



Social and Technological Transformation of Farming Systems: Diverging and Converging Pathways

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Workshop 1.9: Inclusive innovation

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The innovation system approach analyses innovation as the outcome of interactive learning processes among a variety of public and private actors. While this approach has originated from OECD countries it is increasingly applied to other contexts, taking the specific characteristics of these countries into account. For instance, in African countries the importance of understanding the dynamics of innovative activities in the informal economy and for the livelihoods of marginalised groups has to be considered. In this context, inclusive innovation and inclusive development have become a concern for governments in countries of the Global South. Often termed “pro-poor innovation”, “below-the-radar innovation”, “grassroots innovation”, “BoP (base of the pyramid) innovation”, the term “inclusive innovation” can be traced to Utz and Dahlman, and takes a more expansive view of ‘development’ than found in conventional innovation studies. It refers to “the inclusion within some aspect of innovation of groups who are currently marginalised”. In this workshop, we were especially interested in case studies that related to the inclusion of people that suffer from multiple and nested forms of exclusion within conventional approaches to innovation. We aimed to explore the topic of ‘inclusive innovation’ in relation to three themes: 1) The role of intermediaries in inclusive innovation (organisations, platforms, brokers, etc.); 2) Inclusive innovation methodologies for participation of marginalised stakeholders and 3) Social innovations that promote social inclusion. Intermediary organisations - such as innovation ‘brokers’, platforms, knowledge laboratories and local hubs - may play a particularly important role in the interactive learning processes that often facilitate innovation processes in the Global South. We were especially interested to learn of examples that illustrate how such intermediaries can foster social inclusion of typically ‘hard to reach’ groups, or of those who are otherwise structurally disconnected from such intermediaries. In relation to the second theme, we note that much has been done to foster more inclusive innovation processes through for example Farmer First, Participatory Technology Development and Participatory Innovation Development approaches. Nevertheless, many Agricultural Research and Development projects continue to treat, for instance, smallholder farmers as a homogenous social group and ignore the de-facto exclusion of certain subgroups that are hard to reach due to a variety of social, economic and/or cultural factors. In inclusive innovation processes, we suggest that more can be achieved in terms of integrating critical social theory into praxis around issues of social difference, diversity and inclusion. In this vein, we invited contributions that either reflect upon experience of social exclusions in innovation projects, or that outline more sensitive methodological approaches to actively foster inclusion. Finally, we recognise that there are innovations that aim to specifically promote social inclusion in rural contexts of the Global South. Such innovations aim to reorganise knowledge processes to foster participation of marginalised groups in for example education, media, markets and politics, such as: participatory video production for community knowledge sharing; farmer-to-farmer learning programmes; “barefoot colleges” and pro-poor associations between farmers and their market partners. We invited case studies that shed further light on the above themes. Empirical examples should connect with academic debates concerning the nature, constellation and roles of institutional actors in fostering inclusive innovation; the potential of various methodologies for processes of inclusion/exclusion and/or social innovations for social inclusion.

“All relevant stakeholders”: a literature review of stakeholder analysis to support inclusivity of innovation processes in farming and food systems

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Abstract: Transdisciplinary research aims to be inclusive because it integrates the knowledge and perspectives of scientists and societal stakeholders in order to find solutions to complex real world problems, for example in food and farming systems. However, when designing transdisciplinary research, who should be included? In order to support inclusivity, the question of whom to work with must be addressed in a transparent manner. This literature review of stakeholder analysis traces the evolution of the concept including use of the terms, ‘actors’ and ‘stakeholders’. We find that who defines a problem has bearing on who is considered relevant in relation to that problem. Considering heterogeneity within stakeholder categories requires further decisions on who is considered to be representative. Likewise, the presence of marginalised groups further complicates the issue because their inclusion hinges on the ability of those involved to recognise inter-connections that tend otherwise to be neglected. To overcome the limitations of using only the relevance systems of researchers to make these decisions, the participation of potential stakeholders is necessary for making decisions on involvement that reflect ‘on-the-ground’ realities. In conclusion, we propose that researchers share the tasks of problem definition and stakeholder identification with potential stakeholders using participatory methods.

Keywords: Stakeholder analysis, inclusive innovation, stakeholder diversity, transdisciplinarity, participatory research, actor-orientation

Introduction

The aim of this literature review on stakeholder analysis is to support researchers who are seeking to design participation processes within transdisciplinary research. Transdisciplinary research can be applied to identify solutions and co-create innovations through an inclusive knowledge production process based on joint learning between academic and non-academic participants. This type of research requires that scientists include a wide range of people with different knowledge backgrounds in the “*design, planning, development and delivery of research*” making it both “*more useful... [and] more salient (i.e. that it more broadly reflects the interests of those involved)*” (Bracken et al., 2015 p.4).

Transdisciplinarity is “*based on the scientific understanding of knowledge generation and diffusion, i.e. learning, [and] it is vital that the main actors of a system are involved in a process that finally leads to new knowledge and changed practices*” (Kaufmann et al., 2013 p.122). Therefore, stakeholder involvement in the research process, as active participants, is both a

means of increasing the utility of research output and the likelihood that it will shape the decisions, actions and capacities of these individuals and groups, so that they will gain new action possibilities. The inclusion of multiple perspectives and knowledge are critical to transdisciplinary research in order to: “a) *grasp the complexity of problems*; b) *take into account the diversity of real-world and scientific perceptions of problems*; c) *link abstract and case specific knowledge*; and d) *constitute knowledge and practices that promote what is perceived to be the common good*” (Pohl & Hirsch Hadorn, 2007 p.20).

Food and farming systems consist of human, technical and natural components and form part of ecosystems of specific locations. Hence, they are complex social-ecological systems that are shaped and maintained through farmers’ practices and deeply depend on human management (Norman, 2000; Fairweather, 2010). The complex interrelations and dynamics between the components and human actions tend to make their outcome uncertain; collective action at various scales may be required to facilitate changes or specific outcomes. Therefore, finding solutions to problems relating to food and farming systems are typical examples of complex systems to which transdisciplinary research involving stakeholders could be applied.

Although including ‘all relevant stakeholders’ should be a goal, it might be unattainable. First of all, who decides which stakeholders are relevant¹ and who defines relevance in the context of stakeholder analysis? Furthermore, stakeholder involvement demands time, commitment and resources from all involved. When the term ‘all relevant stakeholders’ is stated as a principle or an ideal, it pushes for greater inclusion, whereas efficiency considerations often tend to limit inclusion in practice.

In this literature review we clarify concepts and terms related to ‘actors’ and ‘stakeholders’, and then discuss how stakeholders linked to a specific problem or issue can be identified out of a broader ‘actor landscape’. To do so, researchers must navigate a series of challenges related to: a) diverse viewpoints on the problem situation; b) multiple actors from which to select stakeholders; c) how to account for heterogeneity within stakeholder categories; d) how to account for those who are marginalised and hard to reach; and e) to what extent can an individual’s participation be considered representative of their stakeholder category?

Theoretical underpinnings: from actors to stakeholders

Understanding the difference between ‘actors’ and ‘stakeholders’ is crucial for approaching the task of identifying with whom to work in transdisciplinary research and innovation processes.

Actors

Literature from multiple disciplines and diverse theoretical orientations, use the term ‘actor’ to mean different things. In sociology, there are two influential theoretical approaches to studying actors, Actor-Network-Theory (ANT) (Latour, 2005) and Actor-Oriented approaches (Long, 1990; Long, 2001). Within ANT, Latour defines an actor as, “**anything that modifies a state of affairs by making a difference is an actor – or if it has no figuration yet, an actant**” (Latour, 2005 p.71). In this theoretical framework, actors can be human or non-human. In actor-oriented theory, Long differentiates actors as social actors saying that:

¹ According to the Merriam Webster online dictionary, the definition of relevant is: “having significant and demonstrable bearing on the matter at hand”.

“ *‘social actor’ is a social construction rather than simply a synonym for the individual or a member of homo sapiens. One needs also to distinguish between two different kinds of social construction associated with the concept of social actor: first, that which is culturally endogenous in that it is based upon the kinds of representations characteristic of the culture in which the particular social actor is embedded; and second, that which arises from the researchers’ or analysts’ own categories and theoretical orientation*” (Long, 1990 p.9).

This differentiation of whether actors are delineated from inside or outside ultimately has a consequence for stakeholder analysis, as discussed in the next section. Among varied contributions of actor-oriented theory is the focus on diverse actors who use their knowledge and create strategies to navigate societal structures (both contributing to, and resisting), thus enacting their agency is simultaneously “*composed of social relations and can only become effective through them*” (Long, 1990 p.23). Actors’ room for manoeuvre is a way to conceptualise the interrelationships between actor agency and relations to structures.

The type of actor-oriented approach that Long proposes differs from earlier ones by anthropologists in that it contextualises, that the “*individual choices were shaped by larger frames of meaning and action and by the distribution of power and resources in the wider arena*” (Long, 1990 p.7). Long’s critique of structures is based on this definition of actors as having the power to create change. For example, rather than orienting analysis on how structures of capitalism impact people, he seeks to see how people have power; how individual actors create power to resist, redefine, and act through their own agency in culturally and historically specific places. Long’s actor-oriented analysis is specifically part of sociologies of development, shifting analyses of changing political economies from structures to actors – internalising views of social change through generative rather than distributive conceptualisations of power.

Stakeholders

Usage of the term ‘stakeholder’ has been traced to as early as 1708 to mean “*a person entrusted with the stakes of bettors*” (Bryson, 2003 p.3). However, Freeman’s 1984 book, *Strategic Management: A Stakeholder Approach* popularised the term by challenging businesses to consider all stakeholders, rather than just shareholders. Freeman defines a stakeholder as “*any group or individual who can affect or is affected by the achievement of the organisation’s objectives*” (1984 p.46). Although the roots of this concept are in business literature, the definitions have evolved due to its use in public administration and natural resource management. Now, the use of “*the term ‘stakeholder’ emphasises the ‘stake’ or interests of the parties in a process*” (Hermans, 2005 p.20). A stakeholder can be defined as “*any group of people organised, who share a common interest or stake in a particular issue or system*” (Grimble & Wellard, 1997 p.175).

