the farmer featured among their peers.

6.7 Farmers' challenges in diversifying activities and accessing markets

> *"I think the people from Katoloni CBO do much work on almost similar activities. By watching the videos, the majority of them saw different options that they could undertake, different from what they do. These videos can open our mind, there's much learning that will help other generations beyond us."* (Robert Mbuvi, March 2012)

This observation fits with my experience during multiple visits to farmers' groups throughout the field research: many groups were involved in extremely similar farming activities, often without a clear strategy to secure a unique angle to market access, a "unique selling point". When visiting farmers during my first period in the field in 2010, for instance, I visited a remote group near Kisii in Western Kenya, far from tarmac roads and very poorly served by transport options. Their rich production of avocados didn't have a competitive distribution

outlet, and they were mostly relying on traders setting the price when visiting to buy from them. Additionally, other individual farmers and groups nearby, were producing exactly the same crops, likely suffering from the same difficulties in regards to market access. After the visit, I wrote in a field note:

> *"What if there is no future for agriculture in Kisii ??? All people produce the same stuff. Avocados sold for KSh 1. No market. Do they need new crops, new activities, new markets?? What do they need??"* (field notes, Oct 2010)

Mangos as well as avocados are a good example and they represent one of the paradoxes I experienced directly: fruits available in abundance throughout the whole year in Kenya, much valued for export markets and yet throughout all periods of field research, I kept visiting farmers very eager to give me full bags of the fruit as presents and struggling to sell them at the local market. This is a good example, because it touches on the limits of agricultural extension approaches focusing almost exclusively on improving farmers' groups' productivity, increasing their harvests, sharing information about new crops and new techniques, while not concurrently creating conditions to reduce farmers' marginalisation in their access to markets, through marketing and negotiation skills with traders. On multiple occasions I witnessed farmers explaining the functioning of their work as "groups": learning together, conducting trainings, whether with information officers from Katoloni CBO or other sources of support, once again as a group, but at the same time selling their products as individual farmers, without any bargaining power, often literally in the hands of traders and middle-men.

When attempting to understand the reasons for this – to me, at least initially, irrational behaviour – one of the answers I would receive was farmers' limited amount of time for travelling to a market town and actively engaging in selling their crops, a very valid point, particularly for all groups run completely or primarily by women, due to all of their other tasks and responsibilities. When I asked groups why they would not, for instance, join forces through cooperatives or other kinds of alliances allowing them to collectively be more powerful when selling, my questions were often greeted with no direct answer, almost as if I was touching on a taboo subject, or one for which farmers were not ready to take a stance. However, when I interviewed a successful tomato farmer, actively involved in one of the groups in Mumbuni location, but producing tomatoes as

his own personal business on his own land, he explained with great clarity the shocking difference between his costs to farm and harvest his tomatoes and the profit made by himself and by traders he is selling to:

> *"I sell a crate of tomatoes 30kgs for 1000ksh. The broker sells to consumers for 1500ksh, in just 10 minutes. For harvesting my tomatoes, I pump water, so I use 200ksh for petrol. I water 2 times per week for 10 weeks, 4000ksh for 15 crates. There is the issue of agrochemicals, 5000ksh. (...) So you can make 400ksh per crate, having worked for a month, and then the trader makes 500ksh in a few minutes."*

An additional explanation has to do with the actual functioning of the groups I have met: in some cases the activities carried out by groups require a collective infrastructure: whether a plot of land owned by one of the group members, given in kind or rented out to them, or equipment for bee keeping and occasionally incubators or some communal, safe space for poultry keeping, In such cases, group members engaged in the activity collaborate throughout the whole process and share the harvest or the products among all involved. For other activities, they are conducted individually by members within their own household, and market decisions largely happen at this level.

The vast majority of groups I visited over the years mentioned "merry-go-rounds" as one of the key reasons for beginning to work together and formalising their entity as a group. This term, together with its synonym *harambee* is very common in Kenya where it means the creation of mutual support funding mechanisms within a group, through the collection of monthly or weekly contributions of by all members, assigned every month to a group member in need for a specific project or need. The collection of funds and the updates on the available finances occupy a central role in the dynamic of group meetings in my experience. According to recent research by Karaya *et al (2013)* for Mwala location in Machakos District, 54% of women groups in the area are started in order to be able to get involved in merry-go-round activities and an additional 17% to access external funding, compared with 12.8% to promote environmental conservation, 8.0% to enhance access to extension services and 4.3% to enhance access to markets. Such a limited direct focus on marketing and sales is revealing of another aspect of groups: the agricultural activities that members conduct together represent just one of many of their identities. For example, while visiting a series of groups in Kimwa Kimwe location in March 2012, I met women who were actively involved

in two or even three groups. They would meet and collaborate for half a day per week with one group, another half-day with another group, and continue to get involved in a range of other activities in support of their families or inspired by the learning happening in their groups. As a result, the type of group activities carried out by such groups are primarily subsistence farming to benefit their family.

6.8 Unrealistic expectations and successes linked to videos

An unexpected consequence of the presence of a video programme for such groups is the expectation that video helped to fuel that their problems, especially marketing and sales, could be solved once their activities became featured in video coverage by the information officers. Farmers perceived the availability of a video with the certainty that an adequate (international) audience would immediately materialise. They were also counting on equating international viewers of their videos on the Internet as an immediate source of new sales. This view was in some occasion shared also by some of the information officers, for example, when speaking with a group of students practicing poultry farming in Kalama location, Patrick told them:

> "i*f we start marketing our chickens on the internet, just like hotels in Machakos are marketing online, they can find about us"* (Patrick, August 2011)

Similarly, when speaking to another group of poultry keepers in Kimwa Kimwe location, a farmer told me:

> *"hopefully by the time you come back, we can also export our chicken abroad"* (August, 2011)

Both quotes signal that there is a lot of magic enthusiasm for the Internet and for putting videos online. It doesn't hurt, per se. And perhaps some of these expectations can actually be met. But others are the problems: not having enough chickens ready at the same time, so that one can go to town and negotiate the price better, for example. In reality, international success for one of the farmers involved in the project happened anecdotally on one occasion, however benefiting an already successful farmer, Margaret Muia from Kimutwa (see Figure 6.1), who was contacted through her video about drip-irrigation about supplying some of her products for export. The same couldn't possibly be true for most other groups,

particularly those whose products didn't have a valuable way out of the country for export, such as poultry farmers. Video can indeed bring new opportunities to those who are featured, but this is primarily true for subjects who already stand out, and that have been chosen for video coverage exactly for that reason.

Figure 6.1: Margaret Muia shows the benefits of drip irrigation, 2012

6.9 Limits to video's inclusivity and alternatives

One year after the end of the participatory video programme, I had a long phone conversation with John, the manager of the Farmer Information Hub, to learn what had happened to the project after I left. John explained that the team at Katumani had worked on editing some previous material, but had drastically reduced the number of new productions. According to John, a few new movies were shot in July 2012 – three months after I left, during the cold dry season – but their editing had not been completed. The footage was however available for guests to watch when visiting the centre. As for farmers' access to the videos produced, 32 out of the approximately 200 groups by then members of the CBO have had access to the videos, amounting to a direct reach of approximately 600 farmers. In the vast majority of cases (28 groups), video screenings occurred on a small laptop, during routine field visits by information officers. In the remaining four cases, it was instead groups officially visiting the organisation's Information Hub and watching videos as part of their gathering of information. Additionally,

video had been used as a first point of contact when individual farmers – not necessarily already members of the CBO – visited the Information Hub. In such circumstances, visitors accessed an increasing range of videos, including not only the ones produced by information officers, but also a selection of videos progressively aggregated by the organisation, including downloaded episodes of the Shamba Shape Up television series which I had helped procure, new videos from the AIRC and other materials collected during the course of the research.

Community information officers had continued to work on some of the videos, but also returned to engaging with members of the CBO in a range of more traditional ways, including by organising field days. It was particularly noteworthy to read a blog post reporting on a field day organised in collaboration with their host, the local KARI Katumani research station, in August 2012:

> "Kari-katumani [sic] had for a long time been leading in generating technologies on dry land farming. However, after monitoring and evaluation of their activities by an external team, recommended was the idea of organizing a farmer's open day to demonstrate this [sic] technologies to the farmers. This idea concurred with our thought of how to link the farmer groups to the technologies at the station by making of visits to the center and appreciating all these. Our dream came true this time round.
>
> Kari-katumani had this mentioned date therefore organized a successful farmer's open day at the station together with their partners. The opportunity of mobilizing farmers was given to the infonet/katoloni team which though was in short notice of 5 days; We managed to bring along 497 farmers for the event" (http://katolonifarmersinfohub.blogspot.co.uk/2012/08/farmers-open-day-at-kari-katumani-on.html).

The note summarises in very pragmatic terms the ongoing divide between the agricultural research community and the smallholder farming community. Concentrating on the numbers of farmers participating in a single event, it raises the question of what are the most appropriate ways to reach out to farmers – especially comparing this modality with the average 10 to 20 farmers normally met by an individual information officer during one visit. During a single farmer's open day, participants had the opportunity to be introduced and exposed to a remarkable set of farming technologies, as listed by Katoloni CBO on its website:

> "The technologies demonstrated during the event included;
> -Grain Amaranth (kisii white/Brown) and Amaranths variety (Bean

intercrop and vegetable amaranth (KAT1/Bean intercrop)
-Black night shade variety
-Jute mallow (murenda)-katumani collection.
-cowpea variety (k80, m66, kvu27-1)
-soya bean variety-Nyala and EAL 36000)
-safflower variety: BJ 2027 AND BJ 1300
-Sunflower variety: Issanka
-Maize varieties-KDV1, KDV2, KDV3, KDV5, KDV 6, KH125-02.
- Beans varieties-KAT B1, KATB9, KAT, KAT X 56, KAT X69 and
GLP 1004
-Sorghum/Beans intercrop.
-Sorghum varieties-Gadam, Serena and seredo
-Millet varieties, chick pea varieties Grams.
-Dolichos lap lap and pigeon peas
-Livestock-Dairy goats and cattle among others technologies."

For some of these technologies, the role of the CBO was primarily to help bridge the divide between farmers and researchers working in the KARI centre, a complementary activity to their typical agricultural extension work, focusing on practices already established and not necessarily been actively researched. Not only that: by bringing together hundreds of farmers for a specific occasion, Katoloni CBO also created more opportunities for farmers-to-farmers direct communication and sharing, and for bridging the travel bias between group leaders and other members. This however does not reduce the relevance of all the work done with video by the CBO in the previous year and a half. Rather, it puts it in perspective, highlighting the complementarity of different delivery methods. Large group gatherings demand quite a lot of logistical arrangements,are quite costly and might not allow for in-depth learning for large groups. The documentation of such knowledge in ways accessible to farmers remains just as important. Katoloni CBO did not mention the availability of dvds with their videos for groups to buy at the large gathering, possibly due to technical reasons. Feedback from farmers' groups' I received during my field research however indicated their interest in getting hold of copies of the content for further sharing and repeated screenings. For instance, after a visit to a group who had previously had a chance to watch videos during a session with one of the information officers, farmers explained:

> *"Yes we see value of being able to watching the videos again, so that if you didn't understand something, you can understand it better. Please tell them to bring the dvds here, we will buy [them]"*

I was initially surprised by this feedback and by how 9 farmers out of 9 expressed

the desire to buy their own copy of the videos produced so far, particularly given the lack of direct access that most farmers seem to have to dvd players and reliable electricity in their homes. However, they explained that they would be able to watch them at their sons and daughters' places, as well as at neighbours'. A similar experience happened during a subsequent focus group discussion in Mumbuni location, where six members of a community group of parents linked to the local school suggested they would be happy to pay 100ksh each for a copy of the video, which they did when I delivered the final copies during the last week of field research in March 2013. Obviously not a single solution exists to cover needs of such a wide range of farmers' groups. Regardless, researchers' assumptions about the suitability (or not!) of a specific technology are always to be questioned. The experience that outsiders have with a specific technology or format is heavily influenced by their previous experiences or routines. While it might be easy to dismiss as "unsustainable" an information flow relying on using a car battery to power up a television and a dvd-player, that's how millions of people still occasionally access television content in rural Kenya.

6.10 Conclusion

This chapter has explored farmers' experiences with video, with a particular focus on videos produced by Infonet information officers at Katoloni CBO. Groups react to videos in different ways, depending on their activities, socio and environmental conditions. All groups are interested and engaged in watching videos, and inspired by video to discover local innovations that might be relevant and replicable in their context, and that they might not have had a chance to learn about otherwise. Testing reactions to videos allowed me to learn more about the compositions of the farmers' groups and the real motivations driving their interest in working collaboratively as a group. It also helped in better understanding the true meaning of both "local" and "innovative" in the context of Katoloni CBO. The availability of an inspiring video does not however automatically reduce barriers to the adoption of an innovation, particularly when a mix of geographical, economic and social causes limit a group's ability to put an innovation in practice. Nonetheless, inspiring videos can contribute to farmers' reassessing their own conditions and difficulties, and lead them to try to improve on their current practices, realising that other groups, supposedly less resourceful

than them, have succeeded in innovating and improving their life conditions. As a result, the production and use of local videos provides tangible evidence of a new direction in the support of farmers' groups members of Katoloni CBO: one based on fuelling farmers' inspiration to test new enterprises in a supportive but also competitive environment, by sharing and demystifying the potential of "innovations" already successfully implemented by other farmers and groups in their proximity. Video remains one of many potential tools, however the skills and advantages in the local production of videos go beyond the simple practical results to encompass a new process for learning and new forms of collaborative discourse between farmer-led extension service providers and the communities benefiting from them.

Chapter 7 – Limits to technology?: Hardware, software, infrastructure and technical skills

7.1 Introduction

Previous chapters of this thesis have concentrated on information officers' experience creating videos to supplement their community-led extension services and on analysing farmers' responses to the availability of video, as well as their assessment of the relative importance of access to information and local content for addressing the challenges to sustainable agricultural livelihoods. While previous chapters have focused on the content of videos and the incorporation of video within existing services, this chapter is dedicated to highlighting and analysing the specific ICT-related technical challenges that team members experienced during the course of the field research. It focuses on difficulties linked to some of my technical decisions; misconceptions and limits of free and open source solutions; challenges deriving from the intermittent availability of electricity in the field; specific problems with the dissemination of videos, due to limited technical support as well as specific strategic choices made by the partner organisation. These are shared with the intent of better understanding some of the limitations of ICT4D initiatives, and what such missed opportunities and lessons learned can mean for improvement of future design of interventions encompassing the use of technology, particularly in rural areas. In the first part of the chapter, I combine personal observations with interviews with participants and partners to document technological flaws, misguided technical choices and their significance and implications in the context of the research conducted. From there I explore the reasons behind them and articulate some implications for future directions of ICT4D research and practice. A focus on the connected issues of appropriate technologies, availability of adequate technical support and true "ownership" of the initiatives emerges as a crucial requirement for the design of truly participatory technology initiatives, whether involving video or not. This critique proceeds to question the wider meaning as well as the relevance of fragile ICT4D interventions in communities where adequate infrastructural conditions and sufficient experience with using ICTs might not already be in place.

7.2 Illusions and disillusions: notes for Wednesday, 4 April, 2012

The importance of the arguments of this chapter and their relevance for ICT4D interventions became fully clear to me only in April 2012, while sitting in my room in Machakos during a blackout. I was making notes on the paradoxes of conducting research adopting supposedly simple-to-use technologies, which proved to be much more complex, due partly to the requirement for infrastructure support which was less prevalent in the area than I had anticipated. While one of the reasons behind my research approach was contextualising the role of technology in development, with the intention of avoiding common tendencies to over-emphasise the importance of a specific device or technical solution, the research journey ended up dotted with problematic experiences faced by research participants while using specific technological tools, rendering their use far from effective. Examples of such problems emerged both in my initial visits to Infonet-Biovision partners across Kenya and while observing and interacting with Katoloni CBO's farmer information officers. At times flaws were due to questionable decisions on hardware and software adoption, on other occasions to insufficient training or preparedness of staff and participants. What at first had appeared as coincidences, became progressively a pattern worth exploring further, particularly as some of my own very choices as a participatory researcher contributed to these results. Partly disillusioned, partly frustrated after a challenging day at the end of the research period, I then wrote:

> *"Today once again there's been a blackout lasting for the whole day – the second time it happens in three days. And tomorrow it is the last day of the project. Honestly, the basic required conditions for this type of initiative are not met, in between the local organisation's context and the available infrastructure. The Internet is too slow for uploading videos from here. Blackouts are very frequent. At the moment there are no direct incentives for the production of videos. The project can only collapse in a week's time. It's been a wonderful adventure, but a bit insane. It drives me crazy that I had to do all of this to understand it, but it was worth it. When I'll be home, in the comfort of my 10/20Mb Internet connection, blackout maybe once a year, reliable Apple Mac laptops, surrounded by people paid a fairer amount, etc etc – I wonder what I'll think of all this. At first I'll concentrate on taking care of Patrick's broken Kodak camera – thinking once again at the disaster that is to import something new from abroad in a context where it can't be repaired. YOU JUST CAN'T DO THAT.*

You should just use products which can be serviced locally. I took a risk, and that played against me" (from my research diary, April 4, 2012).