Integrating stakeholders is a way of accommodating conflict points and claims. A classical criticism of a broad definition is that “*virtually anyone and anything can ‘affect or be affected’ by the decisions and actions of a business enterprise*” such that “*expansive views of relevant ‘stakeholders’ tend easily to become so broad as to be meaningless*” (Orts & Strudler, 2002 p. 218). However, when inclusivity is a goal, then a willingness to take an expansive view of stakeholders is required. As definitions of stakeholders specifically differ in how inclusive they are, Bryson asserts that in public management, the term must be used in a more inclusive way to enact more democratic principles (2004 p.22).

In community development practice, stakeholders have been described as 'victims' or 'gainers' in relation to a project to reflect who might benefit or be at risk. Other terms that have developed common usage are 'participant', 'involved party', 'recipient' and 'responsible party'.

In order to maintain conceptual clarity, we will focus on the differentiation of stakeholders as a subset of actors, whereby stakeholders are specifically related to an issue or problem that can be addressed in transdisciplinary research. Once a problem or issue is specified, then stakeholders can be identified out of the known actors.

Stakeholder analysis

Recent decades have witnessed a growing application of different forms of stakeholder identification and analysis in research fields such as public policy, international development, agriculture and environmental sciences. Particularly with transdisciplinary research, stakeholder involvement is necessary for knowledge integration and innovation co-creation. A stakeholder analysis is a way of identifying who is a stakeholder related to a specific issue or problem situation, and serves at making their interests, objectives, power dynamics and relationships explicit.

Christopher Weible, working on marine resource management, emphasises that stakeholder analysis needs *"to address a set of questions: who are the stakeholders to include in the analysis; what are the stakeholders' interests and beliefs; who controls critical resources; with whom do stakeholders form coalitions; and what strategies and venues do stakeholders use to achieve their objectives"* (2006 p.96).

The first step of a stakeholder analysis is identification. However, stakeholder analysis must be done iteratively, in particular because the joint problem definition and the identification of stakeholders are circularly linked. This means the joint problem definition is influenced by the stakeholders contributing to it, and the way in which the problematic situation is defined again influences which stakeholders are affected or can be affected by it. The emphasis on iterative stakeholder analysis is described by scholars from policy (Varvasovszky & Brugha, 2000) environmental sciences (Reed, 2009) and development (Zimmermann & Maennling, 2007).

Problem definition

In food and farming systems, those who describe a problem have bearing on what actors are regarded as within the system boundaries, and subsequently which of these actors will be thought to have a legitimate 'stake'.

Researchers typically describe a problem from the outset of research (usually during proposal writing); such problems may be deemed relevant in the scientific discourse of the researcher's discipline or stated as a priority area for interventions in donor policies. However, researchers from other disciplines, as well as non-academic actors working at different scales, may have different perspectives on the same problem or issue. This is why transdisciplinary research strives to address real world problems that are important in the societal discourse, and to take the integration of various perspectives of the problem or issue addressed as a starting point for the research.

In transdisciplinary research, the joint problem definition is, therefore, established as a distinct phase in the research design and includes knowledge integration for problem identification and problem structuring (Hirsch Hadorn et al., 2008). Methods with which to achieve a

common understanding of a problem can include creating system maps with stakeholders (Angelstam et al., 2013) and also problem and solution trees (Snowdon et al., 2008).

Identification of stakeholders from multiple actors

In transdisciplinary research multiple stakeholders belonging to a diverse set of actor categories need to be integrated, since their different perceptions, knowledge and relationships will contribute to finding solutions to the problem situation (Hirsch Hadorn et al., 2008). In such a situation, it is unlikely that there is one person who can oversee which actors need to be included (Müller et al., 2012). This is an additional reason why “*identification of relevant stakeholders is not straightforward*” (Cuppen 2009 p.33). To overcome this difficulty, a stakeholder analysis can be done by a team because “*a team can compensate for and neutralise individual biases and question untested assumptions*” (Varvasovszky & Brugha, 2000 p.340). In some cases these teams are composed of researchers or other related professionals. An example that initially used experts to generate a list, became participatory because each of the named stakeholders were contacted, “*asking them for their opinion and allowing them to add or delete one or more stakeholders*” (Stanghellini, 2010 p.685).

To start a participatory identification process, first a group of potential stakeholders can be identified by researchers either from literature, media, explorative research or other sources depending on the context and focus. For example, individuals and organisations active in an area or on a topic might be identified in secondary literature including reports from other organisations. Meetings could then be set up with organisations that might have lists of individuals that are active in the issue or area of focus. Typically, agricultural extension officers and other non-profit staff are approached. However, this might run the risk of reproducing information from the same people who are frequently put forward because they are considered ‘model’ farmers and therefore often called upon to act as representatives.

Identification can also come from observation in places where people are active, such as in farmers’ markets, auction houses, community meetings and other places. From these observations, researchers can identify some of the people who are active in relation to an issue. Once a few people are interviewed, then a snowball approach can be used to ask for recommendations of other people to approach.

Participatory stakeholder analysis can include sharing of decision-making regarding identification of actors, determination of which of them are stakeholders, and selection of individuals to participate. Participatory actor maps can be used to facilitate identification using Venn diagrams or other communication tools (Lelea et al., 2014).

Diversity of actors

The multiple and diverse entry points described above can generate a more complete identification of who has a ‘stake’ and hence should be involved. In some cases, there are many individuals identified which can be grouped to create actor categories (and later stakeholder categories). However, it is more common that researchers or others doing a stakeholder analysis will start with an actor category such as ‘farmers’ or ‘traders’ and look for individuals that belong to this category. This carries the risk that one is not accounting for internal heterogeneity. Forming categories is used to reduce complexity. However, the criteria with which grouping is organised will have consequences on who is ultimately involved. For example, to what extent might the category of ‘farmer’ need to be broken down into sub-categories to offer the needed diversity of perspectives? Determining the criteria for

categorisation should become an issue of discussion with stakeholders. Applying methods to critically analyse internal heterogeneity within actor categories lends itself towards crafting greater inclusivity by recognising important differences. When regarding the social landscape, what is the “*difference which makes a difference*” (Bateson, 1972 p.459) in a given context? Rather than assuming what differences matter based on pre-determined categories, create spaces in which participants can draw their own conclusions about which differences matter most in a particular time and place. As Sara Ahmed has written, we must “*trace how the differences that matter between us, matter in some places more than [in] others*” (1998 p.197).

Information about actor heterogeneity can be obtained through both individual interviews and group discussions. The transcribed text can later be coded for themes about important differences in the ‘actor landscape’. An important contribution regarding recognition of stakeholder heterogeneity has come from an example with biomass in the Netherlands where Q methodology was applied (Cuppen, 2010).

In a stakeholder analysis, heterogeneity within a group needs to be acknowledged until the point at which differentiation no longer brings new perspectives. The questions are: to what extent is this heterogeneity important for the objective?; and what will be the implication of ignoring this aspect? For the sake of stakeholder analysis which enables inclusive innovation processes to move forward, there must be a willingness to reflect on this complexity and to make adjustments as feasible.

Marginalised groups

Marginalised groups are often understood as communities in society to whom full access to certain rights, opportunities or resources is systematically denied by members of other groups (e.g. Silver, 1994). In a broader sense, marginalisation may also include that the contributions and needs of certain groups in relation to a problem or issue addressed are less visible compared to those of others. In agriculture, this might manifest as invisibility of marginalised groups who perform labour, such as in the case of migrant workers picking strawberries in California (Mitchell, 2003). Inclusion of marginalised groups can be difficult because their identification hinges on the ability of those involved to recognise inter-connections and on their efforts to intentionally seek out marginalised groups (Table1).

Table 1. Quotations from stakeholder literature of various scientific disciplines regarding the challenge of including marginalised groups

Quotation	Discipline
<i>“It is important to try to include all relevant stakeholders, and those who often get omitted are the hard to reach groups. Extra effort and innovation will be needed to contact and engage with these groups or individuals, who do not generally come forward by their own volition”</i> (Gray, 2007 p.20).	Human ecology
<i>“Selecting relevant stakeholders for participatory processes is challenging. For example: certain stakeholder groups may be historically marginalised from management decisions, and may therefore be difficult to identify or involve...”</i> (Prell et al., 2007 p.5).	Sociology and environmental sciences

<p><i>“It depends on the local situation who the relevant stakeholders are. According to Paul Engel (personal communication), relevant actors are those that ‘just won’t go away’. That is a very pragmatic understanding of ‘relevant’ but, as we shall see, it obscures at least two categories: the dominant ones, who may feel they have nothing to gain from participation, and unaware actors, who do not know what there is to gain” (Warner, 2005 p. 5).</i></p>	<p>Environmental sciences</p>
<p><i>“There is a risk that some stakeholders may be accidentally omitted and as a consequence not all relevant stakeholders of the phenomenon may be identified” (Clarkson, 1995 cited in Reed, 2009 p.1937).</i></p>	<p>Natural resource management</p>
<p><i>“In the low density network areas more work is required to get on board the relevant stakeholders to address the existing or emergent challenges” (Tenywa et al., 2010 p.125).</i></p>	<p>Agricultural sciences</p>
<p><i>“It is important to ensure that weaker stakeholders are not marginalised or discriminated against. Also, stakeholders who are potentially concerned by the project should be identified and integrated into the process” (Luyet, 2012 p.217).</i></p>	<p>Environmental sciences</p>

There is convergence among these authors that seeking inclusion of marginalised and hard to reach stakeholders is both necessary and challenging. However, the necessity of including marginalised groups as stakeholders in research projects depends mainly on the project goals.

‘Inclusive innovation’ refers to the development of innovations for and by those who tend to be excluded by the general ‘mainstream’ of business or development initiatives (Heeks et al., 2013). These authors identify two key aspects in defining inclusive innovation: (1) a clarification as to which marginalised, excluded group is to be the focus of attention for an innovation; and (2) which aspect of innovation must the excluded group be included in (and in order to achieve what).

The second aspect refers to the fact that an inclusive innovation may refer to the marginalised group as being innovator or as being ‘impacted’ by innovation; in other words, an innovation can be inclusive with regard to the process, or the outcomes, or both. Furthermore, the desired outcomes can be defined in many different ways. Inclusive innovation can mean that a marginalised group has participated in a project and benefited from it, for example, with regard to networks, capacity building and new insights. On the other hand, it could also mean that previously existing inequalities have been reduced as a result of the project, e.g. that the income of poor people has increased and inequality has been reduced (Johnson & Anderson, 2012). The latter would require a more systematic way of addressing inequalities beyond just ensuring participation. Richard Heeks and co-authors (2013), therefore, suggest a range of different levels of inclusion, each of which requires different steps to be taken in the course of the innovation process.

Who represents?

The concept of ‘representation’ arises because stakeholder categorisation is used to create smaller groups for participatory processes. As discussed above, stakeholder categories such

as ‘farmer’, ‘trader’, or ‘retailer’ cannot be assumed to have internal homogeneity. Furthermore, such categories do not immediately translate into people to collaborate with in transdisciplinary agricultural research.

From operations and systems management, Matthias Müller and co-authors write, “*in the context of collaborative research into societal problem situations, this difference [between abstract categories and individuals] is crucial, as the purpose of collaboration is to enlarge the epistemic base by using real persons...to represent the perspectives of abstract categories of actors*” (Müller et al, 2012 p.496).

For this reason, we suggest acknowledgement of the implications of individuals’ positionality within the recognised internal heterogeneity of an actor category. As is emphasised in literature on situated knowledge (Haraway, 1988), relevance systems (Schutz & Luckmann, 1973), and emphasised in transdisciplinary approaches (Hirsch Hadorn et al., 2008), all individuals only ever have a partial view.

Conclusion

When projects claim to have successfully included ‘all relevant stakeholders’, the validity of the claim must be questioned. This term usually obfuscates the complexity that is involved regarding who makes the choice about who is considered a stakeholder in relation to a particular problem situation, and further, who decides which of them is relevant.

Critical reflection on how identification is conducted within stakeholder analysis is key for designing inclusive transdisciplinary agricultural innovation research. After reviewing the literature, the main challenges to consider are: a) complex problem situations require diverse perspectives; b) multiple actors from which those who have a ‘stake’ have to be identified; c) internal diversity which might necessitate stakeholder sub-categories; d) marginalised groups which by definition are at the boundaries of what is ‘visible’; e) ‘representation’ of a stakeholder category; and f) who makes decisions about stakeholder identification.

An iterative process including critical reflection by the researchers, dialogue with participants, and shared decision-making on stakeholder inclusion, enables more context-specific inclusive innovation processes to be achieved. The aim is to make the process of making a choice more transparent and to expand decision-making power with stakeholders to make research on complex problem situations in agricultural research more meaningful.

In summary, all of these issues of defining a problem situation, identifying actors and weighing their ‘stakes’ coalesce to reveal that identification is always only partial. Scientists seek to use stakeholder analysis to systematically order a dynamically shifting ‘actor landscape’ in order to identify real people with whom to work with in transdisciplinary research. They can improve conditions for inclusivity by sharing decision-making and by systematically addressing the specific situation and needs of marginalised groups in the research.

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Unravelling inclusive business models for achieving food security in low income markets.

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Abstract: Business actions to strengthen food value chains in developing countries can fulfil important roles in achieving future food security. But hardly anything is known about such initiatives going beyond the pilot phase or having been replicated or scaled up. The complexities of the food value chain, the inter-dependence of its different components, and the challenging contextual conditions encountered in low income markets, present both a challenge and an opportunity for the private sector to develop successful business models. This article aims to answer the research question “What are the characteristics of the business models used by the private sector to contribute to food security for low income markets?”. Five business intervention strategies on food security for low income markets are analysed on business model components, local embedding and innovation strategies and business ecosystem building strategies. Important findings are the added value of marketing and distribution strategies for successful business model development on food security, the use of coalition building to overcome institutional and cultural gaps, and the added value of intermediary organisations.

Key words: Food security, business model, IB, upgrading, business “business ecosystem”, BOP

Introduction

“Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food, which meets their dietary needs and food preferences for an active and healthy life” (FAO, 2013). However, the world still faces a persistent food security challenge. Scholars and policymakers increasingly look at the involvement of the private sector in the fight against poverty issues such as food security (Gradl & Knobloch, 2010; Kubzansky et al., 2011; Prahalad, 2004). Rather than the aid and charity approaches that have dominated the scene for the past few decades, the alternative line of discussion around inclusive business (IB) and base of the pyramid (BOP) approaches emphasise the role of innovation and pro-poor entrepreneurship (Halme et al., 2012).

Local and international organisations invite the private sector to more proactively engage in order to improve food security in developing countries (FAO, 2014; Forum, 2010). Roughly 60% of the 2.5 billion people who live on US\$2 or less a day, live in rural areas and are directly dependent on a small farm for their household income (World Bank, 2016). The other 40% are often closely linked to the food value chain, either through business linkages (e.g. as agricultural input retailers or small traders), or through other means (Forum, 2010). The private sector is keen to enter into these low income markets because they offer growth opportunities, a source of innovation, efficiency advantages, and reputation advantages (Christensen et al., 2001; Hamilton, 2013; Hammond & Prahalad, 2004; Hart & Christensen, 2002; Reardon et al., 2009; Steidlmeier, 1993). Expanding private sector involvement could also bring sizeable gains to poor, food-insecure communities through research and extension services, inputs,

infrastructure, farm equipment, food processing and marketing (Tuttle, 2012). It requires (re)designing the product, process or the institutional arrangements of the value chain (Danse & Vellema, 2005; Gradl & Jenkins, 2011; Kaplinsky & Readman, 2001; Prahalad, 2004; Simanis & Hart, 2006) to meet the marketing mix for the BOP: awareness, accessibility, affordability and availability (Chikweche, 2013; Chikweche & Fletcher, 2012).

There is a clear distinction between the IB and BOP approach (Halme et al., 2012). The BOP proposition emphasises the untapped opportunities for win-win business as companies engage in serving the BOP market (Goyal et al., 2014; Hart, 2005; Prahalad, 2004). While being a popular approach, there have also been criticisms both of the extent to which it has been effectively realised (Arora & Romijn, 2012) and of its negative effects (Hall et al., 2012; Karnani, 2009, 2010; Landrum, 2007). To overcome negative effects, inclusiveness has been advocated (Arora & Romijn, 2012). IB is a sustainable business that benefits low-income communities. It is a business initiative that, keeping its for-profit nature, contributes to poverty reduction through the inclusion of low income communities in its value chain (Heeks et al., 2014; Bonnell & Veglio, 2011). This differs from the value chain approach, as IB aims at economic and social benefit engaging low income groups purposely, while the value chain approach aims to optimise chain performance and maximise benefits. Some scholars indicate that IB may be the way to reach scale in BOP markets (Gradl & Jenkins, 2011). In this article we use the term BOP when talking about the low-income socio-economic population segment, and IB when describing business efforts in this area.

So far, in the context of food security at the BOP, a number of IB approaches have been identified (Colin Poulton, 2010; Nicolas Chevrollier, 2012) (Sanchez & Ricart, 2010; Vorley et al., 2009). However, a systematic mapping of initiatives and a better insight into their structure is lacking, specifically with regard to the following points: i) the different roles actors can play in IB initiatives (Kolk et al., 2013); ii) a better understanding of the initiators, which can shed light on the differences between multinational-led and locally-led IB initiatives (Kolk et al., 2013; Calton et al., 2013); iii) understanding companies' business models as this is a prerequisite for better decision making for the parties involved to scale up to serve more poor people with products and services or for replicating these models in different geographic contexts (London & Hart, 2004; Seelos & Mair, 2007; Goyal et al., 2014); and iv) while IB models can compensate for some of the gaps in the market environment in developing countries, or work around them, (Gradl & Jenkins, 2011; Dolan & Roll, 2013) there is a need to assess how business "business ecosystems" perform to realise optimal performance of the IB initiative (Calton et al., 2013). These are "*communities or networks of interconnected, interdependent players whose actions determine whether or not a company's inclusive business model will succeed*" (Gradl & Jenkins, 2011 p. 27).

This paper aims to fill some of these gaps by unravelling how the local and international private sector has been shaping business models and intervention strategies with their business "business ecosystem" in order to contribute in a sustainable and scalable way to food security for BOP markets by strengthening food production of BOP farmers, and increasing the access to affordable nutritious food for BOP consumers. This is done by analysing case studies of private sector driven initiatives that aim to improve food security on: i) business model; ii) business eco system influence; and iii) the complex interdependence of actors in the food value chain. The next section provides a review of pertinent literature followed by a section that explains the research methodology used. We then present the findings followed by a

discussion of the merits and limitations of the private sector in supporting scalable solutions on food security, concluding with theoretical and practical implications of the findings.

Building blocks to analyse IB models

It is often argued that the success at the BOP requires innovative business approaches in which the logic significantly differs from approaches used at other tiers of the pyramid (London & Hart, 2004; Seelos & Mair, 2007; London & Anupindi, 2012). Disruptive innovation in distribution, value chain management, workflows, organisation, payment schemes, customer education, and human resource management can be necessary (Klein, 2008). It is assumed that success in the BOP requires innovation in multiple aspects of the business approach (Prahalad, 2004; London & Hart, 2004; Seelos & Mair, 2007; Oodith & Parumasur, 2013). This may require an integrated approach that brings together various theories (Wright et al., 2005; Klein, 2008).

Elements of business models

Understanding business models in a poverty context requires explorative approaches able to deal with rich contextual data (Seelos & Mair, 2007). Morris (2005) proposes a framework that allows designing, describing, categorising, critiquing and analysing a business model for any type of company. The attractiveness of the framework for this research is that it allows analysis of the model at three increasingly specific levels of decision making, termed the 'foundation', 'proprietary' and 'rules' levels. For this research the foundation level is most relevant as it allows comparison of business initiatives (Klein, 2008). The *foundation level* consists of six components: the offering of the firm; the market in which the firm operates; internal capability (e.g. production systems, supply chain management); competitive strategy; economic factors (e.g. pricing and revenue sources, volumes); personal/ investor factors (e.g. pricing and revenue sources).