These notes contain at first more questions and doubts than answers. However, when analysed in retrospect, they offer useful perspective for two key reasons. First of all, despite my direct active involvement as action-researcher, the project I embarked on was exactly a piece of research, an experiment, designed with the freedom to explore, learn and make necessary mistakes. Its "success" would not depend on the number of videos uploaded by the research team on a YouTube page. Rather, it would be linked, for example, to understanding whether and why sharing videos on the Internet would or would not be appropriate and feasible in the context of a bandwidth-poor community, with no facilities nor incentives to access video that way. In this light, what would otherwise have seemed a rather hopeless account of one of the final days of field research provides an opportunity for further investigating ICT4D's challenges as well as unrealistic assumptions with a more nuanced and realistic perspective. It should also be noted that criticising the choice of specific tools and new waves of fashionable solutions is nothing new in rural development, or in ICT4D research and practice (for example Heeks, 1999). What is more worrying in this respect is the scarce consideration given to previous warnings and accepted criticism of technical choices when designing new projects and interventions. In the following sections I discuss the key lessons learned from the experience in the field.

7.3 Electricity

The limited suitability of ICT4D solutions requiring consistent electricity supply has been documented extensively in the literature, for example in regards to telecentres/kiosks (Toyama and Kuriyan, 2007) and more generally in rural areas (Geldof, 2010). And yet, my experience was a painful reminder of the difference between nominal electricity provision and the quality of the service provided, especially in rural areas and during times of serious drought. During all periods of field research, power outages were frequent and extensive: in particular in March/April 2012 blackouts occurred on average in two to three of the five working days of each week, often for the vast majority of a day's working hours, and they were generally unexpected and unpredictable. Video editing activities were deeply hit by this level of uncertainty: on some occasions, the information

officers were able to borrow my netbook, or to use one being tested for other purposes by the CBO's staff. However, small screen and limited screen resolution rendered the experience rather frustrating for participants, for example by making it difficult to access some of the software menus. In most cases, information officers ended up waiting for hours, or even giving up and going back home, having wasted the day and the money paid to travel to the office. The situation was similar to the ironic comments which accompanied the arrival of fibre optic connectivity to Kenya in 2009, as captured in Figure 7.1 by famous Kenyan cartoonist Gado.
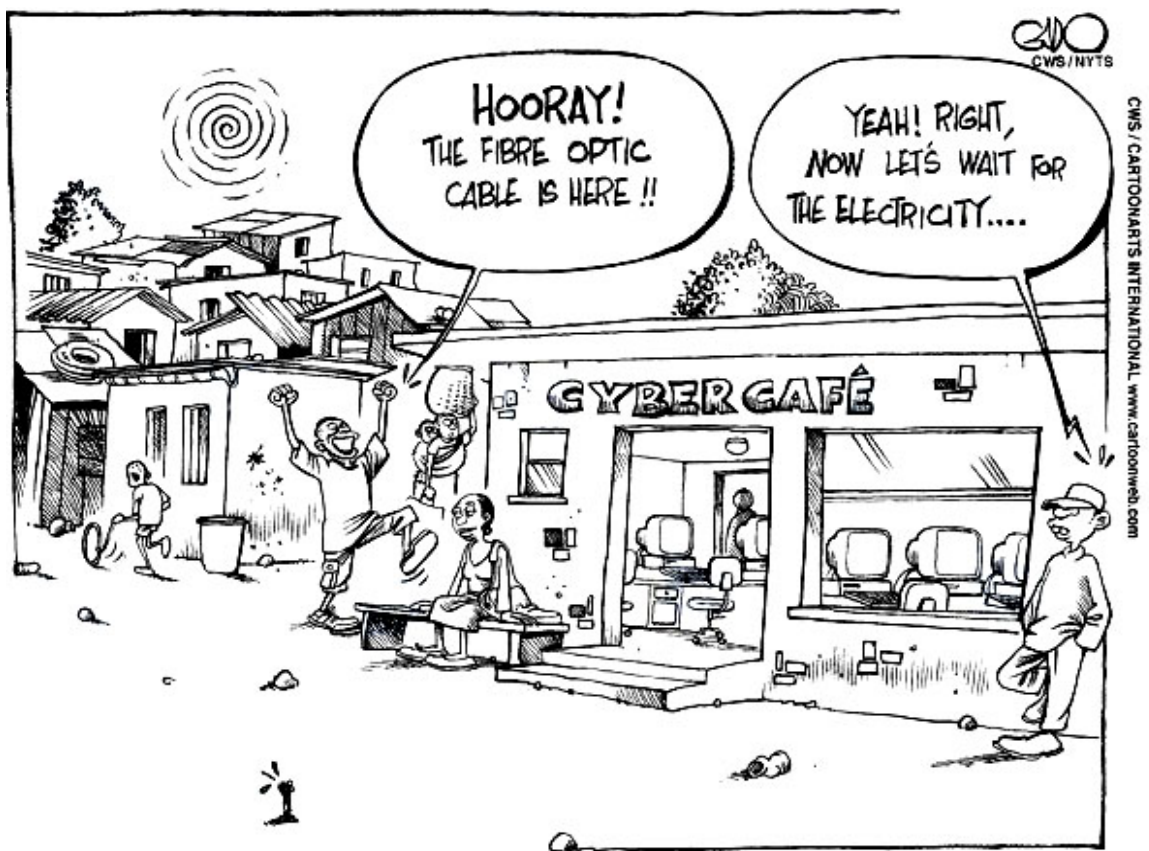
Figure 7.1: Gado's reaction to the arrival of international fibre optic in 2009

As Patrick explained one day:

> *"This is a real challenge for us, and for me especially since I'm the one who comes from furthest afar. You know, every time I come to the office, it costs me KSh 150 [£1.10] each way. It's a lot of money, and imagine if I come here and then there is no power for the whole day. It's a big waste, and I cannot afford it. You know, I also don't have power at home"* (Patrick, March 2012).

Three out of the four information officers, as well as the information centre manager, did not have access to electricity at home. To them, going to the office meant more than just an opportunity to work on video editing and take care of reports for the Infonet-Biovision programme: it also meant being able to recharge their mobile phones, cameras and assigned OLPC laptops for free. Hence, experiencing a day-long blackout at the office would turns into a triple cost: not only the missed work opportunity and the price paid for public transport, but also the additional cost of having to pay to recharge a mobile phone's battery elsewhere. This highlights a little appreciated reality: the diffusion of ICTs in rural areas is much faster and extensive than that of rural electrification programmes, as Figure 7.2 eloquently documents.

Figure 7.2: Barber/mobile charger in Kola, Machakos County, August 2011

While rural electrification programmes will continue to improve their coverage, the fragility of the local infrastructure should not be seen as a weakness – rather an opportunity to organise the logistical activities of a project accordingly, consistently with the guidelines of the Low-cost video in agriculture kit (Woodard, 2012). It would be recommendable to match specific technological solutions to environments where they might lead to effective use, as opposed to enduring frustration. In the case of this research, for example, one of the information officers had access to a small office in Machakos town, with much

better coverage for both Internet connectivity and electricity, and it would have been ideal to base video editing activities there. However, since the programme was mainly relying on non-transportable existing desktop PCs, also used for other activities, blackouts mostly ended up increasing the amount of time wasted while waiting. While access to reliable electricity might not be an option – as was the case in the main office available to Katoloni Mission CBO – equipment procurement policies should aim at minimising the difficulties that participants have to go through in order to get their work done. They should in fact facilitate the work in the field, and not add to the challenges experienced by extension personnel. For example, operability with batteries and portability should be prioritised. Instead, Katoloni CBO's main desktop PC was connected to the grid through an uninterrupted power supply (UPS), allowing for no more than five minutes' autonomy during blackouts, barely sufficient to save the file currently open and shut down the computer.

On the one hand, the reason for this can be traced back to the divide between research and practice in ICT4D, as well as in the limited openness and reflexivity of many practitioner initiatives. The work I conducted with Infonet-Biovision also shed light on the stark differences between technical decision-making at headquarters level, whether in Europe or in Nairobi, and translating them into effective use in rural as well as semi-rural territories, where the basic reliability of the electrical grid might not be guaranteed. Additionally, while the deficiencies in electricity provision are known by development agencies, they are often downplayed or at least not sufficiently taken in consideration when designing project implementations, almost as if the optimism and hope that new technologies are charged with were stronger powers than the bare reality. As a result, communities are targeted for intervention, but the "solutions" pushed to them might turn out to provide increased difficulties and controversy.

These experiences were by far not unique to my research design. Despite witnessing problematic examples during the first period of field research, I was however unable to factor them in sufficiently in planning the participatory project.

For example, I encountered the first sign of electricity failure when visiting a farmer information hub on the outskirts of Eldoret, in Western Kenya. The managers had received a large and heavy solar charging kit for the OLPC, which made it not portable, and, more importantly, did not work as advertised. Possibly it had been introduced in the field before having been sufficiently tested by Infonet-Biovision at headquarters, or rather *instead* of being tested on the ground at all. This prompted further reflections on the external expectations for ICT4D projects, as well as the hopes and biases associated with their design and implementation, especially when local technical expertise and perspectives are not sufficiently prioritised from the beginning. Parallel questions emerged at the same time, specifically about why certain flawed choices continue to be made.

Another example is the rather elaborate solar dryer in Kinango, Coast Province, home of one of the community groups Infonet-Biovision had provided a laptop to (see Figure 7.3). When I visited the group in 2010 the equipment, built by a development agency based in Nairobi, was not operational, and the target community explained it had been in that state for a long time, despite being tested by international technicians more than once.

Figure 7.3: Malfunctioning solar dryer in Kinango, Coast Province, 2010

Notwithstanding the existing difficulties with electricity provision, the farmers'

groups headquartered in the pictured building had been chosen as beneficiaries of one of the OLPC laptops that Infonet tested, irrespective of their ability to use it or even to charge it. When I interviewed the person responsible for the laptop, it was immediately clear that in this case the availability of the ICT tool was a burden more than an additional resource, also due to the lack of electricity supply.

7.4 Online dissemination

Similar considerations are valid for access to the Internet: information officers consistently experienced frustration when trying to upload their own videos on YouTube, because of the very poor signal available in the area around their office – as further captured by Figure 7.4. In the end, I took care of uploading several videos on behalf of the team, from Machakos and Nairobi as well as from London. The quality of mobile data connections in urban areas, such as in Machakos, was much more reliable. Once again, access to a technology – in this case a mobile dongle with a monthly data package subscription – is only one aspect in ensuring effective use of the technology. Logistics, planning and support in identifying correct and more convenient usage patterns are essential, and can only be assisted when the relevant support skills are an integral part of an ICT4D strategy.

Figure 7.4: Desperately seeking to optimise downloading speeds, 2011

7.5 Open source software

Too often the use of open source software solutions in ICT4D has been the result of either ideological decisions or poorly informed pragmatic choices, primarily based on initial cost-saving. The literature around FLOSS reflects this conflict, and the ambiguity associated with an excessive attention on the *Free* or on the *Open* as universal values meant to guide development initiatives, without a sufficient grounding in practical use scenarios. While there can certainly be benefits associated with the financially free nature of open source software, their relevance is only slowly becoming evident in the Kenyan context, more as a result of anti-piracy campaigns by Microsoft than for other reasons. I witnessed this change of attitude during my last period of field research, when I interviewed the managers of two of the busiest Internet cafés in Machakos. Both explained their challenges in being forced to switch to Ubuntu Linux because of fears that they might be fined for having illegal copies of Windows installed in their businesses:

> *"Ubuntu is ok, but many of our regular users find themselves lost using it, and some have stopped coming and gone elsewhere. I don't think it was a good idea to have it installed, it is reducing our business. We kept Windows on a few machines, for those software applications we can't make work with Ubuntu"* (manager of Machakos' Internet cafe #1, March 2012).

> *"It was too risky to keep running Windows. I like Ubuntu, it looks nicer than Windows and it is free, but we are only beginning and I am learning little by little from the Internet. But my work is to do a lot of publishing for people, brochures, picture editing, and I have one guy who works here with me. He does video editing, you know, weddings for my clients, using Pinnacle for Windows. I can't switch everything, otherwise how can I do my work?"* (manager of Machakos' Internet cafe #2, March 2012)

As Thomas (2010) argues, there are similarities between the participatory development approaches and the Open Source Movement. However while participatory development is bottom-up, rooted in networks and organisations of the Global South, Open Source reflects an active participation by more top-down, Northern groups; while access to the software is granted potentially to everyone, participation in its development is not directly accessible to all users, especially in sub-Saharan Africa (Zehle, 2005). As an action researcher planning this project I have always been in favour of using open source software, motivated by a

multiple reasons, including the lack of viruses and malware affecting the Linux environment, as well as the convenience of using tools not requiring costly licenses, and by a desire to contribute to their further development, by documenting their advantages as well as weaknesses, and feeding back the results to the community of developers. More strategically as well as pragmatically, the design of the research project was built on top of an existing layer of open source technology: the laptops in possession of team members were running a FLOSS operating system. While such aims continued to inspire my research work throughout, I have come to realise more profound difficulties embedded in the use of open source tools in ICT4D initiatives and a more nuanced meaning of their effective implementation.

The main challenge I have encountered in this respect is the limited questioning of budgetary requirements when employing FLOSS software in ICT4D contexts: the prevalent assumption of it being freely available fails to recognise the overall cost implications for adaptation, implementation and support. At the same time, it also misses the point of FLOSS' greater merit of freedom, transparency and flexibility achieved through its openness. Morozov (2013) traces back this misconception to the clash between the original Free Software Movement and the commercially orientated Open Source Movement, which has over time commodified some of the qualities of FLOSS, concentrating on the efficiency of open source code, diluting the political aspects of openness.

These debates might seem outdated at a time when plenty of free and open source code is seamlessly embedded in Android, the most popular mobile platform, as well as it used to run the majority of Internet servers across the world, but the examples in the following two sections will confirm their still current relevance.

7.6 Limits of an open source video-editing software

During the course of my field research, the team and I had some problematic experiences with OpenShot, the FLOSS video editing software for Linux that I had selected for the project. My reasons for choosing it were rational: it provided more flexibility and was more stable than similar alternatives, and many helpful features not available in free Windows video editing suites, while at the same time it does not require expensive hardware such as Apple computers. However, I had not sufficiently taken into consideration the local environment and therefore the

appropriateness of my decision: no one else in Machakos (or to my knowledge, in Kenya) was using OpenShot, at least at the time. The only people I met in Machakos doing video editing were using Pinnacle Studio (http://www.pinnaclesys.com/), a commercial software for Windows. Given that my presence and competence would only be available temporarily, I should have further considered the surrounding environment, and only made the final technical decision after becoming familiar with the set of established skills, available support and commonly used software on the ground. This became clearer only when I began the third phase of the research and learned that the team had forgotten some of the previously learned skills, and arguably would have benefited from being able to ask for support locally. This said, OpenShot remains a promising option for video editing. However, it proved problematic at least in two sets of circumstances: when subtitling and in case of a project failure. As already explained in Chapter 5, subtitling with this application proved extremely time-consuming and complex compared with proprietary solutions I have since tested. More worrying, on one occasion the project file that the team had strenuously worked on for over three days suddenly became corrupted for no obvious reason. After contacting the main software developer, it became clear that while he was hinting at the availability of a backup functionality to retrieve earlier versions of the project file, the feature had actually never been implemented in any official OpenShot release, despite having been coded by one of the developers, added to the core code and mysteriously deleted at one point. In practice, the team lost all the work done, all the subtitling and editing. This could have potentially happened with commercial, proprietary software as well, but it certainly created a difficult emotional moment in a team with great expectations.

The following extract from the relevant conversation thread in the official OpenShot forum highlights the opportunities as well as the limits of Open Source development. The researcher contributed as user "openmatic", while "Andy" is OpenShot's lead developer:

> Re: Project became corrupt
> by openmatic » Fri Mar 23, 2012 2:53 pm
>
> Hi Andy,

You mentioned in this thread that from 1.3/1.3.1 if you're using Autosave there should be a zipped file in the same folder as the corrupted project file.
I am using 1.4.2 with Autosave and I've just experienced one such corruption instances - after editing a project for 4 days. The project file is saved in the Desktop, and I can't see any zipped file anywhere. When I open the file, the Openshot screen turns grey and nothing happens.
This was a very complex project, and I would be happy to retrieve it even partially. Is there anything I can do? I fear some of my partners might lose faith in the application if we have to start again from scratch
Thanks a lot for your support

Re: Project became corrupt
by Andy » Fri Mar 23, 2012 4:46 pm

When we initially implemented the Autosave there was a zip file backup included, but for some reason it was removed before the release

Re: Project became corrupt
by openmatic » Fri Mar 23, 2012 2:53 pm

I can only suggest it gets added again in the next release - should I file a request somewhere?
Where does this leave me with my corrupted project file? Any suggestion on how to retrieve it? Obviously I can open it with text editor, and has a lot of information on clips etc
Thanks

Re: Project became corrupt
by openmatic » Sun Mar 25, 2012 11:43am

Hi, Just to clarify - I'm trying to find out whether there is any way to edit out manually some recent changes in a corrupt project file in order to be able to access the project again.
I am also trying to find out what might have caused the failure. It happened at a time we were adding subtitles in the following way:
1) create a standard subtitle file that worked OK with the project
2) Apply it on the timeline
3) Duplicate it
4) Change the text in the duplicated one
5) Duplicate it again and change the text
6) etc

Could this be the cause of the corrupted file? If so I'd be key to know, I can't afford losing another project - ever!

Thanks a lot

(Andy and openmatic, 2012)

There are three main learnings from this exchange. First and foremost, Open Source development and support increases transparency and allows users to participate in testing and suggesting new features as well as engaging in collaborative bug reporting. It also facilitates the direct interaction with the main developers of a specific piece of software, just as in the case of OpenShot. The availability of direct, personalised support is a considerable advantage for technically conversant users such as myself, able to engage in a conversation with developers and interested in doing so.

Second, the openness of the process is not an automatic guarantee for problem-solving and bug-fixing. As of October 2012, no further comment or advice was posted in the quoted conversation: by the time I left the team at KARI Katumani, there was no certainty on what might have triggered the problem they encountered and what might cause it again in the future. The lost video was edited again from scratch and the team started occasionally to save versions of ongoing projects in multiple folders – short of a more professional solution. Also, despite my suggestion finally to implement the backup saving feature in the following release of OpenShot, when the new version was eventually published in October 2012, there was no trace of it. The proposed basic solution, which arguably already existed, was very simple and would have required developers limited additional coding: it involved creating time-stamped backups of project files, and archiving a pre-determined number of them in a suitable "OpenShot Backup" folder, easily accessible in case of a project failure. A more elegant but also more time-demanding solution would allow users of a corrupted file to select multiple backup versions directly from the main software interface, instead of being greeted with an error message.

Technicalities aside, what matters is that a bug report, accompanied by the developer's admission of an important missing feature, does not result in a problem solved. Behind the "Open Source" label are a wide range of projects, at times supported by a wide community of developers, sponsorships or both, but in other instances the lead developer is effectively *the* developer, with only a few (if

any) others volunteering limited time to a project and funds are limited, mostly based on donations. This was the case of OpenShot at the time of the research. It would thus be unfair to have excessive expectations about the speed of its development. Between 2011 and 2012, OpenShot's donations have ranged from $68 to $292 per month (http://openshot.org/donations), and the achievements it has since reached (further stability, new features and user interface improvements) are already remarkable, no matter whether it might or might not be suitable for a specific type of user or organisation. In April 2013 OpenShot carried out a very successful crowd-funding campaign (http://www.kickstarter.com/projects/421164014/openshot-video-editor-for-windows-mac-and-linux), collecting over $45,000 (£29,000) to significantly improve the code and to release it for both Windows and Mac operating systems by the end of 2013 – even though no new versions have been launched between October 2012 and mid-November 2014. This development is very encouraging for future implementations of similar video projects, and will hopefully result in an increase of the support ecosystem for this software application in Kenya and beyond.

Third, some of the benefits of Open Source development are not directly accessible to basic users, even more so in environments where connectivity might not be as pervasive and affordable. The manager of one of the Internet cafés in Machakos quoted above, referred to searching on the Internet for solutions to improve his skills with Ubuntu Linux. Even when tutorials and other useful resources might be available, they are normally only to be found in technical forums not easily accessible to beginners, due to terminology or existing skills required, not to mention that they require the expenditure of a considerable amount of time online. The Internet cafe manager interviewed could afford this by virtue of his job, but always-on connectivity is still far from being widespread among Kenyans, particularly in rural areas. Additionally, the wide range of FLOSS operating systems and the release cycles of individual updated modules can result in incompatibilities between different layers, confusing to non-technical users. Based on my research experience and on the examples previously listed, the choice of open source solutions therefore requires an adequate support network and organisational technical expertise.

7.7 Questioning appropriateness of technical solutions

Another example of the fragility of the technical ecosystem I contributed to create with the research project is illustrated by this email:

> *"We are finalising the Dairy Goat video but unfortunately the Ubuntu software could not open this week, what is seen are many words down the screen. Please, may you advice [sic] us on how to solve the anomality [sic]?*
> *Regards, John"* (personal communication via email, May 2nd, 2012)

I received it less than almost a month after completing my last period of field research, as farmers were working on editing their first video made since my departure. A similar problem had happened once before, luckily coinciding with one of my visits to Kenya for a conference, and I had managed to solve it myself, without thinking too much about it, not knowing exactly why it had happened, hoping it would not happen again. Troubleshooting such faults remotely is not an easy task, especially when it's not possible to view the exact syntax of error messages. Following a lengthy, difficult session of telephone support, I spent a couple of hours trying to find a possible solution to their problem on the Internet. I then realised that the problem they were facing was most likely due to an abrupt shutdown of the computer, probably linked to a sudden power failure. In order to provide a suitable solution, I aggregated information from two threads on the Ubuntu official forums, "translated" the recommendations into non-technical English and sent them to the team in Katumani, recommending that they engaged with one of the technicians from the local Ubuntu-powered Internet cafés in order to implement the fix. A full description of the commands required to revive the system is available in Appendix L.

The next day, to my partial relief I received the following email:

> *"Thanks Ugo, We have worked tirelessly to recover the Ubuntu software with James from Simcor cyber and fortunately succeeded, this evening. Tommorow [sic] our team will continue working to finalise the video on Dairy Goat"* (personal email with John, May 3rd 2012).

The problem was solved, but the fragility of the system and the lack of adequate support networks on the ground became even more evident. Crucially, this

happened after the end of my presence on the ground, pointing to the very real limits of my original vision of an autonomous rural centre for video production. Having done further research on this, I then discovered something often not shared about the use of desktop computers with Ubuntu Linux: the operating system might require a lengthy and complex rescue procedure (including inserting multiple commands at terminal-level) after a sudden shutdown, occurring for instance as a result of a power failure. Based on the threads found on support forums, this seems to happen rather frequently, at least on Ubuntu 11.04, the version of the operating system primarily used for the project. This problem alone could be sufficient for suggesting a review of recommendations for what is appropriate in countries or areas where power failures might be the norm. Proprietary solutions such as Microsoft Windows are generally capable of restoring their file system without active input from a user, ultimately allowing users to be much more independent and self-reliant. It could be possible that an update to a new version of the operating system might fix the problem, as is often the case. However, the six month release cycle used for example by Canonical – the company behind Ubuntu's development – means that in order to update, for example, Ubuntu 11.04 to Ubuntu 12.04, users have to first update to the intermediate version 11.10, thus requiring more work and hefty downloads of software upgrades: not a desirable option in rural areas with limited, costly bandwidth. An obvious solution to this problem is the use of laptop computers, unaffected by sudden power cuts. A more realistic approach to the use of FLOSS operating systems in ICT4D would highlight such technical considerations, instead of insisting on the ideological or pure financial aspects of the argument, especially as relying on an external technician for reviving an unusable Ubuntu desktop is a tangible cost.

7.8 Technical ownership and its consequences on video dissemination: the case of the OLPC XO laptop

A specific case is the role played by the OLPC laptops utilised by Infonet in the project. This device is at the heart of the delivery of agricultural extension, and was meant to be a key tool for the dissemination of videos. As it will become clearer, technical problems linked with lack of full ownership of the devices ended up limiting their usability for the task. It is however worth exploring the history of

the specific tools, as it is an iconic example of the powerful symbolic objects employed in ICT4D.

The OLPC laptop has attracted considerable interest, as well as catalysed excessive positive and negative energy and excitement across the world, including in Kenya by renowned author Binyavanga Wainaina:

> "There are few useful 'development models' for genuinely selfstarting people. I am sure the One Laptop per Child initiative will bring glory to its architects. The IMF will smile. Mr Negroponte will win a prize or two or ten. (...) There will be many laptops in small, perfect, NGO-funded schools for AIDS orphans in Nairobi, and many earnest expatriates working in Sudan will swear by them. (...). Me, I would love to buy one. I would carry it with me on trips to remote Kenyan places, where I seek to find myself and live a simpler, earthier life, for two weeks a year" (Wainaina, 2007a, unpaginated).

Wainaina gained popularity in Kenya by starting the literary journal *Kwani?* in 2003 *which has* given visibility to a new generation of literary voices. Internationally, he is famous for his strong views on international development, particularly his criticism on the role of international NGOs and international development staff (Wainaina, 2007b). His quotation above was a reaction to the widespread enthusiasm generated by the XO laptop even before its introduction to the market, which he saw as an opportunity for a new wave of dependence on NGO-funded activities. The laptop was originally heavily marketed by its main proponent, Nicholas Negroponte at M.I.T., as the "$100 laptop", and while this tag-line was eventually taken out of the official name, it served to fuel the imagination of the public, without ever achieving that price point. Scholarly reasons for criticism of the device centred around budgeting decisions fuelled by the enthusiasm for this product, in favour of laptops to be delivered directly to students (Warschauer, 2009), usually made at the cost of other alternative investments (Kozma, 2007) in education, whether in teacher training, curriculum development, textbook availability or infrastructure (Hollow, 2009). Additionally, the implementation of the OLPC in the education sector of developing countries is tied to a constructivist vision of learning, often greatly clashing with existing pedagogic traditions (Hollow 2009). The specific case of the Infonet initiative is, however, rather different, thus adding a new interpretative layer to the meaning and the role of this hardware in their projects.

On the one hand, the appropriation of these laptops for informal, farmer-led learning, instead of their normal targeted use by children, suggests a local creative role in interpreting an object and conveying a different meaning to an existing tool, by experimenting with a new niche use in the context of agricultural development. In this respect, this specific use of the XO laptop manages to escape the direct criticism and the debates around the pedagogic model behind it, and its role in formal primary education. For example, the laptop was not officially introduced as a personal learning tool, and certainly not for farmers. It might be a facilitating tool for information officers, and part of the initial research work I conducted with the programme was meant to verify its effectiveness at this. More importantly, it was presented as being a communal tool rather than a personal one, shared by a farming community, whether within an information resource centre, or in the field. However, my initial evaluation of the Infonet programme provided a rather different picture of the reality on the ground: farmers' groups experienced limited direct exposure and access to the laptops, due to the limited time information officers could allocate to visiting each and every group.

On the other hand, this specific implementation of the XO poses further questions about the reasons behind its choice, particularly when comparing it with similarly priced, but perhaps more flexible alternatives available on the market at the time of adoption (initially in 2009). While one of the key features of the devices is the opportunity for collaborative production by engaging multiple users, in the case of Infonet the laptops were mostly used as media players during meetings with farmers, and as reference/e-book readers by information officers, thus primarily as passive devices, one of the reasons that eventually led me to experiment with content production through video. The arrival of the OLPC to the Infonet-Biovision project provides insights into the role of short-term pragmatic opportunities in decision-making, as opposed to strategic planning for long-term sustainability. Official documentation of the programme I accessed during my research stated that the laptop had been chosen because of its unique innovative features: the least power-consuming computer on the market (Computer Aid International, 2009) and the only one featuring a dual-mode screen, making it suitable for operation outdoors, even in bright sun. When I asked Infonet's staff

about the arrival of the "green laptop" – as it is colloquially named by field staff – and why it had been chosen, Bruntse pointed out that Swiss headquarters "managed to get hold of them" (conversation with Bruntse, October 2010).

Part of the video project I engaged in was designed around the availability of one OLPC laptop for each of the information officers taking part in the training programme, so that by the time the first phase of the programme ended, they could use the laptop for disseminating and testing both the videos produced and also others collected from relevant sources. The results of my initial evaluation in 2010 included doubts on the technical suitability of the tool for the work carried out by the officers, particularly the small size of the screen making it less than ideal for group sharing of visual content (at the time primarily pictures) and the very low audio volume making it challenging to share audio content, such as the podcasts of radio shows produced by Biovision's team. However, as part of my approach I decided to make the best use of all existing resources, instead of requesting additional laptops or other tools for dissemination. As an example, during the first round of video dissemination, the information officers and I agreed on the inadequate audio output for dissemination, but researching on the local market, we found a simple, economic, temporary solution: the use of portable, USB-powered audio speakers, sufficiently small and not requiring additional power sources.

What was however not expected was that three of the four OLPCs in possession to the team in Katumani would no longer be suitable for dissemination of video, because of software malfunctions, such as the inability of loading external usb drives, where videos would be stored, or because they were altogether missing the video player application. The OLPCs used by Infonet-Biovision featured a rather ad hoc installation of Ubuntu Linux, optimised to run on low-power, low-end hardware, devised and implemented by Kevin, a software technician at the time working for Biovision's partner Avallain (http://home.avallain.com/).

When Kevin left the organisation, it became practically impossible to either reset the operating system to its default settings, or to install additional applications, because of the lack of sufficient internal documentation and insufficient skill-sharing before his departure. Concurrently, the team at Infonet-Biovision was planning a software update to a more recent version of Ubuntu on the same

laptops, hoping that this would increase their reliability. By the time I returned to Kenya in 2012 for the last round of the video programme, the software update had been performed by a new technician, unfortunately rendering the laptops less responsive due to reduced optimisation of the new operating system and notably not succeeding in installing a suitable video player. Despite feeding back comments to the new technician involved, the problem was not rectified: even as I left Kenya after completing the last round of field research, only one out of the four laptops – the unit which had not been "updated" – could be used by information officers to disseminate videos during their visits to farmers' groups.

7.9 The need for adequate, local technical support

All the examples documented throughout this chapter point to one key flaw of ICT4D projects, especially when conducted in multiple rural locations: the need for much more granular and efficient technical support. As explained previously, FLOSS solutions can offer tangible benefits, in terms of customisation permitted to *technical personnel and users* during installation and set-up, for example, selective choices of the services to run can provide ways to extend the battery life of a laptop (van Reijswoud and De Jager, 2008). Similarly, old hardware – or in this case very low-end hardware – can be combined with appropriate software to continue providing a range of services otherwise requiring much more powerful and costly equipment. However, high levels of customisation require accurate documentation of the work done, not only to inform subsequent adaptations, but especially to provide a starting point in case a project is passed to a new technician. Infonet-Biovision had correctly chosen FLOSS when deploying OLPCs: the modifications to the default configuration were replicated on approximately 30 laptops, providing an optimised user interface, protection from viruses and common malware as well as saving on acquiring licenses for proprietary software. However, what I did not know when I designed the project, is that by subcontracting the service to a partner, instead of recruiting for the necessary skills, the organisation ended up not possessing the necessary knowledge to critically assess the technical implementation and the lack documentation provided. By the time Kevin, the technician in charge for maintenance of the devices, left the partner organisation, Infonet found itself in a difficult position, with no way to easily restore or directly update the software.