The framework is useful for the analysis of IB models that aim to contribute to improved food security at the BOP as it allows comparison across different business models from a broad universe of ventures. Also, the framework provides features to analyse the adaptability of business models to complex environments. There is *internal fit* when there is a coherent configuration of foundation factors. The *external fit* addresses the appropriateness of the configuration given specific and often changing external environmental conditions. Consequently, the model responds to the presence of many in-company and external interdependencies.

However, conventional business model scholars presuppose a well-functioning and supportive environment for business to develop and function (e.g., well-functioning infrastructure, clear institutional frameworks). IB scholars emphasise different circumstances in low income markets, which may influence the configuration of the business model (Prahalad, 2004; Goyal et al., 2014; Gradl & Jenkins, 2011; Gradl et al., 2008; London & Anupindi, 2012). 'Institutional voids' are extremely important in this context (Khanna & Palepu, 1999; Khanna et al., 2005). The lack of formal market institutions in low-income markets causes high transaction costs and thus the firm has to look for alternative ways to organise such transactions. One way to work around this is engaging non usual partners, so called "fringe stakeholders" such as community leaders or development agencies, which help to embed the business model in the local context (London & Hart, 2004). Deliberately improving the "business ecosystems" around IB models can also help overcome the market gaps that

make those models high-touch, high-cost, and often - small-scale (Foster & Heeks, 2013; Gradl & Jenkins, 2011).

Local embeddedness

The generic classification for businesses embedding in their context is by creating horizontal, vertical and diagonal alliances (Poulton & Macartney, 2012; Volery & Mensik, 1998). Horizontal alliances (e.g. producers in a cooperative), and vertical alliances (e.g. producers and suppliers) are most commonly used to improve the performance of the value chain. Diagonal alliances, also dubbed cross sector partnerships (Akanksha et al., 2012; Calton et al., 2013; Deb, 2013; Faulconbridge, 2013; Kaplinsky & Readman, 2001; McKenzie, 2013; Stadler & Prost, 2012; Termeer et al., 2010) are mostly among public and private sector actors, and aim at improving the business “business ecosystem” context. Business strategies on the food production side of food security mainly use horizontal and vertical alliances to improve its external fit (Forum, 2010; Nicolas Chevrollier, 2012; Reardon et al., 2009). While in the case of developing and selling nutritious food to BOP consumers, diagonal alliances are more frequently developed in order to solve institutional challenges (e.g. absence of infrastructure) that complicate the connection between the company and its market (Kaplinsky & Readman, 2001; Poulton & Macartney, 2012; McKenzie, 2013; Nicolas Chevrollier, 2012; Reardon et al., 2009; Woodhill, 2013).

Alliance building strategies support the development of an appropriate external fit of the business model. The opportunity for upgrading of the business in the value chain is an important aspect of this fit. A commonly used categorisation from Humphrey & Schmitz (2004) is: process (i.e. introducing quality standards); product (i.e. add vitamins to a food product); functional (i.e. from primary production to food processing); and inter-chain (i.e. target raw food materials at cosmetic market) upgrading. Obviously, depending on the complexity of the upgrading strategy, alliances need to be built with more or less value chain actors.

IB “business ecosystem” strengthening

Gradl & Jenkins (2011) argue that companies may be unable to engage lower-income segments commercially at any kind of scale without high operating margins or the ability to cross-subsidise to cover costs. Many IB models are “high-touch” involving: significant customer education; supplier, distributor and retailer training; provision of financial services - even among non-financial institutions; and “high-touch” can become expensive. To overcome this challenge, deliberately improving the “business ecosystem” around IB models additional to business model innovation can help overcome the market gaps that make those models high-touch, high-cost, and as such often small-scale (Altenburg & Lundvall, 2009; Foster & Heeks, 2013). Given the institutional voids (Peng et al., 2008; Vellema & Danse, 2007) within BOP markets, economic activities are supported more strongly by informal network-based mechanisms, such as societal norms, trust and familial ties (De Soto, 2000). Without formal institutions in place to mitigate the contractual hazards of transacting with parties outside a firm’s own social network, opportunity exploitation is often constrained. Evidence supporting this assertion can be found in the limited presence of medium-sized enterprises (Dia, 1996) and the presence of large informal sectors in BOP markets overall (Schneider, 2002).

Gradl & Jenkins (2011) suggest 6 IB “eco system” strengthening strategies; BOP awareness raising and capacity building; research; information sharing; public policy dialogue; and creating new organisations. While large donors and development finance institutions have a

long tradition in supporting such interventions, more recently MNC have also started to support them.

Analytical framework

Figure 1 presents the key features of an IB model. Table 1 summarises for each feature its specific variables.

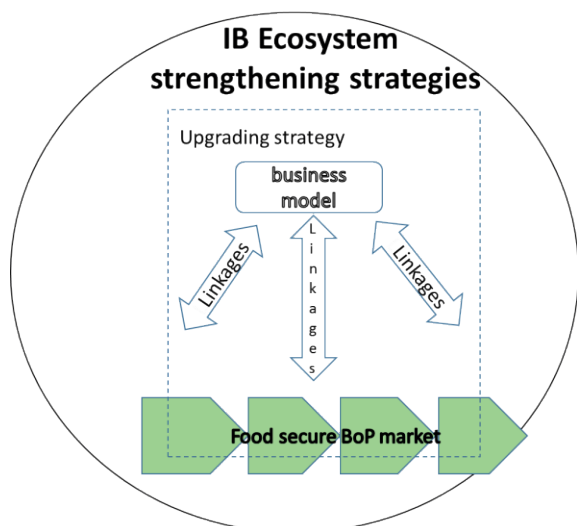


Figure 1. Key variables of an IB model for food security

Table 1. Variables of IB model

Feature	Specific variables
Business model	Offering, market, internal capability, competitive strategy, economic, personal
Linkages	Horizontal, vertical, diagonal
Upgrading	Process, product, functional, interchain
“business ecosystem” strengthening strategy	Awareness raising and capacity building, research, information sharing, coalition building, public policy dialogue, creating new organisations

Research method

This research builds on a database of 71 private sector driven initiatives on food security for the BOP by Nicolas Chevrollier (2012). They clustered these 71 cases in 5 business intervention strategies (BIS):

1. Farmer development services - smallholders as customers of goods and services that aim to improve their food production. Food security improves by improved income of farmers and more foods on the local market;

2. Secured sourcing schemes - smallholders as suppliers to larger local or international processors or traders. Improved food security mainly through the increased income of value chain actors;
3. Rural retail hubs - acting as an intermediary between (smallholder) producers and consumers. Increased income for value chain actors and potential to make quality food products more easily accessible and more affordable;
4. Food product adaptation - adaptation of existing products, services, processes to serve BoP consumers. Improved food security due to increased availability and affordability of food and food products;
5. Hybrid market creation - innovative strategies that seek to create new markets at the BoP through the introduction of new (specialised) products. Improved food security by improved access to and availability of quality foods.

For the research presented in this article, 3 cases per BIS were selected randomly. In the case of BIS2 four cases were selected to compensate for the higher number of cases in the database. These 16 cases were analysed based on online available secondary sources (publications, project reports, business websites and information available on social media) and verification interviews with at least one key representative of the lead organisation.

Overall 2 of the 16 cases are led by Local Companies (LC), 5 by Multi National Enterprises (MNE), 4 by Small and Medium Sized Enterprises (SME), 4 by social enterprises (SE) and 1 by a Public Private Partnership (PPP). Only one case refers to Latin America, 9 to Asia and 6 to Africa, which may be due to English search terms being used. All cases are partially or fully funded by the private sector, which was one of the selection criteria used to build the database.

Results

Business model

In line with Klein (2008) the 16 business cases are analysed at foundation level (see Annex 1 for details). Twelve out of sixteen cases offer primarily standardised products. At the same time, for 13 out of 16 cases product or service quality appears an important competitive feature of the business model, contrary to the assumption that business strategies for low cost markets are about low quality. Technology development and R&D appears important mainly in the BIS1 and BIS2 cases, as well as in the BIS5 case Valid Nutrition. For this data set, most cases aim at producers and entrepreneurs rather than food consumers, though it appears that almost all cases develop over time a diverse market strategy, reaching out to both food producers as well as food consumers.

The most prevalent internal capability appears to be selling/marketing. Besides that, supply chain management is also a key factor for cases ranging from BIS1 to BIS4. The production/operating system is also a key factor in most cases except the BIS3 as these aim at retailing. This competence enables firms to generate big volumes of low price products and to get them to the right location.

The cases do not provide a singular answer to the question for whom is value created - the low income food producer or the low income food consumer? Over time all cases seem to evolve from a narrow focus on either producers or consumers into strategies where they target both. This might be a response to institutional voids in the food system that force firms to take

care of multiple activities in the value chain to safe guard their competitive position. In the case of BIS1 and BIS2 consumers need to buy the products of the farmers to create demand for the inputs, processing and/ or distribution services. In the case of BIS4 and BIS5 raw materials need to be available and brought to the processing units to assure food product availability. The type of market (general/broad/niche) and the nature of the costumer relationship (transactional/relational) differ considerably across cases and there is no specific distinction between different BIS types.

Linkages and up grading strategies

Within this data set none of the lead organisations established horizontal alliances to create linkages. Cases where the social enterprise is the lead agent appear to develop mostly in diagonal alliances. These cases are all BIS4 and BIS5 aiming at BOP food consumers. In all diagonal alliances at least one NGO is involved. Other alliance partners identified in these diagonal alliances are government (2 cases), businesses (2 cases) and multilateral organisation (1 case).

All four upgrading strategies could be observed in the 16 cases. Product upgrading strategy has happened in the retail oriented BIS3 and the food consumer oriented BIS4 and BIS5. This means that the products introduced in the market have been adjusted e.g. by adding micro nutrients. Process upgrading strategy seemed to be the second preferred strategy by producer oriented BIS. This means that adjustments have been made in the process, e.g. by introducing an innovative processing technology to process cassava at a farm site such as in the BIS1 Dadtco AMPU case in Nigeria. Only in one case (Heineken sorghum in Sierra Leone) did interchain upgrading happen. In this case small holder farmers were stimulated to supply sorghum for local beer production. Sorghum was not a major food staple in the target country, for which it did not compete with local food availability. Farmers were taught to produce sorghum that complied with the brewery requirements. The extra income generated by selling sorghum to Heineken provided farmers with increased financial means to take care of their food security.

In some cases more than one upgrading strategy could be observed such as product and process upgrading. The time that the business has already been active in the BOP market seems to influence this result. Most cases that are active in the BOP market for quite some time show a number of consecutive upgrading strategies that have been implemented over time.

“business ecosystem” strengthening strategies

All cases engaged one or more ecosystem partners during the implementation of the IB model development. NGO's are the most commonly used type of partner, followed by governments. Interestingly, in the cases where NGOs were partners, the lead organisation is never an SME but always a MNE or LC; except in the cases of BIS4 Valid Nutrition South East Africa and BIS5 KeBal Indonesia where the social enterprise was setup by the NGO itself for a very specific purpose.

None of the strategies is exclusively used by one type of BIS. In fact, the cases selected for each BIS show that all strengthening strategies can be used in every type of BIS. All cases invested in awareness raising and/ or capacity building strategies, and almost all the cases have developed some form of new organisation.

The case studies show that MNCs have developed less research, coalition building and public policy dialogue in their ecosystem strengthening strategies than BIS developed by other lead organisations. Overall, always more than one strengthening strategy is used, and in all cases there is BOP awareness raising or capacity building. Research as a strengthening strategy seems to be the least used. In general PPP's and social enterprises seem to be using the full array of strengthening strategies more than the other lead agents.

Discussion and conclusion

The purpose of this article is to unravel how the private sector has been shaping business models and intervention strategies with their "business ecosystem" in order to contribute to food security for the BOP market. We analyse the results based on research gaps identified in the literature and the key variables of an IB model as summarised in Table 1: business model characteristics, linkages and upgrading strategies; and eco system strengthening strategies. We will also reflect on issues that require further research.

Food security involves bigger companies, but mostly multi-actor initiatives

In the case of business driven food security initiatives 34% of the 71 cases identified by Nicolas Chevrollier (2012) are led by MNEs, in contrary to the findings of Kolk et al. (2013) that revealed hardly any MNE engagement in business model development for BOP markets. This can be explained by the global nature of the food industry, driven by MNEs (Filippaios & Rama, 2008), as well as the declining economic growth of their home markets which has stimulated them to search for new growth markets (Regmi & Gehlhar, 2005).

A considerable number of BIS is still initiated by small (rather than large) and local (rather than multinational) firms. In fact not all BIS were initiated by for-profit firms, but also by social enterprises and one PPP. The business model on food security in BOP markets is often initiated as a partnership between the private sector and parties active in the "business ecosystem" instead of a pure private sector lead initiative. This may be because the collaboration is instrumental in improving the external fit by incorporating internal capabilities of other parties into the over IB model such as the distribution systems of food aid organisations.

The research data did not allow for a more in-depth analysis of the characteristics of the initiators of BOP initiatives. However, this could be relevant in future research as this can shed light on the differences between MNE-led and SME- and/or locally-led IB initiatives, as well as private sector- led or NGO- led initiatives. Also, the significance of not-for-profit in IB initiatives points to a more complex relationship between profitability and poverty alleviation than originally thought (Kolk et al., 2013; London & Anupindi, 2012).

Business models based on low cost, big volume, standardised products of quality contribute to BOP food security

Overall, the most relevant foundation level components of the IB model on food security appear to be end user focused (either small holder farmers or low income food consumers) and highly standardised products, supplied in big volumes but based on quality.

The higher number of producer oriented business models in the dataset can be explained by the additional advantages it provides to the BOP as well as to the business to strengthen the food production capacity at the BOP as it also creates sources of income and spurs economic activity at the BOP (Calton et al., 2013; Nicolas Chevrollier, 2012). Additionally it enables co-

creation, using the valuable insights of BOP people and BOP enterprises as input for innovation processes (Simanis & Hart, 2006; Oodith & Parumasur, 2013). The higher number of producer focused BIS can also be a time bound result. All BIS4 and 5 are from recent dates (Nicolas Chevrollier, 2012). More recently the attention has moved from strengthening food producers to improving the access and quality of food for low income consumers (Godfray et al., 2010).

The results of the case analysis confirm that the marketing mix for BOP markets focus on awareness, accessibility, affordability and availability (Chikweche, 2013; Chikweche & Fletcher 2012; Brugmann & Prahalad, 2007). But it appears that food security related BIS differentiate among themselves especially on the accessibility and availability characteristics. Marketing, sales and supply chain management are key internal capability components present in most cases. This can be explained by the contextual characteristics of the BOP food market. Many BOP food producers are based in remote rural areas, while many BOP food consumers are based in crowded urban slum areas that lack proper infrastructure.

For some cases it was difficult to analyse the business model using the framework of Morris (2005) as they seemed to develop double (or mixed) business models over time. This may be because companies engage in service delivery in addition to their core activities (Poulton & Macartney, 2012), possibly to overcome value chain challenges (Woodhill, 2013) and institutional voids (Reardon et al., 2009; London & Anupindi, 2012). In these cases some initiatives started out as product delivery activities but developed into end-market distribution and marketing activities over time to enable the businesses they were serving to sustain themselves.

Uniqueness of business models in sales and marketing strategy

None of the cases shows clear evidence of developing a competitive advantage through radical technological innovation despite the unique opportunities for radical innovation provided by the BOP (Hang et al., 2013; Hart & Christensen, 2002; Ray & Kanta Ray, 2011). However, it confirms (Vellema & Danse, 2007; Altenburg & Lundvall, 2009) findings on the relevance of adaptation instead of innovation, and the importance of business model innovation instead of technological innovation in BOP markets.

The key element through which the BIS try to distinguish themselves is by investing in infrastructure and/ or distribution systems. Most cases develop indirect distribution strategies leveraging existing networks by establishing innovative partnerships with organisations that already reach the BOP. This confirms the findings of London & Hart (2004); Hart & Sharma, (2004) that leveraging on networks of fringe stakeholders enables the BIS to enter immediately and benefit from the trust base already established in these markets. These partnerships appear to be established mainly for BIS aiming at BOP food consumers (BIS4 and BIS5), rather than BOP producers (BIS1 and BIS2).

Linkages aim more at achieving upgrading rather than establishing economies of scale

None of the lead organisations established horizontal alliances. Horizontal alliances often aim at achieving economies of scale or improving the countervailing power. It appears that the lead organisations did not focus specifically on that strategy at this initial stage of development in which collaboration for scaling up was not yet the focus. Most of the alliances built for the BIS analysed chose a vertical orientation. This can be explained by the fact that most cases focus on strengthening producers, and as such functional and process oriented upgrading

strategies. Three of the four consumer oriented cases were based on diagonal alliances and were led by social enterprises. In these cases product upgrading strategies were developed.

Recently, a growing number of donor and policy making organisations combine food and nutrition security challenges and invite firms to propose strategies to solve them. This analysis reveals important differences in business model characteristics and embedding strategies between producer and consumer oriented food security initiatives. It requires further research to obtain a better understanding on the prerequisites that should be taken into account if businesses and other parties want to engage in either producer oriented or consumer oriented food security strategies.

“business ecosystem” strengthening focused mostly on creating awareness and coalition building

The results confirm the relevance of interaction with eco system actors for the development of an IB business model. All cases incorporated activities that aimed at raising awareness of the product, new technology or new way of working being introduced at the BOP. The strategy least used to strengthen the “business ecosystem” appears to be research, perhaps because the low cost/high volume business model does not leave a lot of space for research. But it may confirm that the relevance of research in IB or innovation processes is often neglected (Altenburg & Lundvall, 2009).

In most BIS awareness raising activities aim at the target group of the food security strategy, thus farmers in the case of the producer oriented strategies and consumers in the case of the food consumption oriented strategies. Awareness raising is a strategy that can contribute to an improved external fit of the business model to the market, as suppliers and/ or consumers obtain a better understanding of the unique proposition (e.g. product, functional or process upgrading) that is being introduced.

The eco system strategy on coalition building appears to be a commonly used strategy. It confirms that coalition building strategy appears to be used to overcome risks on institutional voids (De Soto, 2000; Altenburg & Lundvall, 2009) e.g. Metro Vietnam, cultural differences (Ma et al., 2014; Hart & Sharma, 2004; Stadtler & Prost, 2012) e.g. Danone and Grameen foundation, and to overcome innovation challenges e.g. Dadtco (Sonne, 2012; Stewart & Hyysalo, 2008).

In addition, in most BIS one or more organisations are involved that facilitate the development of the business case and the process of embedding. This confirms findings on the relevance of intermediary or brokering organisations to develop innovation strategies in a developing context in general (Colin Poulton, 2010; Ma et al., 2014; Stadtler & Prost, 2012; Stewart & Hyysalo, 2008) as well as an agri-food context specifically (Klerkx & Leeuwis, 2008; Kilelu et al., 2013). The research approach and the data quality of this research do not allow an in depth analysis on the characteristics of this intermediary role. It requires further research to obtain a better understanding on the way the business “business ecosystem” of the BOP market influences the business model, as well as the characteristics of intermediaries to facilitate the development of IB in BOP markets.

Conclusion

This article aimed to provide more insight into the way the private sector has been shaping business models and intervention strategies with their ecosystem in order to contribute to food

security for the BOP market. A combination of variables were identified to obtain a better insight on internal functional characteristics of the business models as well as features to enable the private sector to locally embed and respond to institutional voids. Applying these variables to a set of 16 private sector supported food security cases, provided a more detailed insight into the functional factors of the business models developed, but it also confirmed that for each case linkages with other actors in the food ecosystem have been established to improve the performance of the food value chain. In the case of producer oriented BIS the focus is on functional and process upgrading strategies, while for the consumer oriented BIS it is more focused on product upgrading strategies.