For organisations willing to explore new technological devices such as the OLPC, and to implement *ad hoc* software versions, developing internal capabilities becomes essential (Kraemer *et al.*, 2008) and can provide more tangible ownership and control over the knowledge generated, the lessons learned as well as sustainability and replicability of the initiatives.

While the increased availability of information technologies created the opportunities for the development of the Infonet-Biovision programme, the technical choices of the ICT4D arm of its projects have been shaped by the lack of in-depth, strategic technical expertise among the staff. This is a problem widely experienced by organisations involved in development initiatives in the Global South. When speaking about it with a project manager from a not-for-profit organisation in East Africa in July 2011, he pointed to the desirability of internalising such knowledge and decision making:

> *"We have been relying on external support for technical matters, but this has meant a lot of delays and losing control over certain choices. By hiring consultants for IT work, we don't focus on retaining knowledge within the organisation. Then, if a consultant is no longer available, or has moved on to a new job, we are not in a position to proceed and we need to start from scratch"* (Interview with ICT4D project manager in Kenya, July 2011).

This type of remark highlights the struggle for budget allocation, and the temptation for some organisations to outsource technical expertise to external partners through consultancy or service plans, which is what happened to Infonet-Biovision with Avallain. This tension mirrors the dilemma between the perception of ICT4D as a community of professionals forming their own specific development "theme" or sub-sector on the one hand, and its mainstreaming (Esterhuysen, 2009) as a set of tools and skills available to organisations active across all development sectors, from agriculture to health and education. The first vision centres around the special skills necessary for ICT4D projects, and the importance of controlling them in-house. The second refers to the tendency for development agencies to disengage from some of the ICT4D debates, and concentrate instead on the application of ICT tools in their specific domain of interest and expertise. While there might be advantages in, for example, putting an agriculture development organisation, such as Biovision Foundation, at the heart of the introduction of ICT programmes in support to agriculture, the lack of specific in-house technical ICT expertise, and even more the lack of ICT4D

experience, and the recourse to external providers with different agenda and skills can negatively impact on programme design, management, running, monitoring and evaluation.

Similarly important, and too often disregarded, is the repairability (S. Graham and Thrift, 2007) of the ICT equipment introduced by ICT4D initiatives, particularly at a local level. This project provided plenty of opportunities to learn about this: during the first week of video shooting, one of the Sony cameras fell on the ground, and its screen suddenly stopped working. Luckily it was possible to visit a Sony Repair Centre in Nairobi the following day, which managed to repair the camera under warranty at no extra cost. A camera from the robust, dust/water/drop-proof series by Kodak broke down after nine months of use. Unfortunately the brand already had limited distribution in Kenya, and will progressively lose it further, since the company filed for bankruptcy in January 2012. When designing the project, I had chosen this camera because of its sturdy, durable construction, and decided to import it from the United Kingdom, since it was not distributed locally. When it broke down, it was not possible to find a local repairer for it, despite the local thriving informal repair sector, so I ended up taking it back to Europe, having it replaced (still under warranty) and sent back to Kenya through a Biovision employee visiting the organisation in Nairobi. Such *ad hoc* solutions might work in specific circumstances, but cannot be the norm, as they can add delays and additional costs to projects. Similarly to the recommendations on adequate and sustainable software choices, guidelines for appropriate hardware procurement should not only take into consideration ruggedness and performance analysis, but should also never fail to verify the existence of a thriving local community of users and repairers. From this, it follows that products officially distributed locally should normally be preferred to direct imports. This contributes to stimulating the increase of local capacity and subsequent business opportunities and employment in the repair sector (Foster and Heeks, 2010; Vallauri, 2009b).

A complete set of recommendations for procurement of future equipment is available in Appendix M, as an extract from my final technical report to Biovision.

7.10 Technological overload as an unintended consequence

During my periods in the field, I progressively came to realise the multiple silent manifestations of what could be called "ICT4D" – a term non-existent in the discussions with information officers and farmers on the ground – affecting the life of Katoloni Mission CBO's staff. Specifically, I stepped back and analysed the recurrent technological waves that communities such as the ones I was working with are exposed to, and I began to compare the individual, genuine intent of each initiative on its own to the perceived, cumulative intent perceived by participants in the field. As a result of its involvement with Biovision and KARI, the team at Katoloni CBO received increased visibility and exposure, resulting in opportunities and frequent requests from headquarters to take part in pilots, training sessions, research projects and studies – including my own. In less than the two years between my first visit to the group and the end of my field research, the team partnered with a local organisation importing second-hand computers from the United States and deploying them locally. They were involved in an initial training for the mobile messaging platform Frontline SMS (http://www.frontlinesms.com/), which led to nothing more than the installation of the software on one of their computers. They were introduced to blogging and assisted in starting their own website (http://katolonifarmersinfohub.blogspot.co.uk/), as well as their own Twitter account (https://twitter.com/Katoloni) - still dormant as of 2014). They even ended up creating a second website through the e-rails platform and research programme (http://www.erails.net/KE/katoloni-mission-cbo/katoloni-mission-cbo/). They were given a demonstration of the potential of tablet computers by and Infonet-Biovision staff member, despite then not having any access to further tablets through the project or in their daily lives. They also contributed in 2011 to the first round of prototyping for a mobile application for Android smartphones (released in January 2013, http://biovisionafricatrust.org/2013/01/the-user-response-system). Last but not least, they were trained in visually documenting plant diseases with a GPS-enabled digital camera, with the goal of testing timely crowd-sourcing pictorial evidence of new diseases spreading in rural areas – except for then wondering:

> *"Why does the camera take 30 minutes to acquire positioning?"*
> (Personal communication with Anthony, March 2012)

With this extensive list, I do not intend to criticise any of these projects or collaborations individually, but rather to comment on the challenges of keeping up with all of them as an aggregate. All projects require time, attention and the acquisition of new skills in managing new tools. Just as importantly, they demand precious time for follow-up after each new training is completed, while rarely providing sufficient technical support or compensation packages to make it sustainable for participants to keep engaged. Even the overall sustainability of my participatory research project becomes more questionable, when put in perspective with the multiple layers of technology-rich initiatives pushed towards the same number of information officers.

From the perspective of project implementers, including Infonet-Biovision, the costs associated with procuring new tools are negligible compared to the costs the organisation would subsequently have to contribute in order to provide comprehensive training and ongoing technical support. This creates a range of anomalies: first, when a product requires servicing the time and resources required to perform the operation are substantial; and second, new tools continue to be procured, tested and deployed in the field, while technical support and maintenance for existing tools might not always be sufficiently available. The perceived speed of innovation, and the availability of new waves of gadgets promising – or at least being marketed as providing – more intuitive user interfaces, better specs, lower costs and lower maintenance requirements. For example the Nairobi Infonet-Biovision team rationally explained their interest in introducing new tools:

> *"Now with these cheap Android phones there is no need for our information officers to go around with the OLPC, if they can have all the information in their phone"* (Christoph Hess, Infonet consultant, personal communication, June 2011).

> *"We have tested one tablet. They are becoming very cheap, and apparently there is one around $100 that will be coming from China soon"* (Anne Bruntse, August 2011).

Ultimately, the cost of introducing new "pilot" products is lower than the cost of providing reliable and long-term support, updates and adjustments for existing tools and products (Brunello, 2010). However, a focus on the "next big thing" is problematic for two main reasons. First of all, it suggests an approach relying on a specific tool, as opposed to an articulated strategy for rural agricultural

development. This relates to arguments in the literature on the supposed role for ICTs as silver bullets for development (Best and Kenny, 2009; Samii, 2009). A second level of concern is the lack of reflection on the implications that the deployment of an increasing range of devices has to the provision of support and training to communities of users in the field. This poses questions on the tension between ICT access and effective use (Gurstein, 2003), and in particular on the most suitable contribution that programmes such as Biovision's Farmer Communication Programme might be able to play. While reduction in the cost of devices and advances in network coverage continue to dramatically increase access to ICTs in Kenya and other sub-Saharan countries, the provision of ICT-enabled extension services still requires significant investments in personnel, logistics and local facilitation if it is to reach out to some of the most marginalised communities.

7.11 Symbolic use of ICT4D

> "The farmer communication programme has found participatory video production very useful in collecting and dissemination of information on ecological organic agriculture. What started as a mere research study by Ugo Vallauri a PHD student working with one of its project (Infonet-Biovision) in participatory video production in Machakos (Kenya) has grown into a big thing and still its exuding huge potential for scaling up. This is mainly attributed to the communities' taking of ownership and control of the filming equipment and of the process of creating film" (Biovision Africa Trust, 2012, February 12th - website).

ICT4D represents a paradox within development initiatives. Despite being based on digital technologies, it often lacks the level of transparency that could easily be achieved by appropriately using the same communication technologies at the heart of ICT projects. The text above appeared on the website of the newly formed African division of Biovision in February 2012, just weeks before my last period of field research. While no final "finding" from the project could possibly be available at the time, the website was already mentioning the potential for scaling-up. In contrast, even a year after the completion of the research on the ground, the same website provides no link to download any of the technical reports I wrote for the research partners, which offered a much more nuanced and less optimistic scenario. This example fits in a wider set of wish fulfilments

induced by the powerful role played by technology tools and implementations. ICT4D involves many "discourses on ICT4D", often providing a very distorted vision of reality. This unhealthy mix of marketing and ICT4D debates is at the heart of conversations on online social networks as well as at conferences, whether academic or practitioner-oriented. Talking or writing about a project, while perceived as an act of openness in the spirit of knowledge sharing, is instead a strategic move often done to achieve other goals, whether additional funding, opportunities or a personal career boost. It happens in other sectors as well, but it is particularly appalling to see this tradition pervasive in much discussion around some sectors of the ICT4D community, especially given the supposed moral values embedded in ICT4D (Unwin, 2009).

Similar considerations can be made about the role played by ICT4D initiatives among grassroots groups implementing them. Following the initial training, Katoloni CBO began to list video production among their programmes and activities, both as a widget on their website as well as in their official documents at their office. In their case, however, the sharing of their activities was linear and genuine, lacking any hint or generalisation on its possible scalability. Information officers acquired additional visibility and credibility in their communities also because of the cameras they carried in their pockets:

> *"My people now look at me differently. First they started to respect me because of the small laptop. But now that I have a camera and I can make a video about them, it is really different"* (Margaret, September 2011).

Katoloni CBO indirectly acquired new visibility, and a new comparative advantage with other similarly locally based groups involved in community-based extension services. This happened however before any review of potential impact of their work on their target groups took place, and therefore poses further questions on the role of ICTs as symbols of power.

7.12 Conclusion

In this chapter, I documented the technical challenges experienced during the course of the PV project, in order to understand the requirements to make the use of ICT-powered projects effective, specifically in rural areas. Three main

conditions emerged by analysing my own experiences as well as the functioning of the Infonet-Biovision initiative and observing the local ICT ecosystem in the Machakos area. First and foremost, the weakness of the mains electricity network in rural Kenya and the equally fragile provision of connectivity in the area. While these conditions are not surprising, they are often not sufficiently taken in consideration at planning stage, thus resulting in non appropriate procurement of equipment, as well as questionable choices of venues for specific activities.

Another area of learning is the importance of analysing the local context in order to identify sustainable software solutions. This challenges ideological or purely financial motivations for choosing FLOSS or other software solutions: the availability of a local user base and the software's ability to actually deliver on all of a project's requirements are essential.

More broadly, the difficulties experienced in the dissemination of the produced videos with the OLPC laptops, confirm not only the importance of technical support, but also that true ownership of an ICT4D initiative requires in-house technical skills. Additionally, the symbolic power of ICT4D projects and objects can lead to misguided decisions, whether including the acquiring of unnecessary equipment, or the technological overload of rural staff members.

Chapter 8 - Conclusions

My research explored the effectiveness of using participatory video as a tool to enhance and unlock communication opportunities within farming communities in rural Kenya, and its role in the provision of farmer-led agricultural extension services. This chapter summarises the main contributions of this thesis, including key conceptual, methodological and empirical findings. It then presents the main limitations and lessons learned through my work in the field, and the difficulties encountered, with the intention of suggesting possible improvements to the research process. The chapter ends with a look at future areas of research and specific topics emerging from the results of my work.

The research and the writing of this thesis have been a complex intellectual and personal journey, often prompting me to question my own positionality as a researcher and the meaning and responsibilities of a participatory researcher, striving to make the collaborative research project *work*, helping to share skills and ownership of the work conducted with partners, but at the same time trying to document the process rigorously, understand its limits and major weaknesses, the reasons for recurrent design flaws in similar initiatives as well as the role played by the downplaying (or rather, ignorance!) of key infrastructural limitations affecting the area.

When I began the research, I was interested in exploring the gaps between the enthusiasm of ICT4D practitioners and often academics and the actual needs and aspirations of the communities and individuals target of their support. The dual role of practitioner and researcher has rewarded me with a rich experience, allowing me to fully grasp the complex realities on the ground, the differing narratives, motivations and agendas between headquarters and rural areas, as well as a more balanced view of the role and meaning of ICTs in the context of rural communities pressed with other challenges including climate change, access to electricity, transport and market outlets.

8.1 Conceptual reflections

My work brings together three main bodies of literature: ICT4D, agricultural development and participatory development communication, with the underlying

question of what kind of development we are aspiring to. In the case of ICTs for development, the literature I have analysed questions the relations between the powerful values embedded in the technological objects themselves, and the views on development associated with it. As for the literature on agricultural development, I compared two usually opposed views of innovation, one based on technological advancement (and therefore chemical and genetically driven), with the innovation based on farmer-led experimentation, on blending of traditional, indigenous knowledge with more formal agricultural research. When combining the two bodies of literature, a disconnect becomes evident: literature on ICT4D rarely questions the type of agricultural development suitable to a region, assuming instead that the optimisation of market transparency, improved access to information resources and increased productivity are universal values. It fails to sufficiently address the agricultural development models, the types of resources needed, and especially the extreme divides between the commercial agriculture of large farmers and the majority of small-holders and landless peasants, primarily involved in family and subsistence farming. Similarly, literature around agricultural development and extension analysed in the literature review of the thesis systematically avoids questioning the values, ethics and specific characteristics of ICTs, concentrating instead on their instrumental use to fill information gaps or to enable conversations. Crucially, both camps make references and analogies between the introductions of ICTs and the concept of "Green Revolution", without however sufficiently questioning the technological fix bias that using such term involves. Although there are some notable exceptions, this trend calls for a much broader, multidisciplinary focus at the intersection between ICTs and agricultural development, taking into consideration the full spectrum of possibilities that ICTs might bring to agricultural development, as well as the full spectrum of agricultural development possibilities that can be unlocked by appropriate ICTs.

8.2 Methodological contributions

The most significant methodological contribution of this research is a renewed focus on a specific approach to participatory video in agriculture, which combines a more traditional focus on process with an increased attention on the actual content produced and its applicability beyond the groups of people directly

involved in making the videos. Participatory video in agricultural development is traditionally perceived as a way to provide farmers with renewed trust in innovations presented from the perspective of a farmer (Zossou *et al.*, 2009). In the research project I coordinated, instead, participation is embraced with an additional focus on ownership and control of the technical tools used in the interest of future autonomous use, as well as on the delivery of specific types of videos. The meaning of participation is therefore both broader than in traditional participatory video work, and less open-ended, due to the focus on creating not just videos meaningful for the community, but specifically videos able to complement the farmer-led agriculture extension work carried by Katoloni CBO.

8.3 Empirical contributions

The main empirical contribution of the thesis revolves around the new role played by video in motivating both information officers and farmers' groups. Video becomes a source of inspiration, not only for learners, but also for information officers, traditionally not allowed to contribute creatively to the extension process. Additionally, the research provides useful contextual evidence of the infrastructural limits and therefore questions the desirability of initiatives requiring extensive use of ICT equipment in areas where it might not be appropriate. The three sub-sections ahead summarise the specific findings relative to the research questions presented in Chapter 2.

8.3.1 The impact of locally produced video on the role of community information officers

The increasing access to ICT tools and content creates both opportunities and new challenges for community information officers working on farmer-led agricultural extension services. Tools like Infonet-Biovision's vast repository of agricultural content, highlight the increased efficiency in researching and providing feedback to communities' questions and needs, while pointing to the need for sufficient training for information officers to make the most of new technologies. The addition of participatory video production provides information officers for the first time with a way to document agricultural innovation as they see it happen, starting to break the top-down, headquarters to rural areas model of delivering agricultural extensions. By creating new visual content reflecting the

priorities observed in the field, information officers can also more effectively reach out to farmers lacking the literacy competences necessary for previous text-centric waves of ICT content. At the same time, video making emerges as a complex and time-consuming activity, whose mastering requires extensive initial training.

The participatory production of videos by information officers creates the opportunity for them to collectively reflect on what local innovation stories they would like to document, bring life to and share. The opportunity to make videos enhances their level of access to farmers and communities nearby. By visiting and extensively interviewing farmers to be filmed, information officers learn much more about the local innovations and the reasons triggering them. Not only do information officers have an opportunity to influence the definition of what is locally relevant and what are the innovations worth disseminating; their own voices become more prominent and regarded, as their role as video producers in the communities they work with gives them further credibility.

The research project highlighted the complexity and time commitment required to film and edit even short videos about farming communities. This was partly due to the initial limited ICT skills of participants, the frequent blackouts, as well as the objective difficulty encountered in adding subtitles for dissemination beyond the Machakos area. The laborious process resulted in information officers having to dedicate most of their working time to video making, during each research period. While for the duration of the research, the cost of producing videos was not a criterion for the sustainability of the project, looking ahead, the effective integration of farmer-led video production into existing rural agricultural extension networks is likely to require the remuneration of staff for such activities, including charging one of the farmers' information officers with a role of coordinator, in much the same way that the coordinator of the Farmer Information Hub is in charge of organising officers' visits to farmers' groups.
Participant information officers identified regular visits to farmers' groups as the main dissemination opportunity for the produced videos. The research confirmed this as a satisfactory way to increase farmers' engagement during field visits, providing them with simple visual prompts which could lead to more detailed

group discussions. Other dissemination methods emerged as viable alternatives during the course of the study and would require further investigation: the distribution of the produced videos in dvds, as well as accessing the content produced during visits to Katoloni CBO's Farmer Information Hub.

8.3.2 Farmers' reactions to the participatory video programme

Many farmers' groups which are part of Katoloni CBO have a majority of female members, joining forces as a way to support each other in learning new skills to diversify their subsistence farming as well as to create merry-go-round to support themselves financially. In interviews across all periods of the research, access to information on new farming techniques, and particularly on low-input and organic farming techniques reducing their dependence on costly fertilisers emerges as a priority. However, the learning coming from information officers and other sources is often not directly applicable, because of the other challenges faced by farmers: particularly the lack of sufficient capital to invest in new activities or innovations, the changing climate conditions as well as poor access to markets.

Through the open and participatory approach to content production employed for this project, information officers collaboratively supported the emergence of new farmer voices, previously invisible, not accessible or simply unheard, because of farmers' limited access even to local travel opportunities. The importance of this approach lies in the way that combining the awareness of farmers' needs and the access to local knowledge about positive, inspiring examples help information officers to document the CBO they work for in ways which were previously not possible. By sharing positive examples of individual members as well as farmers' groups, the local team contributes to redefine the meaning of innovation, focusing on simple, replicable, locally-appropriate and relevant practices, and on local proof that they are achievable by fellow members. Participation and local production open up opportunities to improve the quality and relevance of videos through iterative processes, for example by screening an initial version of a video to farmers and thus learning about additional knowledge gaps and needs for further explanations, or by using feedback on initial videos to improve on subsequent productions. The open nature of topic selection also allows for a

peculiar and unexpected use of video, as a way to reward groups' adoption of positive practices: Katoloni CBO believes in creating a positive competitive environment among its groups, and has used video to celebrate positive steps done by a specific group. This fits with the reinterpretation of innovation as documentation of positive progress towards more active and engaged groups.

Farmers' groups who took part in screenings during focus group discussions in the second and third phase of the research were generally enthusiastic about video as an additional way to access agricultural information, particularly about local videos featuring other groups nearby . The concept of what's "local" emerged with peculiar connotations: local means known to you, so being able to watch a video about a community known to you, at least nominally, means being able to identify the innovations described as something that can definitely be replicated within the wider Katoloni CBO area. Farmers are inspired to strive to reach the same success as the groups portrayed in local videos, encouraged by the geographic proximity and therefore by the replicability of the models documented. The presence of a video programme fits within the CBO's approach to inspiring groups to compete and learn from each other. Videos of other local groups provide tangible hints at feasible interventions that can help groups diversify their activities with new ones, not necessarily requiring new land, such as bee-keeping or poultry keeping. When screening videos of groups further away, living for example in even harsher conditions due to drought, farmers reacted with surprise, and were equally inspired to take action to implement simple but effective techniques suggested by groups living in more dire conditions, for instance in regards to water-saving.

8.3.3 Requirements for the effective use of ICTs in farmer-led rural agriculture extensions

The empirical findings of the thesis are a strong reminder of the infrastructural limitations of rural sub-saharan Africa. Connectivity problems and the weak distribution of electricity persist despite improvements in the coverage of mobile networks and rural electrification programmes. However, reflections on these challenges in Chapter 7 suggest that these limitations should be viewed as *opportunities* to address logistical decisions proactively (Woodard, 2012), for

example about suitable locations for video-editing and uploading of videos to the Internet. Practitioners interested in projects in rural areas should therefore pragmatically analyse the quality of the infrastructure and choose locations for activities requiring electricity and/or connectivity accordingly, instead than rushing to buy equipment which may not be suitable . The same is true for appropriate software decisions: suitability also depends on the existence of a cluster of local, accessible support, whether directly through a community of users or as provided by local commercial services.

Open source software has been at the forefront of debates in the ICT4D sphere for a long time (Surman and Diceman, 2004). By reflecting on challenges experienced by the team at Katoloni when using the free and open source software I chose to use for the project, I suggest a different approach, requiring a much deeper level of local technical support as part of an initiative. Ironically, this renewed focus of the technical aspects of ICT4D emerges out of a thesis criticising the technological bias of ICT4D.

Another aspect of the sustainability of ICT4D interventions and projects that emerged through the research is the technical control and ownership of technological choices made by organisations such as Infonet-Biovision. As the technical difficulties with dissemination of the videos demonstrated, lack of control over the software installed can have rather negative implications, ultimately locking out the implementing agency of the resources that it owns, or at least severely limiting their full use. The theme of ownership of ICT4D initiatives also links with a reflection on the incentives for provision of maintenance and support of hardware and software already in operation, compared with pressure from the ICT industry to prioritise testing, adoption and introduction in the field of new solutions.

8.4 Challenges and constraints

The main limitations of this research revolved around the difficulties in the dissemination of the videos produced as well as the fragility of the technical setup meant to support farmers in becoming autonomous in video production. By admission of the team at Katoloni CBO, a year after the completion of the field

research, only 32 out of the almost 200 groups who are members of the CBO had had access to the videos produced. While some of the evidence presented in the thesis suggests that video increases farmers' level of engagement with the information officers' agriculture extension visits, video does not appear to directly increase the number of farmers' groups reached by the CBO with its work. If only approximately 600 people (on average, 20 per group) are reached over the course of a year – a number similar to those reached during a single day of outreach and demonstration at KARI-Katumani – then this poses new questions on the suitability of the service. Some of the videos had additional online viewers and it is possible that others accessed them locally in other ways, but there is no quantitative data available on this aspect.

The participatory collaboration with the team of information officers at Katoloni CBO provided very rewarding insights into the complex and fragile realities of farmer-led extension initiatives, and into their challenges due to extremely limited funding and staff. However, it also charged me with much more substantial responsibilities than I had anticipated in regards to the technical set-up of the project. I ended up operating at the same time as the IT expert for the team, the trainer of information officers, reflecting on their production process and then interviewing and visiting farmers' groups to assess their experience with the programme. All of these roles were necessary in the context of the programme, but it was rather challenging for the same person to be involved in all of them. For example, my extended participation in training and in technical support to the post-production of videos resulted in less time available to sufficiently explore with the team new opportunities for decentralised distribution of the produced videos.

8.5 Directions for future research

Despite research partners' interest for replication and scaling-up of the participatory video programme, more research is needed in order to further improve the dissemination of the resources produced by farmers at Katoloni CBO, and to understand optimal modes to increase farmers' access to videos. While my research has highlighted the benefits for farmers' groups to directly produce and to be featured in local videos, farmers involved in the programme also responded

positively to videos made by others in the same region – for example by the NGO ALIN – representing similar realities of communities living in nearby parts of Eastern Kenya.

Following from that, while this research focused specifically on video production and sharing within the area covered by Katoloni CBO, future research should explore the opportunities deriving from decentralised networks of farmer-led participatory production and farmer-to-farmer dissemination of larger quantities of videos, to assess to what extent and under what conditions a network of farmer filmmakers could document and inspire the emergence of new voices and small-scale farming innovations.

Similarly, the role of locally produced, low-cost video might continue to change as new relevant media products reach the market. For example, my last period of field research in 2012 coincided with the launch of the first series of the agriculturally themed reality show Shamba Shape Up, now in its fourth, very successful season. The show is part educational, part a reality TV show dedicated to farmers in need to improve their *shamba* (farm in Kiswahili), and I've shared tips with the team for downloading older episodes of the show from the Internet, so that they could be watched on demand and shared without additional connectivity problems. Future research should assess the relative contributions played by the various types of visual content, including commercial television and participatory video, as well as explore the potential for new forms of collaborations for low-cost video produced by farmers' information officers to inform, inspire and influence more mainstream outlets.

Another area of future research could involve more directly the impact of these initiatives on farmers' adoption of specific techniques, which remains one of the most challenging aspects (Duncombe, 2012). It was not the scope of the work in this thesis, but recommending replication and scaling-up of similar initiatives would not be appropriate without a parallel investigation of the relative impact of locally produced videos compared to other tools – or other types of videos - in determining the steps towards adoption of a new farming technique or a new activity to diversify a group's activity.

8.6 Policy contributions

The results of the research conducted for this thesis also suggest some policy contributions to be explored further. First of all, non-governmental organisations working in the field of farmer-led extensions could benefit from further integration with extension officers from the Ministry of Agriculture, providing them with more granular support as well as with the opportunities to share the local innovation they witness and document more widely. Similarly, the current fragmentation of the sector, which I witnessed while learning about other CBOs and NGOs working in this space, could benefit from sector-wide efforts to share good practices and specifically useful content (including audio-visual), in order to reduce duplication of efforts. Lastly, an increased focus on improving the reliability of the electricity and connectivity supply in rural and semi-rural areas could reduce barriers to access to knowledge as well as sharing rurally produced knowledge more widely.

8.7 Conclusion

This thesis has explored the role of participatory video as a way to complement farmer-led extension services provided by a team of information officers at Katoloni CBO, in Machakos County, Eastern Kenya. Despite its limitations and the technical challenges encountered during the process, the research provides new perspectives on the enhanced role that information officers can play by documenting and sharing locally relevant stories of innovation with their communities as well as with headquarters. The thesis has also highlighted the important role that local videos in local languages can play in inspiring farmers' groups to implement new practices and diversify their activities. Contextually, the research has provided an opportunity to explore the key requirements to ensure the effective use of video and other ICT4D programmes in rural development. Among other challenges, the technical ownership of initiatives and the development of in-house technical support appear as crucial conditions to ensure that ICT4D initiatives can expand organically.

Appendices

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This section contains all the relevant additional documentation I refer to during the thesis: from the questionnaires used, to the models for interviews and focus group discussions, to the Memorandum of Understanding with all partners.

Two DVDs including a selection of the videos produced by the team at Katoloni CBO in 2011 and 2012 are attached to the thesis.

Appendix A – First questionnaire in English, 2010

Information on farming

a) Is farming your primary activity? (*Please circle one answer*)   Yes   No

b) What other business activities do you practice?

....

c) What are your main challenges for your farming activities? (*Please order the three most important to you*)

Challenge	Order (*please order with 1, 2, 3, the top three challenges*)
Access to information	
Transport	
Inputs	
Pest management	
Access to markets	
Market prices	
Other:	
Other:	

d) What are your sources of information on farming? (*Please order the three most useful to you*)

Source	Order (*please order with 1, 2, 3 the top three sources*)
Radio	
Newspapers	
Magazines	
Tv	
Other farmers	
Internet	
Your agricultural information officer	
Other:	
Other:..	

Experience with the Infonet-Biovision programme

a) How have you accessed agricultural information from Infonet so far? (*Please tick all that apply*)

       at a farmers' information centre

       I was given printed Infonet material

       other farmers shared their findings with me

       the agriculture information officer shared some information with me

       via the Infonet cd/dvd

       via the "green" laptop

       by accessing the website

       other:…………

       I have not had any access to Infonet

       I don't know what Infonet is

b) How would you like to receive more agricultural information from Infonet in the future?

……

………

c) Please rate your experience with the Infonet agricultural content you have accessed:

Type of content	*Please only rate content you have accessed, by circling the appropriate value (-2 = unsatisfactory, -1 = partially negative, 0 = average, +1 = good, +2 = very good)*				
Organic farming	-2	-1	0	+1	+2
Pest Management	-2	-1	0	+1	+2
Marketing	-2	-1	0	+1	+2
Storage and processing	-2	-1	0	+1	+2
Soil, water and land management	-2	-1	0	+1	+2
Market links	-2	-1	0	+1	+2
Income generating ideas	-2	-1	0	+1	+2
Animal health information	-2	-1	0	+1	+2
Human health information	-2	-1	0	+1	+2

d) Please provide an example of something you learned through your agricultural information officer

....

....

....

e) Have you been able to start using any of the new techniques you learned through your agricultural information officer? (*Please circle one answer)*

Yes   No

f) If yes, please explain what new techniques learned through your agricultural information officer you now use?

....

....

....

g) What additional support would you need to start implementing the farming practices you have learned about?

....

....

....

h)What additional information would you like to access through Infonet and your agricultural information officer in the future?

....

....

....

i) Have you been able to share the information learned through this programme with other farmers in your area? (*Please circle one answer)*   Yes   No

j) If yes, please give one example of how you share information with others?

....

....

k) How frequently do you interact with your agriculture information officer? (*Please tick one answer*)

       in weekly meetings

       monthly meetings

       occasional meetings

       contact by mobile phone

       other: ....

       I don't have regular contacts

l) How would you like the agriculture information officer in your community to help you in the future?

....
....
....

m) Have you experienced any of the following changes since starting to work with your agriculture information officer? (*Please circle one answer per each statement*)

Change in agricultural practices		
Increased harvest	Yes	No
New crops and varieties	Yes	No
Additional income through the new varieties	Yes	No
Transition towards organic farming	Yes	No
Other:..		

n) What have been the most influential factors facilitating the above changes?

....
....

Access, ownership and use of ICT tools

a) Which ones of these tools do you own? (*Please tick all that apply*)

       music player   mobile phone   radio

       tv   dvd player   computer

b) Which one of these tools do you have access to in your family even if don't own? (*Please tick all that apply*)

music player   mobile phone   radio

tv   dvd player   computer

c) If you own a phone, can you tell us what brand and model you own? (*ie. Nokia 1100*)

....

d) What features of the phone do you use most? (*Please tick up to 5 features*)

call	sms	mpesa/zap
alarm	calendar	camera
radio	music player	games
flash light	internet	other: ....

Basic Information
The following information is asked in order to be able to analyse the data collected
Sex: ....
Age: ....
Level of education: ....
Formal agricultural training:..............
Location: ....
Group name (if member of a group): ....
Name of agricultural information officer: ....
Size of land farmed: ....
Today's date: ....

Thanks a lot for your time!

Appendix B – Kiswahili version of first questionnaire, 2010

Maswali ya Infonet Okt/Nov 2010

Habari juu ya Kilimo

a) Unategemea kilimo kama shughuli ya msingi maishani mwako? (*Tafadhali weka alama ya mviringo kwenye jibu lako.*)   Ndiyo La

b) Je, unashughulika na kazi gani nyingine mbali na kilimo?

....