Recently, a growing number of donor and policy making organisations have combined food and nutrition security challenges to invite the private sector to propose strategies to solve them. However, this analysis reveals that there are important differences in business model characteristics as well as embedding and upgrading strategies among producer and consumer oriented food security initiatives. These require further research in order to obtain a better understanding of the prerequisites that should be taken into account if businesses and other parties want to engage in either producer oriented or consumer oriented food security strategies.

Finally, the research revealed the relevance of building coalitions to strengthen the IB ecosystem, and the role of intermediary organisations to develop these coalitions as well as other ecosystem strengthening strategies. It requires further research to obtain a better understanding of the way the business ecosystem of the BOP market influences the business model, as well as the characteristics of intermediaries to facilitate the development of inclusive business in BOP markets. This appears to be a neglected feature in the research on business model development for the BOP that may provide more insights into embedding and ecosystem strengthening strategies.

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Annex 1: Cases specified on functional factors of the business model, linkages and upgrading strategies

Case name	BIS	Lead org	Component 1 (factors related to the offering): How do we create value?	Component 2 (market factors): Who do we create value for?	Component 3 (internal capability factors): What is our source of competence?	Component 4 (competitive strategy factors): How do we competitively position ourselves?	Component 5 (economic factors): How we make money?	Component 6 (personal/investor factors): What are our time, scope, and size ambitions?	Linkages	Upgrading
Dadtco AMPU Nigeria	1	SME	heavy mix; some customisation; medium breadth; shallow; product itself; internal manufacturing; direct distribution;	B2B; regional; upstream suppliers and downstream processors; niche market; relational;	Technology, Production system, Supply chain management	Innovation leadership	mixed; NA; high; low;	growth model	Vertical	Process Upgrading
East West Seeds Thailand	1	SME	primarily products; standardized; narrow line; deep; product itself; internal manufacturing; indirect single channel distribution;	B2B; international; upstream suppliers; niche market; transactional;	R&D; Marketing	Image of dependability; product quality	fixed; NA; high; low;	growth model	Vertical	Process Upgrading
Tanga Fresh Tanzania	1	SME	heavy mix; some customisation; medium breadth; shallow; product itself; internal manufacturing	B2B and B2C; regional; upstream suppliers and final consumers; multiple segments;	Production system; Technology and innovative capability; Supply chain management; Marketing	B2C: product quality and availability; B2B intimate customer relationship	mixed; NA; high; low;	growth model	Vertical	Functional upgrading

Case name	BIS	Lead org	Component 1 (factors related to the offering): How do we create value?	Component 2 (market factors): Who do we create value for?	Component 3 (internal capability factors): What is our source of competence?	Component 4 (competitive strategy factors): How do we competitively position ourselves?	Component 5 (economic factors): How we make money?	Component 6 (personal/investor factors): What are our time, scope, and size ambitions?	Linkages	Upgrading
			and service delivery; indirect multichannel;	B2C transactional; B2B relational;						
Alquería Dairy Colombia	2	SME	primarily products to consumers and primarily services to businesses; standardised; narrow line; shallow; product itself; internal manufacturing; indirect distribution;	B2B and B2C; national; upstream suppliers and final consumers; broad market; B2C transactional; B2B relational;	Production system and supply chain management	B2C: product quality; B2B intimate customer relationship	fixed; NA; high; low;	growth model	Vertical	Process Upgrading
Sierra Leone Breweries	2	PPP	primarily products; standardised; narrow line; medium depth; product itself; internal	B2B and B2C; national; final consumers and downstream suppliers; broad market; transactional;	Supply chain management/innovative capability	Product quality	mixed; NA; high; low;	growth model	Vertical	Chain upgrading

Case name	BIS	Lead org	Component 1 (factors related to the offering): How do we create value?	Component 2 (market factors): Who do we create value for?	Component 3 (internal capability factors): What is our source of competence?	Component 4 (competitive strategy factors): How do we competitively position ourselves?	Component 5 (economic factors): How we make money?	Component 6 (personal/investor factors): What are our time, scope, and size ambitions?	Linkages	Upgrading
			manufacturing; indirect multichannel;							
Metro AG Vietnam	2	MNC	primarily products; standardised; broad line; deep; access to products; internal service delivery; direct distribution;	B2B; regional; retailers; multiple segment; transactional;	Supply chain management	Operational excellence; low cost	mixed; NA; high; low;	growth model	Vertical	Functional upgrading
Unilever Kecap Bango Indonesia	2	MNC	primarily products; standardised; narrow line; medium depth; product itself; internal manufacturing; indirect distribution;	B2C; national; final consumers; broad market; transactional;	Marketing; Supply chain management; innovative capability	Product quality; image of operational excellence	fixed; NA; high; low;	growth model	Vertical	Functional upgrading

Case name	BIS	Lead org	Component 1 (factors related to the offering): How do we create value?	Component 2 (market factors): Who do we create value for?	Component 3 (internal capability factors): What is our source of competence?	Component 4 (competitive strategy factors): How do we competitively position ourselves?	Component 5 (economic factors): How we make money?	Component 6 (personal/investor factors): What are our time, scope, and size ambitions?	Linkages	Upgrading
DCM Hariyali Kisaan Bazaar India	3	MNC	heavy mix; some customisation; broad line; deep; access to products/services; value added reselling; direct distribution;	B2B and B2C; national; upstream suppliers and final consumers; broad market; relational;	Marketing; Supply chain management	Product selection; Intimate customer relationship	mixed; NA; high; low;	growth model	Vertical	Functional upgrading
MCC Kheir Zaman Egypt	3	MNC	primarily products; standardised; broad line; medium depth; access to products; reselling; direct distribution;	B2C; national; final consumers; broad market; transactional;	Resource leveraging; Marketing; Supply chain management	Low cost; product selection;	fixed; NA; high; low;	growth model	Vertical	Product upgrading
Suguo super-market China	3	LC	primarily products; standardised; broad line; deep; access to products; reselling; direct distribution;	B2C; national; final consumers; multiple segment; transactional;	Marketing; Supply chain management	Product selection and availability; low cost	fixed; NA; high; low;	growth model	Vertical	Functional upgrading

Case name	BIS	Lead org	Component 1 (factors related to the offering): How do we create value?	Component 2 (market factors): Who do we create value for?	Component 3 (internal capability factors): What is our source of competence?	Component 4 (competitive strategy factors): How do we competitively position ourselves?	Component 5 (economic factors): How we make money?	Component 6 (personal/investor factors): What are our time, scope, and size ambitions?	Linkages	Upgrading
Britannia Biscuits India	4	LC	primarily products; standardised; medium breadth; deep; product itself; internal manufacturing; indirect multichannel;	B2C; national; final consumers; broad market; transactional;	Production system and marketing	Product quality/features; low cost	mixed; NA; high; low;	growth model	Diagonal	Product upgrading
Coca Cola Minute Maid Uganda	4	MNC	primarily products; standardised; narrow line; deep; product itself; internal manufacturing; indirect single channel distribution;	B2C; international; final consumers; broad market; transactional;	Production system, supply chain management, marketing	Product quality/features	fixed; NA; high; low;	growth model	Vertical	Product upgrading
Danone Grameen Shokti Doi Bangladesh	5	SE	primarily products; standardised; narrow line; shallow; product itself; internal	B2C; regional; final consumers; broad market; relational;	Selling/marketing	Product quality/features; low cost	fixed; NA; high; low;	growth model	Diagonal	Product upgrading

Case name	BIS	Lead org	Component 1 (factors related to the offering): How do we create value?	Component 2 (market factors): Who do we create value for?	Component 3 (internal capability factors): What is our source of competence?	Component 4 (competitive strategy factors): How do we competitively position ourselves?	Component 5 (economic factors): How we make money?	Component 6 (personal/investor factors): What are our time, scope, and size ambitions?	Linkages	Upgrading
KeBal Indonesia	5	SE	manufacturing; indirect single channel distribution;	B2C; local; final consumers; niche market; transactional;	Production system; Selling/marketing	Product quality/features	fixed; NA; medium; low;	growth model	Diagonal	Product upgrading
Pushtikona Bangladesh	5	SE	primarily products; standardised; narrow line; medium depth; product itself; internal manufacturing; direct distribution;	B2C; national; final consumers and service providers; multiple segment; transactional;	Selling/marketing; production system	Product quality/features	mixed; NA; high; low;	growth model	Diagonal	Functional upgrading

Case name	BIS	Lead org	Component 1 (factors related to the offering): How do we create value?	Component 2 (market factors): Who do we create value for?	Component 3 (internal capability factors): What is our source of competence?	Component 4 (competitive strategy factors): How do we competitively position ourselves?	Component 5 (economic factors): How we make money?	Component 6 (personal/investor factors): What are our time, scope, and size ambitions?	Linkages	Upgrading
Valid Nutrition South East Africa	5	SE	primarily products; standardised; narrow line; shallow; product itself; internal manufacturing; licensing; indirect multichannel;	B2B; international; government/institutional; market niche; relational;	Production system; technology/R&D and intellectual capability	Product quality/features; low cost	mixed; NA; high; low;	growth model	Vertical	Product upgrading

Annex 2. Cases specified on IB ecosystem strengthening strategies.

Case name	BIS	Lead org	BOP Awareness	Research as strengthening strategy	Coalition building	Public policy dialogue as strengthening strategy	Creating new organisations as strengthening strategy
Dadco AMPU Nigeria	1	SME	Yes	Yes	Yes	No	Yes
East West Seeds Thailand	1	SME	Yes	Yes	Yes	Yes	No
Tanga Fresh Tanzania	1	SME	Yes	No	Yes	Yes	Yes
Alquería Dairy Colombia	2	SME	Yes	No	No	Yes	Yes
Sierra Leone Breweries	2	PPP	Yes	Yes	Yes	Yes	Yes
Metro AG Vietnam	2	MNC	Yes	No	No	No	Yes
Unilever Kecap Bango Indonesia	2	MNC	Yes	No	Yes	No	Yes
DCM Hariyali Kisaan Bazaar India	3	MNC	Yes	Yes	Yes	Yes	Yes
Kheir Zaman Egypt	3	MNC	Yes	No	No	Yes	Yes
Suguo supermarket China	3	LC	Yes	No	Yes	Yes	Yes
Britannia Biscuits India	4	LC	Yes	Yes	Yes	Yes	No
Coca Cola Minute Maid Uganda	4	MNC	Yes	No	No	No	Yes
Danone Grameen Shokti Doi Bangladesh	5	Social enterprise	Yes	Yes	Yes	No	Yes
KeBal Indonesia	5	Social enterprise	Yes	Yes	Yes	Yes	Yes
Pushtikona Bangladesh	5	Social enterprise	Yes	Yes	Yes	Yes	Yes
Valid Nutrition South East Africa	5	Social enterprise	Yes	Yes	Yes	Yes	No

Learning about success and failure - a systems perspective on food security innovation processes for small-scale farmers in Tanzania

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Abstract: Food insecurity is still relevant for 16.8 million Tanzanians (FAO, 2015). Introduction of e.g. innovative techniques is a widely accepted approach to food insecurity (e.g. Alarcon, 2011). Causes of food insecurity are multi-level and multi-issue evolving e.g. from the interplay between poverty, insufficient awareness, environmental degradation and price instabilities (Ashley, 2016). We argue that to successfully implement and disseminate food security innovations, an adequate understanding of the context is needed. So far, innovation system approaches (used as analytical frameworks) have proven to be appropriate tools to study these multi-level and multi-issue problems in a holistic way (Hall, 2003). In this context, we focus on food security innovations for small-scale farmers in two Tanzanian regions. Based on empirical research, the paper presents findings on: (i) food security innovation processes within the study area; and (ii) selected food security innovation examples from which we attempt to derive the initial conditions for successful dissemination. Methodologically, an explorative mixed-methods approach was applied starting with a literature review and then fieldwork including semi-structured expert interviews at national and regional levels and farmer group discussions at the local level. Preliminary results from system analysis show that the ability of farmer groups to connect to other system-levels and actors would be a critical success factor, but knowledge flows occur when there are levels of trust on the horizontal level. For the local level, knowledge sharing systems are an important condition to enable dissemination processes.

Keywords: Food security, innovation systems, smallholder farmers, food systems, Tanzania

Introduction

Food security is a prevailing challenge in Tanzania. It has been addressed by numerous projects (conducted by universities, NGOs and governments) in many ways, as addressing the causes of food insecurity can differ markedly from case to case. This contribution developed from a research project which addresses food security by applying a people centred approach to two case study sites (CCS) in rural Tanzania. It is designed to identify upgrading food security strategies/or innovations along food value chains (FVC) on a local level (Graef et al., 2014). The causes of food insecurity in Tanzania are low productivity, lack of agricultural inputs, high rural poverty, low adoption of innovations, lack of markets and weak infrastructure - to name a few (Ashley, 2016).

Taking into account the conclusions of other authors, innovations (technical, social, process) can help to alleviate food security problems (Ashley, 2016). There is no overall definition for the term innovation, therefore here we use a definition that originates from a majority world context: *“the process of introducing something new and the new thing itself”* (Dyamentt, 2012). However, regardless of how the definition of the term is framed, it can be stressed that

anything that is new to the user/ adopter is an innovation (Rogers, 2003). This paper addresses the concern that not enough is known about food security innovation processes in general, such as why only a small percentage of innovation directed at food security is actually taken up and implemented at a local level (Hounkonnou et al., 2012) and more specifically (regarding the case study site) what conditions influence people to take decisions on adoption or rejection. Being given the task of informing a project dissemination strategy, that was inclusive and legitimate at a village level (Hendricks, 2010), the authors wanted first to shed light on the setting in which food security innovation processes take place in the study area. From there a way forward to develop possible conditions to make these food security innovations more successful and then to enhance dissemination processes is discussed.

Agriculture is a mainstay in Tanzania's economy, contributing more than 30% of the GDP. In contrast, across Africa, the average contribution of agriculture to GDP is around 20%. More than 80% of the Tanzanian population depends on agricultural production for their living. Regardless of the importance of agriculture to the economy, the reinvestment in the sector is truly very low, both compared to the importance of the sector to the country and by international standards (Diyamett et al., 2012). Therefore, in Tanzania, poverty alleviation and food security programmes have been integral parts of national policy for more than 30 years. Due to several shifts in policy, no long term strategy has been drafted (Haug & Hella, 2013). Another challenge to formulating a coherent strategy are the aforementioned manifold causes of food insecurity. In 2014, almost 34% of the population (17 million) suffered differing degrees of food insecurity. Geographical regions are affected to different degrees: whereas between 50 and 85% of people in the more semi-arid regions like Dodoma or Singida suffer increasingly from food insecurity problems, the more semi-humid regions like Morogoro or Tanga have reduced rates of 10 - 20%. The case study sites for this research include both regions: Morogoro is a semi-humid area - the main crops grown in this area are maize, sorghum and rice and the precipitation is between 600-800 mm; Dodoma, is a semi-arid area where the main crops are sorghum and millet, with a strong involvement of livestock and the annual precipitation is between 350 – 500 mm.

The next section presents the analytical framework used. The methods section will elaborate on the selected methodologies including a literature review, semi-structured expert interviews and farmer group discussions. Finally, the results and discussion section will introduce results from the aforementioned methods on selected aspects of innovation and will discuss possible consequences for dissemination.

Approaching food security from an innovation systems perspective

As the causes of food insecurity are manifold and cannot be traced back to one aspect, the solutions also need to be manifold and specific. For innovative solutions that address e.g. the right levels, actors or knowledge gaps, a thorough analysis of the context is needed. In this regard, system frameworks are recognised as being suitable tools - in the sense of analytical frameworks – with which to study agricultural innovations on different levels; both in this case and in most of the world (Hall, 2003). The literature mentions a number of different approaches. The National Agriculture and Research System (NARS) approach for instance, assumes that all knowledge comes from research (leaving out farmers from innovation processes) and is therefore exclusive in this regard. The most widely used approach across most of the world is the Agricultural Knowledge and Information System (AKIS) which includes intermediate structures and farmers as important actors (Assefa et al., 2009; Engel, 1997).

Next, on an analytical level, the Agricultural Innovation System (AIS) approach studies the complex relationships that emerge from such systems (Assefa et al., 2009). These system approaches also influence the decisions of policy makers, scholars or institutions. However, the Sectoral Innovation System approach as suggested by Malerba (2002, 2004) provides us with a suitable conceptual framework for the description of innovation systems, because it offers an opportunity to study the environment food security innovation processes are found in on different system levels and according to different (so called) system elements (Figure 1). Relevant levels identified are: the national level, as major food security and governance policies are decided here; policy is a key actor, as food security is ranked as an issue of high importance which needs national support in Tanzania; the regional/district level is also involved, as the project operates on a regional level, entailing two regions with rather different characteristics in terms of culture, religion, natural conditions and climate; the project addresses four villages in total, two in Dodoma and two in Morogoro so this level is included; and finally, the farmer group (FG) level is where innovative solutions are implemented and tested. This is thus the starting point for dissemination of the respective strategies and solutions.

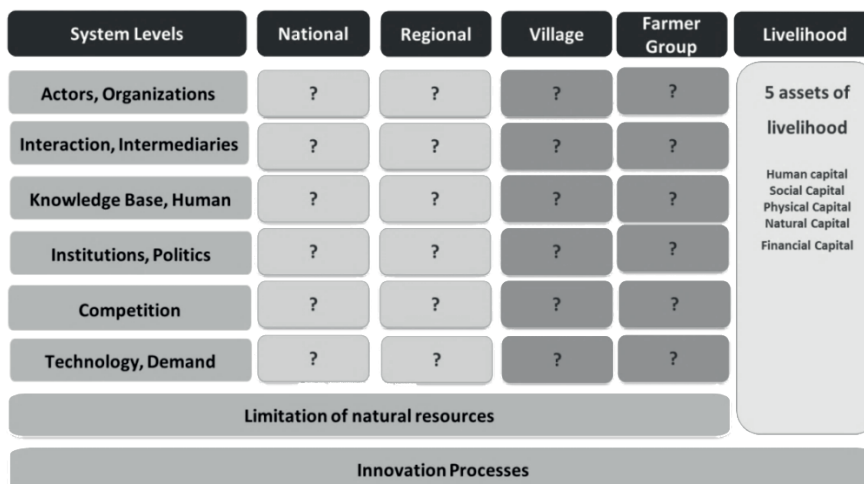


Figure 1. Analytical framework to study food security innovations (Adapted by Malerba, 2002 and Bokelmann et al., 2012)

The system elements are briefly described below:

Actors and organisations: characteristics of existing organisations and actors are described. The element contains e.g. individuals/groups of individuals, enterprises, universities, financial institutions, local authorities, training institutions. Agents and organisations can be on different organisational levels;

Interaction and intermediaries: intermediaries are networks, extension services, specific intermediaries of agricultural /food systems. E.g. extension has to adapt to different dimensions of challenges: to answer problems associated with changing social and environmental conditions, to cope with new information technologies or changing structures and finally they have to assume their role as translator and negotiator between different actors;

Knowledge base and human capital: this element includes indigenous, sector specific or cross-sectoral knowledge bases within the system. It also includes mobility of labour, spreading of sector-specific knowledge, learning processes and knowledge access, training and education;

Institutions and politics: describes implicit and explicit rules, standard behaviours and routines for interaction between the actors and/or organisations within the specific innovation system. Actors within the innovation system are mainly influenced by the legal framework. Describes the impact of specific policies on food security innovation processes;

Technology and demand: analysis of existing technologies, trends (products and services). Demand can give information on how the sector will develop in future and which central developments - and future potential - can be awaited;

Natural resources: the limitation of natural resources and effects of climate change are among the main reasons for food insecurity in Tanzania. This is therefore adopted as an additional system element;

Competition: the competitive situation in the innovation field in at both national and international level is described in this analysis element;

Innovation processes: this system element was added to the analytical framework in order to gain knowledge about how innovation processes emerge in specific settings. This element adds the process perspective.