....

c) Ni shida gani kubwa unazokumbana nazo unapotekeleza shughuli zako za kilimo?(*Tafadhali kulingana na wewe chagua shida tatu kubwa zaidi unazozipitia kati ya zifuatazo*)

Matatizo	Tafadhali panga Matatizo unayooyapitia kulingana na uzito, tumia nambari kwa mfano (1, 2, 3)
Vile unavyofikia Habari na taarifu	
Usafiri	
Mahitaji ya ziada unayoongezea katika shughuli zako za kilimo	
Kudhibiti wadudu	
Kufikia soko	
Bei ya bidhaa sokoni	
Zinginezo:	
Zinginezo:	

d**)** Ni wapi unapata ujumbe kuhusu kilimo? (*Tafadhali kulingana na wewe chagua mbinu tatu zinazokusaidia upate habari za kilimo kati ya zifuatazo*)

Njia uliotumia kupata habari	Tafadhali zipange zile njia tatu bora zaidi ulizozitumia kupata habari, tumia nambari kwa mfano (1, 2, 3)
Redio	
Magazeti	
Vitabu au magazini	
Runinga au Televisheni	

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Wakulima wengine	
Mtandao wa internet	
Afisa wa maswala ya kilimo wa kijiji	
Zinginezo:…………………………………	
Zinginezo:…………………………………	

Uzoefu na mpango maalum wa Infonet- Biovision

a) Ulipata kujua habari za Infonet kwa njia gani (*Tafadhali, kwa njia zifuatazo weka tiki kwa ile njia iliyokusaidia kujua habari za infonet*)

kupitia kwa vituo vya habari za kilimo vya wakulima
kupitia kwa nakala za Habari zilizochapishwa za Infonet
kupita kwa wakulima wengine walionifunza
afisa wa habari za kilimo alinifunza
kupitia cd/ dvd ya Infonet
kupitia computer (the "green computer")
kupitia kwa tovuti/ website
zingine: ………………………………………………………………
sijawahi kupata habari yoyote kuhusu Infonet
sijui Infonet ni nini

b) Ungependa kuendelea kupata habari kilimo kutoka Infonet kwa njia gani siku zijazo

……
……

c) Tafadhali onyesha zile habari za kilimo za infonet ulizopata:

Aina ya habari	Tafadhali dhibitisha kwa kuchagua nambari inayolingana na vile ulivyoona habari uliopata pekee (-2 Sitosheki, -1 Si nzuri , 0 = Kadri, +1 = Vizuri, +2 = Vizuri sana)				
Kilimo hai	-2	-1	0	+1	+2
Kudhibiti wadudu	-2	-1	0	+1	+2
Kuuza	-2	-1	0	+1	+2
Kuhifadhi na kuunda	-2	-1	0	+1	+2
Kuhifadhi udongo, maji na mashamba	-2	-1	0	+1	+2
Uhusiano wa masoko	-2	-1	0	+1	+2
Kanuni za kuimarisha mapato	-2	-1	0	+1	+2
Ujumbe kuhusu afya ya wanyama	-2	-1	0	+1	+2
Ujumbe kuhusu afya ya binadamu	-2	-1	0	+1	+2

d) Tafadhali toa mfano wa habari yoyote uliofunzwa na Afisa wa habari za kilimo wa kijijini mwako

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....

....

e) Umewahi kujaribu kutumia ujuzu mpya uliofunzwa na Afisa wa habari za kilimo? (*Tafadhali weka alama ya mviringo kwenye jibu lako*)   Ndiyo   La

f) Iwapo jibu lako ni ndiyo, ni mbinu gani mpya za kilimo ulizosoma kupitia kwa Afisa wa habari za kilimo na unazitumia kwa sasa?

....

....

g) Ni msaada upi au usaidizi mwingine unaohitaji ili uwezeshwe kutumia mbinu tofauti za kilimo ulizosoma ?

....

....

h) Kulingana na wewe ni habari ipi yakuongezea unayoonelea unahitaji kuipata kupitia kwenye mpango maalum wa Infonet na kupitia kwa Afisa wa habari za kilimo siku zijazo?

....

....

i) Umewahi kujadiliana na kushirikiana na wakulima wengine kuhusu habari ulioisoma kwenye mpango huu katika kijiji chako? (*Tafadhali weka alama ya mviringo kwenye jibu lako*)   Ndiyo   La

j) Iwapo jibu lako ni ndiyo, toa mfano mmoja wa ile mbinu uliotumia kujadiliana na kushirikiana na wakulima wengine

....

k) Unahusaiana na kushirikiana kivipi na Afisa wa habari za kilimo? (*Tafadhali weka alama ya tiki kwenye chaguo lako*)

　　　　Kwa mikutano ya kila wiki
　　　　Kwa mikutano ya kila mwezi
　　　　Kwa mikutano inayofanyika mara moja moja
　　　　Mnazungumza kupitia kwa simu ya mkononi
　　　　Mbinu zingine za kumpata...............................
　　　　Mbinu zingine za kumpataHuwa sizungumzi na Afisa wa habari za kilimo kila mara.

l) Ungependa Afisa wa habari za kilimo kijijini mwako apeane usaidizi upi kwa wakulima siku zijazo?

....

....

m) Je, Umewahi kuona mabadiliko yafuatayo tangu uanze kufanya kazi na Afisa wa habari za kilimo?

Mabadiliko katika utekelezaji wa kilimo		
Mavuno yameimarika	Ndiyo	La
Mimea mipya na ya aina mbali mbali	Ndiyo	La
Mapato yalioongezeka kutoka sehemu tofauti	Ndiyo	La

Kubadilisha mtindo wa kilimo ushiriki kilimo hai	Ndiyo	La
Mabadiliko mengine..		

n) Ni mambo gani yamechangia pakubwa mno katika kuleta Mabadiliko hayo?
....

Kufikia na kumiliki vifaa vya tekinologia
a) Je, unamiliki kifaa kipi kwa hivi vifuatavyo? (*Tafadhali weka tiki kwa kile kifaa ulicho nacho.*)

    Kinanda cha muziki   Simu ya mkononi
    Redio   Runinga au televisheni
    Ala ya muziki aina ya DVDTarakilishi au computer

b) Ni, kifaa kipi unachokitumia katika jamii yako kati ya hivi vifuatavyo hata kama si chako haswa?
    Kinanda cha muziki   Simu ya mkononi
    Redio   Runinga au televisheni
    Ala ya muziki aina ya DVD   Tarakilishi au computer

c) Iwapo una simu ya mkononi ni simu ya aina gani? (*Kwa mfano Nokia 1100*)
....

d) Ni vipengele gani vya simu yako ya mkononi unavyotumia sana? (*Tafadhali tia alama ya tiki kwenye vipengele tano kati ya hivi vifuatavyo*)
  Kupiga simu   SMS
  M-pesa / Zap   King'ori (Alarm)
  Kutumia kalenda iliyoko kwenye simu   Kutumia simu kupiga picha
  Kusikiliza redio ya simu   Kucheza michezo ya simu
  Kutumia ala ya kucheza mziki kwenye simu Kutumia simu kama tochi
kumulika
  Mtandao wa internet
  Kazi zinginezo unazotumia kwa simu: ....

Msingi wa Ujumbe
Habari hii imehitajika ili kusaidia katika kuchambua taarifa iliyopatikana.
Jinsia.................
Umri.................
Kiwango cha elimu.............
Mafunzo rasmi katika kilimo.........
Mahali/ Makazi..................
Jina la kikundi (Iwapo anayejibu ni mmoja wa kikundi)......................
Jina la Afisa wa habari za kilimo..
Shamba lililo chini ya kilimo linatoshanaje? ....
Tarehe ya leo: ....

ASANTE SANA!

Appendix C – Questions for interviews with information officers in 2010

- Can you please describe the three things in your job that you spend the most time doing?
- How long have you been doing this job for?
- What is your background? What formal training do you have in agriculture?
- How do you think that agriculture in your community will change in the next 5 years? Why?
- What are the most useful skills of farmers in your community?
- What are the main challenges for farmers in your community?
- What do farmers say are their most important needs?
- What are the main information needs of farmers in your region?
- How many farmers do you meet on a weekly basis?
- Could you please describe a typical visit with a farmer or a farmers' group?
- Do you often face challenges you can't solve in your work? Could you give me an example?
- If you were to spend KSh 50,000 to make your work more efficient, what would you invest in? Why?
- What is your experience with the Infonet content provided?
- What content areas available on Infonet are most useful to your farmers?
- What issues would you like to see improved as part of the Infonet content?
- Do farmers often ask you for information that you can't find on the Infonet? Please give an example
- What kind of feedback do you receive from farmers about the information you provide? Could you give me an example?
- Do you often learn from farmers knowledge not included in Infonet?
- What do you suggest as the best ways to integrate farmers' feedback into the future work of the Infonet programme? Why?
- Do farmers apply the knowledge passed on by you? Could you give me some examples?
- What factors could improve farmers' implementation of practices learned through you? Why?
- What changed in the organisation of your work since you had access to the Infonet content and the laptop?
- When and why have you previously used a laptop?
- What do you use the Infonet laptop for?
- Have you been able to use the Infonet laptop for other activities outside your work?
- What have been your main challenges in using it? Why?
- What additional training would you require to make better use of the laptop?
- What do you like most about the laptop?
- Are there things you would like to do with the laptop but you can't?
- What features of the laptop would you like to see improved? Why?
- Do you have any other comments to add or things you would like to talk to me about?

Appendix D – Questions for focus group discussions in 2010

Aim and format

The purpose of conducting these focus groups is to gain a detailed understanding of the impact of the programme from the perspective of participating farmers. Ideally the focus groups will be conducted with between 6-8 farmers present. It is anticipated that each focus group will last for up to 90 minutes.

*We want to create a relaxed environment in which participants are free to share their experiences, both positive and negative. Focus needs to be on asking **why** and **how** as much as possible – moving beyond description and just **what** questions. There are a large number of suggested questions listed below – but the idea of the method is that it will be flexible and responsive – **if the participants want to then they should be free to guide the conversation on to other related topics as well.***

The aim is to encourage discussion amongst the participants as much as possible rather than them taking it in turns to answer questions from the facilitator one at a time. If they argue then that is not a bad thing, we want to give them opportunity to challenge one another and have different opinions. Remember that the role of the facilitator is not always to talk very much, but to guide the discussion through the key questions, pausing the discussion on interesting points and drawing out the quieter members of the group so that everyone can contribute.

Setting the context	
Outline of introductory questions (10 minutes)	*Purpose*
Facilitator introducing himself and explaining the reason for the event. Example: *My name is Ugo Vallauri, I am a researcher*	*Establish my position and reason for the focus group.*

at the University of London, working on rural agricultural development and the role of communication and information technologies. I am here working for Biovision / icipe to find out more about the Infonet programme. The Infonet programme helps agriculture information officers such as *** in your community, by providing them with access to up-to-date information on organic agriculture and with a computer to facilitate their work. I am interested in finding out what effect this programme has on your lives as farmers and whether you are benefiting from it. Please know that nothing you say here will have any effect on your current relationship with your information officer and will not be used by people other than myself. You are free to say whatever you like to me.	
Now that the programme has been running in your area for almost a year, I would like to find out some of your thoughts and experiences. I would like it if we could begin with you telling me about your farmers' group, what are the activities you engage with and the reasons for you to be together in a group. After this introduction, I would like us to discuss some topics with you to learn your opinions.	*Summarise the core aims and key anticipated areas of discussion.*
What I am really interested in is to find out what you really think about things. I don't have any specifici expectations, and I want you to be completely free to tell me what you	*Set the atmosphere of open and honest dialogue as core purpose of the focus group. There are no*

want. In order to understand how the Infonet programme actually works I would like to listen to your opinions. Please know that there are no 'right' or 'wrong' answers, and negative feedback will not result in problems for you.	*right or wrong answers!*
Do you mind if we record the discussion? It helps me because it means I don't have to write things down at the same time as we are talking. Also we can remember what we all said and then learn from it later on. I'll make sure no one else finds out who said what, and I am not going to share any of your names with others.	*Introduce the recording of the session, demonstrate the recording equipment. Establish confidentiality and ask if they are happy to be mentioned in the report.*
Are there any questions you would like to ask me to begin with?	*Check everyone understands what we will be doing.*

Core questions for focus group	
Main questions, purpose and topic area (up to 70 minutes)	Additional questions /notes
General farming environment?	1. Can you please introduce yourselves? 2. How would you describe the objectives of your farmers' group? 3. Why did you join it?
Issues around farming	• What would you agree are the main difficulties of farmers in your communities?
When you need some information about farming, what do you do?	– What are the sources available in your community?

How do you usually learn about new techniques or advice on farming?	
If you were to design a system to help you with your farming problems from scratch, what would it be like?	
Considering the past year of work with the Infonet programme, what are the most useful ways in which your group was supported by the Infonet information officer working in your area?	
What would you suggest as additional ways the information officer to provide support to your group?	
What would you all agree are the three most important things you have learned through Infonet?	
What would you all agree are the most critical factors for implementing in your farms what you learned through Infonet?	
Have you seen this before? (picture of the laptop) Can you describe to me what it is and what has been your direct experience with it?	

How have you found this discussion? *Opportunity for feedback and reflection*	Have you had opportunity to say what you really think? Are you happy to answer these questions or would you prefer we did not do it again? What do you think we should improve the next time we talk to a group of farmers? What other things do you think we should do to find out about this programme and how effective it is being?
Concluding thanks and opportunity for any additional ideas	Thank you very much for your help. Is there anything else you would like to tell me about the Infonet programme and your experience with your agriculture information officer before we finish?

Appendix E – Map of Infonet-Biovision project sites visited in 2010
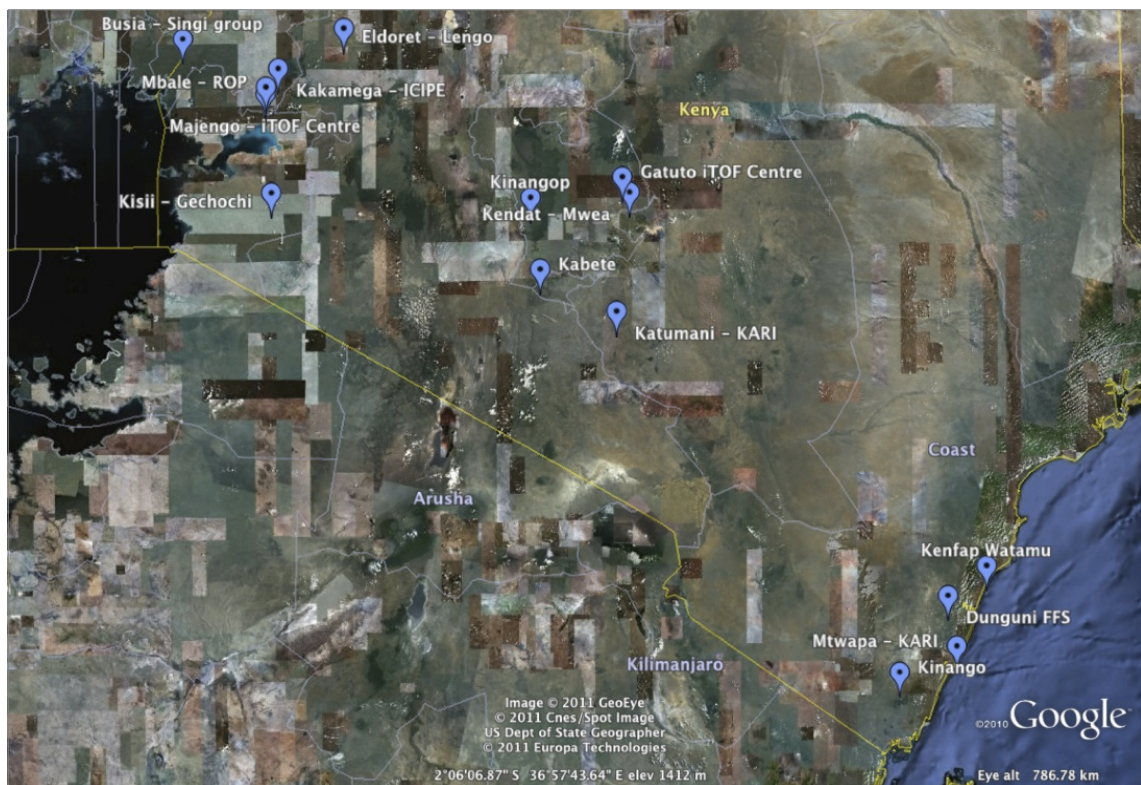
The activities of Infonet are concentrated in three parts of Kenya: Western Kenya, Central Province and Coast Province. The selection of project sites to be visited reflected the geographic distribution and reach of the project.

Map provided by © 2010 Google

Source of the overlaid layer is available at:

https://maps.google.co.uk/maps/ms?
msid=201724142733830339561.0004a03dcb669e3dd111a&msa=0&ll=-
1.230374,36.925049&spn=6.411191,11.634521

Appendix F – First MoU with Infonet-Biovision

Parties

Infonet-Biovision, Kenya, and Ugo Vallauri, PhD researcher at Royal Holloway, University of London.

Concerning

Ugo Vallauri working in partnership with Infonet-Biovision to assist them with their baseline evaluation of the Infonet activities in Kenya, data from which can be used for his PhD research.

Period of validity

October 2010 – January 2011

Activities

30 days in Kenya October-November 2010 to finalise baseline evaluation framework and conduct field work

Specifically,

> Review relevant literature on web-based information communication pertinent to Infonet activities.
>
> Prepare a concept note (of a minimum of 5 pages) showing how this study will contribute to improved performance by Infonet-Biovision.
>
> Develop an appropriate study design including appropriate data collection tools based on relevant indicators.
>
> Conduct 15 days of field work as per the study design to collect the needed data.
>
> Analyse the data and write a detailed report including results, discussion and recommendations for improving the programme's impact pathway.

Commitment from Ugo Vallauri

During the agreed period in Kenya, Ugo commits to providing support and assistance to the Infonet-Biovision team on baseline evaluation related matters in an advisory capacity, giving comment and feedback throughout the process.

The final baseline evaluation report will be written by Ugo in consultation with the Infonet-Biovision staff in Nairobi. The length of the final report will have a minimum of 20 pages including. The report will contain all the standard parts of a technical report, and specifically results from the baseline, their discussion and recommendations for Infonet. In addition to this report, an abridged version of approximately 5 pages also be produced. A preliminary form of the report will be produced not later than December 20th 2010. The final report will be submitted by January 30, 2011.

Ugo also commits to allow Biovision to check any writing (including his PhD) that mentions them by name or direct implication before it is published. Biovision agrees to respond within two weeks of receipt of such writing, or otherwise forfeits any right to comment. The names of authors of publications resulting from any work out of this project, other than Ugo's PhD, will reflect the division of work involved in its production, and may include key Biovision Infonet staff, David Amudavi and Anne Bruntze, as co-authors wherever relevant.

Commitments from Infonet-Biovision

Infonet-Biovision commits to covering the costs of transport and accommodation and reasonable living costs during the fieldwork in Kenya.

Infonet-Biovision allows Ugo to write in his PhD thesis about the partnership and the research undertaken and the data gathered, and will comment within two weeks on any work sent to them (as above).

Infonet commits to assisting Ugo in answering questions and allowing him to conduct interviews with them regarding the programme in addition to the agreed fieldwork.

Termination

Either party is at liberty to terminate this agreement by giving either party a notice of 30 days from the commencement of the contract.

Following the completion of the baseline evaluation report, Ugo may continue to liaise with Infonet-Biovision, both in the context of the PhD and with further developments with the Infonet-Biovision programme. If this is the case then a new arrangement will be reached which does not come under this MoU.

Appendix G – Application for RGS-IBG Postgraduate Research Award

Applicant: Ugo Vallauri

Affiliation: Geography Department, Royal Holloway, University of London

Commencement of the PhD: October 2007 (part time, self-funded)

Intended completion date: September 2012

Dates of intended fieldwork: March – September 2011 (two rounds of fieldwork)

Title of the project

Participatory video as a catalyst for promoting farmer-led innovations among small scale farmers in Eastern Kenya.

Abstract of the project

The project will investigate the effectiveness and implication of using low-cost digital participatory video in documenting, diffusing and promoting farmer-led appropriate agricultural innovations in the context of a community-based organisation operating in the wider Machakos district in Eastern Kenya.

Primary area of study: Sustainability

Aim of the project:

The project aims at challenging recent trends in research in Information and Communication Technologies (ICT) for rural development, primarily focusing on the role of mobile phones as key enablers of agricultural information sharing in poor and marginalised areas of Africa. The results of research I conducted so far suggest the importance of moving away from a device-centric perspective, concentrating instead on communication flows among and across rural communities. Within this framework, participatory video appears to be a promising and appropriate way to share personal and meaningful accounts of farmer innovations otherwise not captured by traditional extension networks.

The proposed fieldwork will concentrate on the role of this form of

communication in rural development interventions carried out by Katoloni, an active community-based organisation (CBO) in Machakos, Eastern Kenya, working with no less than 50 active farmers' groups with the district.

Following a round of exploratory research conducted in October-November 2010, the organisation was identified because of their current use of some ICTs in their activities, and because of their existing plans to test video-based communication with literate as well as illiterate members.

The project will contribute to the wider PhD study in two ways. First, it will provide an opportunity to investigate bottom-up uses of video communication as a platform to document and disseminate local sustainable agriculture practices and innovations. Secondly, it will explore and analyse the reactions to this technique and the conditions for its impact among local farmers' groups, particularly when combined to existing networks of agricultural extension.

Location of the research area: Machakos District, Eastern Kenya - 1°31′S 37°16′E

Full description of the proposed research:

The current proposal builds on previous research I conducted in partnership with Infonet-Biovision (http://www.infonet-biovision.org/), an initiative providing support to small scale farmers in rural Kenya by producing a database of up-to-date information on sustainable, low-input and organic agriculture, and disseminating it via laptops provided to community information officers. While the original objective of the research was an assessment of the project impact and of potential developments using mobile phones, my findings allowed for a different analysis of farmers information needs. The data I gathered suggest that most farmers now have access to mobile communication, either directly or indirectly, but their main agriculture information needs are not satisfied by current offerings, primarily because of the focus on textual content written in English. A number of independent farmer informants suggested the importance of video-based communication in local languages (primarily Kiswahili) as an educational tool, to be used by extension officers during trainings, but also by farmers themselves to communally review newly learned techniques. Even though the use of video is not new in agricultural development communication,

the diffusion of more affordable ICT equipment in rural areas provide an opportunity for more widespread production and dissemination of local content.

Katoloni CBO was chosen because of the particular articulation of the organisation, providing assistance to farmers' group across the whole Machakos district, through four extension officers working in collaboration with researchers from the Kenya Agricultural Research Institute, committed to the promotion of organic farming practices with the dual goal of improving environmental conservation and allowing farmers to reduce their production costs and find new competitive markets for their products.

The research will be organised in two main phases. The first phase (March-April 2011) will include elements of participatory action research, as I intend to work directly in collaboration with the local extension officers, providing advice on specific technological choices and training on basic video production, editing and dissemination. In the interest of inclusiveness and participation, I will focus on creating a collaborative environment featuring farmers' groups eager to contribute their specific expertise and time to share their views on production, essential feature requirements as well as fruition of video-based content.

The second phase of the research (August-September 2011) will examine the implication of the usage of video in selected farmers' groups members of the CBO, by way of in-depth interviews with extension officers on the ground, focus groups with a variety target groups, extensive surveys and comparisons with baseline data I collected during the previous round of. I will be additionally analysing the range of videos produced, exploring whether they facilitate the emergence of new voices in rural agricultural development, and whether they increase awareness and implementation of more sustainable agricultural practices.

An extra layer of enquiry will involve investigating whether horizontal farmer-to-farmer digital video produced in one specific district provides a valuable source of information for farmers in other part of the country. This aspect will be explored by analysing the distribution of the produces videos through the existing Infonet network.

How the research will further geographical knowledge and details of its applied benefit:

This research contributes to a number of ongoing debates in human geography:

rural agricultural development, the divide between agricultural research and rural bottom-up practices, the role of ICT in promoting a more inclusive and participatory approach to development. The results of the research will be contributing to existing and upcoming programmes linking the promotion of more sustainable, ecologically sound agricultural practices with ICT initiatives for rural development. It is expected that the results will also provide a diverse and original contribution to practitioners as well as funders working in rural development in Kenya and East Africa.

Plans for disseminating the results of the research:

Apart from writing extensively about the research as part of my PhD, I intend to disseminate the results of the research in three different ways.

During the research, I intend to keep a blog collecting not only video material produced as part of the project, but also field notes, comments and useful documentation and web links. Posting the videos on the Internet will not only amplify their possible usage by other communities within and outside Kenya, but also provide much needed external feedback in the form of comments and suggestions.

After analysing the data, I will also submit abstracts and papers to suitable publications, particularly in the areas of agricultural development, rural development and ICT for Development.

In addition to this, I intend to submit papers to key upcoming conferences, particularly in the sector of ICT for Development.

Last but not least, I will ensure that the results of the research are made available extensively to the farmers' groups who participated in the research, through sharing of findings in both writing and video format.

Risk assessment and safety management plan and details of appropriate ethical approvals:

I have worked and lived in Kenya in the past, this making it easier to assess the risk of conducting fieldwork and the importance of preventive measures. The geographical area chosen for this project is a semi-arid par of Kenya, generally not particularly affected by the long rains, usually hitting the country in late March/April.

During my staying I will be looking for safe accommodation in Machakos town, conveniently located in the centre of the research area. Given the altitude of Machakos, I will make sure to use a mosquito net while sleeping at all times, to reduce the risk of contracting malaria. In terms of transport, in some cases I might have to rely on motorbike drivers to reach out to specific farmers' groups, but will otherwise prioritise 4wd vans instead. My previous experience, together with the choice to work in collaboration with Katoloni CBO will ensure sensible logistical decisions are taken at all times.

In terms of research ethics, I intend to always clearly state the objectives of my work, my affiliation and the foreseen usage of the collected data with all involved stakeholders. The choice of the partner ensures that there is a joint interest in exploring video as a suitable platform for communicating agricultural innovations. At the same time, I am aware of the disadvantages of research in partnership, particularly when it comes to possible conflicting agendas, and different set of expectations, especially when it comes to the desire for immediate results. Setting a participatory environment for the research will be an essential tool to ensure quality involvement of participants and subsequent results.

While I mentioned earlier my intention to post the videos produced online, this will happen only when participants have agreed so.

How did you hear about the RGS-IBG Postgraduate Research Award?

Information about the award was shared with PhD students by a professor in the Geography department.

Appendix H – Second MoU with Biovision and Katoloni CBO, 2011

Memorandum of Understanding Regarding Testing the Participatory Use of Video for Documentation and Dissemination of Sustainable Agriculture Practices in Kenya

Parties

Biovision Farmer Communication Programme (FCP), Kenya; Katoloni Mission CBO, Kenya; and Ugo Vallauri, PhD student at Royal Holloway, University of London.

Concerning

A project for Ugo Vallauri to conduct research for his PhD study at Royal Holloway, University of London, in collaboration with Katoloni Mission CBO as a key partner in Eastern Kenya in the Biovision Farmer Communication programme, particularly in the area of using locally generated digital video content as an additional communication tool for the programme. The purpose of the research project is to test the use of video as an additional channel for documentation and dissemination of sustainable agriculture practices with FCP's Infonet information officers within Katoloni CBO. This research aims at investigating the potential of this type of ICT in rural agricultural development, particularly in the context of participatory process for content production, farmer-led extension services.

This study will contribute to the researcher's thesis key areas of enquiry which his thesis aims to address, namely:

- The role of women and the youth in smallholder agriculture and the relevance of ICT in addressing inclusion and emergence of new voices.

- The role of participatory media development and multimedia, video communication in the establishment of rural-to-rural communication flows and networks, redefining rural actors as sources and hubs for innovation.

- The divides between access to information, knowledge and ICTs – and the achievement of agricultural development goals. Recontextualising the role

of ICT within wider divides of land, power, access to water and other re-
sources.

- Is the role of ICT relevant in agricultural development because of specific
  initiatives or at an infrastructural level? In other words, is there a specific
  scope for a developmental stream of ICTs in rural agriculture?

Period of validity

July 2011 – March 2012

Activities

(a) Field research in Kenya between July 11th   and September 2nd 2011
(b) Follow-up field research in Kenya in February/March 2012

Specifically,

- Ugo will conduct field research in close collaboration with information
  officers of the Katoloni Mission CBO, with support from Biovision Farmer
  Communication Programme.
- The first phase of field research will involve training up to eight officers on
  the usage of video and participatory video practices for documentation and
  dissemination of sustainable agriculture practices. It will continue with
  supporting information officers in producing documentary videos to
  support their work. It will concurrently involve research on farmers' needs;
  expectations and reactions to video communication.
- The second phase of field research will primarily assess the progress of the
  project during the previous six months, by way of interviewing project
  participants, farmers, and viewers of the content produced, with the goal of
  learning about the benefits and impacts brought by the additional tool of
  information dissemination within the FCP programme.
- Following completion of the two field research periods, Ugo will continue
  to share his findings during the analytical period and will plan to share the
  final findings at the end of the research process with both partners.

Commitment from Ugo Vallauri

- During the agreed periods in Kenya, Ugo commits to work with the highest

integrity and in an open, participatory way with the partners.

- Ugo will consistently share his research plans, come up with an agreed and feasible research schedule in collaboration with Katoloni CBO, and support participants in their learning throughout the project.
- Ugo will ensure that all relevant video produced during the research project is released with open licensing allowing for free distribution and sharing within and beyond the Biovision FCP.
- Ugo will provide the partners with a copy each of the report of the research training event.
- Ugo will ensure that any material presented at any forum or published and emanating from the project will acknowledge the partners.

Commitments from Biovision Farmer Communication Programme (FCP)

- The Biovision FCP commits to support Ugo's position as a researcher in Kenya for the duration of the project.
- The Biovision FCP commits to providing technical support to Ugo, including providing information officers participating in the project with appropriate digital camcoders for video production.
- The Biovision FCP commits to assisting Ugo in answering relevant research questions and allowing him to conduct interviews with them regarding the programme in addition to the agreed fieldwork.
- The Biovision FCP may additionally contribute to local money expenses (travel, accommodation, translation) for the second round of research in February/March 2012.

Commitments from Katoloni Mission CBO

- Katoloni CBO commits to selecting participants for the project and providing logistical support and guidance to Ugo in relation to both training and subsequent research activities.
- Katoloni CBO commits to support information officers in participating in video training and production during field research sessions.
- Katoloni CBO commits to assisting Ugo in answering relevant research questions and allowing him to conduct interviews with them regarding the

programme in addition to the agreed fieldwork.

Termination

Either party is at liberty to terminate this agreement by giving either party a notice of 30 days from the commencement of the contract.

Appendix I – Questions for focus group discussions in 2011 and 2012

Aim and format

The purpose of conducting these focus groups is to gain a detailed understanding of the impact of the programme from the perspective of participating farmers. Ideally the focus groups will be conducted with between 6-8 farmers present. It is anticipated that each focus group will last for up to 90 minutes.

*We want to create a relaxed environment in which participants are free to share their experiences, both positive and negative. Focus needs to be on asking **why** and **how** as much as possible – moving beyond description and just **what** questions. There are a large number of suggested questions listed below – but the idea of the method is that it will be flexible and responsive – **if the participants want to then they should be free to guide the conversation on to other topics related to their group and farming as well.***

The aim is to encourage discussion amongst the participants as much as possible rather than them taking it in turns to answer questions from the facilitator one at a time. If they argue then that is not a bad thing, we want to give them opportunity to challenge one another and have different opinions. Remember that the role of the facilitator is not always to talk very much, but to guide the discussion through the key questions, pausing the discussion on interesting points and drawing out the quieter members of the group so that everyone can contribute.

Setting the context	
Outline of introductory questions (10 minutes)	*Purpose*
*Focus group facilitator to spend time introducing themselves and explaining where they are coming from. **Example:***	*Establish my position and reason for the focus group.*

My name is Ugo Vallauri, I am a research student at the University of London, working on rural agricultural development and the role of communication and information technologies. I am here because I collaborate with Katoloni CBO to find out more about the way they interact with farmers' groups such as you. I am interested in finding out what effect their programme has on your lives as farmers and whether you are benefiting from it. Please know that nothing you say here will have any effect on your current relationship with your information officer and will not be used by people other than myself. You are free to say whatever you like to me.	
I would like it if we could begin with you telling me about your farmers' group, what are the activities you engage with and the reasons for you to be together in a group. After this introduction, I would like us to discuss some topics with you to learn your opinions.	*Summarise the core aims and key anticipated areas of discussion.*
What I am really interested in is to find out what you really think about things. I don't have any specific expectations, and I want you to be completely free to tell me what you want. In order to understand how the Infonet programme actually works I would like to listen to your opinions. Please know that there are no 'right' or 'wrong' answers, and negative feedback will not result in problems for you.	*Set the atmosphere of open and honest dialogue as core purpose of the focus group. There are no right or wrong answers!*

Do you mind if we record the discussion? It helps me because it means I don't have to write things down at the same time as we are talking. Also we can remember what we all said and then learn from it later on. I'll make sure no one else finds out who said what, and I am not going to share any of your names with others.	*Introduce the recording of the session, demonstrate the recording equipment. Establish confidentiality and ask if they are happy to be mentioned in the report.*
Are there any questions you would like to ask me to begin with?	*Check everyone understands what we will be doing.*

Core questions for focus group	
Main questions, purpose and topic area *(up to 70 minutes)*	Additional questions /notes
General farming environment?	-Can you please introduce yourselves? - How would you describe the objectives of your farmers' group? - Why did you join it?
Issues around farming	- What would you agree are the main difficulties of farmers in your communities?
When you need some information about farming, what do you do?	- What are the sources available in your community?
How do you usually learn about new techniques or advice on farming?	
Have you had a chance to watch some of the videos created by the information officers?	*- Where did you watch them?* *- What did you think of the videos?* *- Would you buy them in DVD?*

What are the most interesting aspects of the videos you have watched?	*- What other topics would you like to see covered?*
What would you all agree are the most important things you have learned by watching the videos?	
How have you found this discussion? *Opportunity for feedback and reflection*	- Have you had opportunity to say what you really think? - What other things do you think we should do to find out about this programme and how effective it is being?
Concluding thanks and opportunity for any additional ideas	Thank you very much for your help. Is there anything else you would like to tell me about the Infonet programme and your experience with your agriculture information officer before we finish?

Appendix J – Questionnaire for CBO members, August 2011

Group Name: ....

Number of group members: ...   Men: ... Women: ...

Location: ....

Your role: ....

Age: Sex: ☐ Man ☐ Woman

What is the size of land available to your group's projects: ...

What is the average land size for members of your group: ...

1) What are the main activities of your group?

....

....

....

The three videos we have watched are:
- – Meteorological Department
- – Florence & Climate Change
- – Poultry Keeping

2) Which one of the three videos did you enjoy the most? Why?

....

....

....

3) Which one of the three videos did you enjoy the least? Why?

....

....

....

4) Did you learn something new for your group by watching these videos?   ☐ Yes ☐ No

5) Can you give an example of something you have learned?

....

....

....

6) Can you share something inspiring from the videos that you are willing to experiment in your group?

....

....

....

7) What are the three most important topics that Katoloni CBO should feature in future videos?

1) ....

2) ....

3) ....

8) What type of videos would you be most interested in watching?

☐ Videos about other groups in Katoloni CBO

☐ Videos about innovative farmers in Ukambani

☐ Videos about other parts of Kenya

☐ Videos about farming in other countries

☐ other – please provide an example: …...

9) What language should the next videos be produced in? (choose only one)

☐ Kikamba

☐ Kiswahili

☐ English

10) If you were to make a movie about your group, what would it be about?

....

....

....

11) What would be the best way to share what you learned in the videos with other group members?

………

………

………

12) What are the main advantages of accessing videos about agricultural issues in your region?

………

………

………

13) How do you prefer to learn about a new topic?

Please rank up to 5 favourite ways to learn, choosing from the following options:

Mode of learning	**Rank your favourite options with 1,2,3,4,5**
Radio	ـــــ
Video	ـــــ
Magazine	ـــــ
Demonstration with information officer	ـــــ
Receiving information on your phone	ـــــ
Radio and magazine	ـــــ
Video and magazine	ـــــ
Video and discussion with officer	ـــــ
Exchange visits to other groups	ـــــ

Appendix K – Kiswahili version of August 2011 questionnaire

Mkutano wa Katoloni Mission CBO – August 18th 2011 - Maswali

Jina la kikundi ....

Kikundi kina watu wangapi?   Wanaume:............. Wanawake:... ....

Tarafa [Location]: ....

Wewe ni nani kwa kikundi [position]: ....

Umri: ...   ☐ Mwanaume   ☐ Mwanamke

Shamba la kikundi chenu ni kiasi gani: ...

Wanachama wa kikundi chenu wana mashamba kiasi gani: ...

1) Kikundi chenu kina miradi gani? [Activities]

....

....

....

Video tatu ambazo tumeonyeshwa ni:

- Idara ya utabiri wa hali ya hewa
- Florence Nzambuli na mabadiliko ya hali ya hewa
- Ufugaji wa kuku

2) Ni video gani imekufutia zaidi? Kwa nini?

....

....

....

3) Katika video hizo tatu ni gani haijakufutia sana? Kwa nini?

....

....

....

4) Umesoma jambo mpya la kusaidia kikundi chenu kutoka kwa video hizi? ☐ ndio ☐ la

5) Unaweza kupeana mfano wa kile umesoma?

....

....

....

6) Unaweza kusema ni nini imekupendeza katika hizo video ambacho unaweza kupelekea kikundi chako mkafanyie majaribio?

....

....

....

7) Ni video za kuhusu nini [topics] ambazo ungependa Katoloni CBO iweke katika video watakazotengeneza wakati mwingine? Taja aina tatu.

1) ....

2) ....

3) ....

8) Ni video za aina gani tatu[3] ungependezwa sana kuona?

☐ Video kuhusu vikundi vingine vya Katoloni CBO

☐ Video kuhusu uvumbuzi wa wakulima kutoka Ukambani

☐ Video kutoka eneo zingine za Kenya

☐ Video kuhusu kilimo kutoka nchi zingine

☐ Aina zingine – Tafadhali taja mfano: …...

9) Ungependelea video zile zijazo ziwe katika lugha gani? (chagua moja)

☐ Kikamba

☐ Kiswahili

☐ English

10) Ingekuwa ni wewe unatengeneza video ya kikundi chako ,itakuwa ni kuhusu nini?

....

………

………

11) Ni wapi ama ni njia gani itakuwa nzuri zaidi kusoma kwa pamoja na wanchama wengine wa kikundi mafundisho ya video hizi?

………

………

………

12) Ni uzuri [advantages] gani wa kutumia video za kilimo katika eneo lenu?

………

………

………

13) Ungependelea kusoma namna hipi jambo mpya kuhusu kilimo?

Tafadhali fuatanisha njia tano[5] kwa ubora katika hizi umepewa:

Njia ya kusoma	**Fuatanisha kwa ubora 1,2,3,4,5**
Radio	____
Video	____
Magazine	____
Kusomeshwa kwa kuonyeshwa na information officer	____
Kupokea mafunzo kupitia simu yangu ya mkononi	____
Radio na magazine	____
Video na magazine	____
Video na mazungumzo na information officer	____
Kutembeleana ili kubadilishana mawazo na vikundi vingine	____

Appendix L – Instructions to recover Ubuntu Linux after a power failure

Sent by Ugo to Katoloni CBO via email, May 2nd 2012

Hi John,

I might be wrong, but I am quite sure that this problem occurred because of a power failure. Because of this, the Ubuntu partitions in your hard disk are not mounted. This means they are not accessible, and therefore Ubuntu can not start. If this is the case, it might be possible to restore the system quite easily.

I recommend you print this email before doing anything.

The first thing to do is to manage to boot the machine with the Ubuntu CD. I'm quite sure the cd you have is fine, but you need some help in getting your machine to boot from the CD directly. I suggest you get some help either from J. or from someone at the Simecor cyber.

Immediately as you startup the computer, when you see the Dell logo, at the bottom of the screen you should see something like "Press <F2> to Enter Setup". Maybe it's not F2, it might be F12 or Esc.

The Boot menu needs to be changed to give the CD preference. I know for sure that J. knows how to do this.

Once you've booted in the machine with the CD, whoever is helping you should do the following:

1) Open Terminal (you can search and access Terminal through the Application menu)
2) Type the following then press enter: **sudo fdisk -l**

The result of this command is that you'll get a list of all available partitions. It will look something like this:
Device Boot   Start   End   Blocks Id System

```
/dev/hda1   *      1     13206   6655792+  7  HPFS/NTFS
/dev/hda2       13207    232581  110565000  5  Extended
/dev/hda5       228706   232484   1904616  82  Linux swap / Solaris
/dev/hda6        13207   228705  108611464+ 83  Linux
/dev/hda7       232485   232581    48856+ 83  Linux
```

3) Now look at the names of the ones that have "Linux" at the end of the line. In the example above, it will be /dev/hda6 and /dev/hda7 (in your case the name could also be sda and not hda).Find the Linux partition which has the highest number of Blocks. In this example, it is **/dev/hda6** (in your case, it could be a different name). Note down its name.

4) Then, you have to try to mount this partition - which means, to make it accessible by Ubuntu again.

Type the following then press enter: sudo mount "name of your partition" /mnt
You need to substitute "name of your partition" with the actual name of the partition.
So, if the name is "/dev/hda6", you will type **sudo mount /dev/hda6 /mnt**

If the name of your partition is different - for example /dev/sd4 - you would be typing sudo mount /dev/sd4 /mnt

5) If everything is ok, you will receive no error message.
6) Then type: **ls /mnt/home/infonet**

You should be seeing a list of files and folders from your normal Ubuntu.

If this is all OK, you can now proceed to close Terminal, and shutdown the system. You need to make sure to eject the disk before trying to run the "normal" version of Ubuntu again.
Please let me know how this goes – and call me / sms me as you're about to do this, so I can be in front of my laptop and help you remotely as well
Kind regards,
Ugo

Appendix M – Recommendations to Biovision on procurement of appropriate equipment, 2012

In terms of equipment, the meaning of "appropriate" is easily challenged in the environment where the project took place. While both types of cameras used in the project broke during the course of the experiment, the Sony ones were distributed locally, bought in Kenya and were therefore repairable locally, at no cost, under warranty. The Kodak one which broke down had been bought in the UK and no support was available in Kenya under warranty. It required shipping back and forth to Europe, which in this case did not result in an extra cost, but it's not sustainable and reduce productivity per investment. Considering that 50% of the cameras broke within 9 months, it is safe to say that future camera purchases should be made in Kenya. In absence of import tax and VAT on electronic products, buying in Kenya is just as cheap as buying in the UK or in the rest of Europe. The only difference is the availability of models. All things considered, it is however more sustainable to purchase camera models officially distributed and serviced in the country, at the cost of not having the latest model, or less choice for brands.

Given the kind of videos produced by the information officers so far and the type of use and of experiences, the video quality level provided by the cameras used for the project is more than adequate, and it did not limit the creativity of the team.

These areas should be assessed in procuring additional cameras in case of project scale-up:

- **Battery life**: the model of Sony cameras used in the project had limited battery life. In ideal conditions, it could record up to 85 minutes with one charge (in case of recordings of half-hour each non stop). However, in real life conditions a single battery would rarely be sufficient for shooting a whole video, made of several shots, multiple takes of each shot, frequent switching on/off, additional cut-away shots. The problem was partially solved by acquiring a second battery for each Sony camera for the second phase of the project, although this requires further attention in ensuring both batteries are charged at the time of shooting. Particular attention should be paid in the future in prioritising cameras with longer-lasting batteries, especially given the challenges that information officers might

have in charging them. In this respect, it is not sufficient to just read specification sheets: it would be recommended to compare professional reviews from websites such as http://www.consumerreports.org and http://www.which.co.uk (subscription required), user reviews from websites such as like http://www.amazon.com and actually try the cameras in real life scenarios, whenever possible. Digital cameras primarily designed to take pictures might perform poorly when taking video. The Kodak cameras used in the project had significantly higher battery life, at the expense of screen size. Information officers seemed however to prefer having a bigger screen while shooting, and therefore battery

- **Durability:** aside from the availability of local support and warranty, rugged cameras should be preferred, if available. One of the Sony cameras broke as a result of being dropped. Luckily it was repaired with no questions asked, as the screen didn't look cracked. The Kodak cameras are designed to be dropped. One of them broke, but not as a result of falling. Given that Kodak is progressively folding, it is not recommended to stick with it. Locally supported rugged cameras should be given a preference when choosing.

- **Audio quality:** the type of cameras used for the project were perfect in terms of portability, as they could fit in a pocket. However, information officers experienced some problems in achieving good audio quality with them, particularly when shooting outdoor with the Sony camera while the wind was blowing. While they creatively learned how to reduce this problem, for example by using fabric sheets to protect the microphone from the wind, the problem is typical of small digital cameras designed primarily for taking pictures: they come with inexpensive microphones. There is no easy alternative at the £100 price range. However, Biovision could consider experimenting with completely different equipment, for example choosing basic camcorders, which come with improved, stereo microphones and support external microphones as well.

- **Available storage:** the cost of external storage is rapidly reducing. It is advisable to budged for sufficient storage, in the form of SD cards, especially since information officers might not always have a chance to

offload the videos shot right away. It is recommended that future cameras should be paired with SD cards with 16Gb capacity.

– **Suggested video resolution**: the focus of the video market is on HD video and full HD. However, what this means is that the required processing power for editing such videos keeps increasing. Additionally, HD video can only be enjoyed when playing the edited videos on high quality screens, or when watched at high resolution on YouTube. Given the current limitations in working in the field, it is advisable to choose cameras allowing for recording at resolutions lower than full HD. It is recommended to shoot video at resolutions not higher than 1280x720 (720p). An additional advantage of choosing such resolution is that it requires less storage space.

– **Brand:** while it is questionable to recommend a specific brand, Sony provides very good customer support in Kenya. Before considering other brands, additional information on their level of service should be sought. Other brands producing suitable rugged digital cameras are Olympus, Panasonic Lumix, Canon and Fujifilm. Depending on their availability on the Kenyan market, they could also be explored.

In summary, there is no such thing as an ideal camera. It is however recommended to prioritise the following criteria when choosing what camera/brand to focus on, in this specific order: (1) local warranty & support; (2) battery life or replaceable battery; (3) rugged equipment; (4) flexibility in video resolution modes; (5) sufficient storage – by providing large SD cards for storage. As for audio quality, the only way to expand it significantly is to shoot with actual camcorders, more expensive but with higher specs.

In terms of video editing, future procurement of computer hardware should take into consideration:

– **Portability/Battery life:** laptop computers are preferable for their flexibility, portability and because they can operate during power cuts. The experience of frequent and extensive power cuts at KARI Katumani suggests that this is an essential feature. Too often information officers

travelled extensively to the office only to find there was no electricity available, therefore wasting entire days. Some laptops provide Additionally, laptops can more easily be powered up via solar power, which might in the future be a viable backup in some cases. Last but not least, in setting up further information hubs it might be worth privileging areas with more consistent power supply: for instance, Anthoni Musili's office just outside Machakos suffered from much less severe and frequent power cuts, and was more directly reachable by many farmers' groups within the CBO.

– **Screen size and resolution:** netbooks and similar should be avoided, as video editing requires powerful processors with decent screen size. Recommended screen sizes should be within 11.6-15" The main problem with smaller screens is that the interface of video editing software might not be rendered in its entirety on such computers. This is the case with the Classmate laptop currently being tested at Katumani as a replacement for the OLPC. Additionally, smaller screens have limited use during screenings with farmers' groups. The screen resolution is an important factor: most low-end netbooks only have a resolution of 1024 x 600 pixel, which is too limited for displaying complex interfaces such as those of video editing software. Resolutions lower than 1280 x 720 should be avoided.

– **DVD writer**: laptops should include a DVD writer to allow for easy production of extra copies on the go, including when visiting a farmers' group.

– **Compatibility with Ubuntu Linux:** if Infonet is to continue working with free and open source systems, it is recommended that it chooses laptop computers 100% compatible with Ubuntu. Often laptops are not fully compatible with open source software, thus resulting in reduced performance or usability (a typical example is video cards performing poorly on Linux, or unusable suspend functionality).

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