The literature provides the important insight that the type of innovation and innovation activities can differ greatly among sectors (Malerba, 2005). From that, we hypothesise that different types of innovations and different types of innovation activities during an innovation process require different functions from an innovation system. Empirical information on the type of innovation and the attributes of an innovation might provide more specific explanations for barriers in an innovations system e.g. a specific characteristic might call for a specific actor or knowledge within the innovation system that the developer or the user needs to implement the innovation. Conceptual attributes of innovations are provided in the work of Rogers (2003) which link these attributes to the user perspective and the process of diffusion. Our overall research question is, what explanations for the enabling or hindering of food security innovations we can obtain through linking the meta-perspective on innovation systems with the study of innovation attributes during innovation processes. If an actor/ innovation system function is missing something which an innovation would require in order to be further developed/disseminated, this probably has an impact on the innovation process and finally on the outcome in terms of food security.

The attributes of innovations are: relative advantage, compatibility, complexity, trialability and observability (Rogers, 2003). It is important to note that, in contrast to the innovation system approach, these attributes are all based on the users' perspective, while innovation system research focuses on the entrepreneur/ a company's perspective.

A **relative advantage** perceived by farmers can be expressed as both an economic advantage and social prestige (Rogers, 2003 p. 229) or, in the case of our research, as the improved quality of a product or living conditions.

Compatibility refers to the consistency with pre-existing values, norms or practices (Rogers, 2003 p. 240). This is based on the assumption that the higher the compatibility is, the less uncertainty and risk the users perceive (Rogers, 2003). Compatibility is (and can only be) assessed by the adopters in comparison to previous practice, knowledge or ideas. Therefore, local knowledge should be taken into consideration when introducing an innovation into a local context. It can also refer back to the innovation system. If the system only provides technologies that are too complex or not compatible, they are likely to be rejected.

Complexity refers to the ability of the adopter to understand and use an innovation in an everyday setting (ibid. p. 257). High complexity can be an important barrier for individuals and make them reject a measure.

Trialability tells us something about how possible it is for the user to change or improve the innovation. This attribute is important where dissemination is the major aim. Rogers also stresses that a higher degree of trialability can reduce the perception that an innovation is risky or uncertain.

Observability means that the results, the outcome of an innovation, are visible for others. The higher the degree of observability the more likely the innovation is to be adopted.

Thus, considering the attributes of an innovation as an additional analytical element in empirical innovation system research can provide explanatory information as to why some innovation processes are more successful than others or why some innovations are preferred by the users. Attributes can also refer back to the analytical frame and the broader setting in which innovation processes take place.

Methods

Some theories or frameworks suggest - or even require - methodology. However, innovation system frameworks do not predefine specific methods. They mainly provide empirically developed heuristics for a way to structure thinking and embed the empirical work into an analytical frame. A structuring, analytical lens is used here. The literature states that the methods still have to be developed (Assefa, 2009; Spielmann, 2009). So far not much is known on the nature of food security innovation processes in the selected Tanzanian case study sites; and there is certainly a lack of written information. To give a comprehensive overview of the state of FS innovations in the study regions an exploratory approach is needed in order to access useful information on the different system levels.

On a *national and regional* level explicit (written) information is accessible, whereas on a village, farmer group (FG) or individual level, this information is lacking. An intensive literature review was thus carried out, including policy briefs, scientific articles and NGO reports. Additionally, semi-structured expert¹ interviews were conducted to answer open questions from the literature review and get an initial insight into the system.

¹ Experts are persons who have: relevant knowledge of the FS system or a specific system element

On a *local /farmer group* level two field phases have taken place so far:

The *first field phase* in 2015 aimed to understand what food security innovation processes there required and to understand the practices of farmer groups facing food insecurity. In this phase, three farmer groups from outside the project were interviewed because project farmer groups had just been founded and had not yet experienced any innovation processes. The groups worked on different innovative solutions including poultry keeping, machinery and saving and credit/rice growing. The groups interviewed were real farmer groups (see Przyborski and Wohlrab – Sahr, 2014 and Lamnek, 1998) that had either established themselves or were formed by MVIWATA (which is the farmers' association). They had added more activities like rice growing later by themselves.

The *second field phase* (February/March 2016) was based on the results from the first phase and tried to identify the initial conditions required to arrive at successful food security innovation processes. Twelve farmer groups were interviewed, nine of them were formed as part of the project activities and three groups were established outside the project groups. Again, the groups selected from outside the project worked on similar innovation examples to the project groups. One major aim during the second phase was to anticipate problems that project based FG could possibly face once the project was over. Learning how other groups dealt with certain problems was therefore a major motivation to include the outside groups. New adopters of certain innovation examples (e.g. kitchen gardens or improved cooking stoves, machines...) as well as project group drop outs were also considered in the research.

Results and Discussion

Results from system analysis.

The results section will present results from different methods jointly. The structure and focus is on three selected system elements. In the positioning of the results from the field we will refer back to literature if it helps with comprehension. Here the system elements "interaction and intermediaries", "knowledge base and human capital", as well as "innovation processes" proved to be the most relevant with regard to uptake of innovation as well as likeliness of dissemination. The results section attempts to give a glimpse of how the different system elements and levels relate to one another and influence food security innovation processes.

Interaction and intermediaries

Literature shows that the agricultural extension system, as both an important intermediary in the system and link to the farmers, is still mainly provided by the government, which has been withdrawing the financial support necessary for this system to work properly (Temu et al., undated). This is in contrast with the fact that the regions have become powerful entities after the decentralisation process in the 1980s, and more responsibilities have been handed over to region and district levels since the 1990s (Haug & Hella, 2013). The literature supports the findings from interviews stressing low reinvestment rates in agricultural innovation, research and extension (e.g. Diyamett et al., 20112). *Farmer groups* have thus become more important in dissemination and knowledge sharing processes (Barham & Chitemi, 2009) as the extension services often fail to work. Literature suggests that smaller FG which hold shared values and norms, and have stronger ties to outside organisations and actors, are more successful than others (Agrawal, 2001).

Results from *interviews* consistently show that the *agricultural extension system* is still an important intermediary between science and farmers. On the one hand it has a clear mandate and mission to act as a link between system levels and actors, but on the other hand it faces the challenge of drastic underfinancing for many years (Interview #2). In Tanzania, the needs of extension services generally do not match the number of available personnel: the extension officer to farmer ratio is documented to be at least 1:700 (Interview #2). Some advisers mentioned that they have no transportation vehicles, making it impossible for them to supervise all farmers in their very widespread catchment areas. The experts interviewed evaluated the present situation as follows: coverage of services and availability of funding decreases from the higher (national) to the lower (farmer) levels. In short, availability of funding, equipment and human resources on the target level (farmer level) has decreased to approximately 30% of total needs (Interview #2). On the extensionist side, a high fluctuation of extension workers was reported. This was due to bad or irregular payments and complicated working conditions. Due to these facts, both government officials and NGOs were not perceived as trustworthy and their activities were evaluated as “*to be not sustainable for the farmers*” (FG #1).

The system analysis revealed a number of *discussion* points. The aim of extension services to be intermediaries and kick-starters of innovation is no longer reflected in service numbers, which show low reinvestment rates in agricultural innovation, research and extension (e.g. Diyamett et al., 2011) and a low rate of integration for farmers in everyday decision making processes, “*there is no link*” (Interview #2). Rogers (2003 p. 254) calls this problem an “*empty vessels fallacy*”, when innovators and actors assume that the potential users (here: farmers) have little or no experience to contribute to a problem and no relationship with a new idea.

The inclusiveness of farmer groups also has its limitations, as farmer group interviews revealed that FGs have high entry barriers for their members (member fees etc.) and can therefore exclude certain individual farmers who do not fulfill these requirements, as they often do not have the financial and human resources for their activities.

Additionally, *literature* mentions *innovation platforms (IPs)* as a tool which is often supported. This aims to be a means of coordinating innovation activities (Spielmann, 2009). These platforms have been criticised for not being appropriate and not being tested sufficiently in real life settings. So far, they do not represent all the steps in a value chain and can be very exclusive when it comes to farmer involvement (Nederlof et al., 2011). On the regional and local levels, *empirical findings* support literature and specify that ‘job descriptions’ for innovation platform workers are unclear and stakeholders are not carefully selected, weakening the effective outcome of an intervention with such tools (Interview #8 and #2). Thus it can be *discussed* that the lack of success of interaction activities can often be traced back to the time and/ or resources factors: NGOs such as MVIWATA (National Network of Small-Scale Farmers’ Groups in Tanzania) and international NGOs often show a short term or project based involvement in the villages (Interview #2). As a consequence, on a local scale, the interaction and communication processes between levels are hindered due to restrictions in funding and lack of trust. The task of feeding information back and forth between levels is not properly carried out either. The results from the system element “knowledge base and human capital” which complement the results on the “interaction and intermediaries”, fit in well here and follow below.

Knowledge base and human capital

Results from *literature* show that a number of actors on different system levels express a high demand for specific information and knowledge (e.g. Mwalukasa, 2013). As is explained below, this contradicts with knowledge sharing routines. There are knowledge flows from the national/regional levels down to the local level, but presenting this knowledge in written form often creates insurmountable obstacles if the local population want to assess this knowledge by themselves. This is also confirmed by literature (Eidt et al., 2008). Whereas there is little evidence that knowledge transfers from the local to the district or national level (Mwalukasa, 2013).

Adding to this, *empirical results* from almost all farmer groups consistently show that even the transmission of knowledge between relevant actors in the system is disturbed e.g. due to lack of resources which constitutes a major obstacle to unimpeded knowledge exchange between levels. Reverse knowledge flows between the farmer level and the regional/district level are often interrupted (Interview #2). This leads to a situation where two separated spheres of knowledge appear. Figure 2 is an attempt to illustrate this; it displays the shared perception on knowledge sharing mechanisms by farmers and experts with regard to food security innovation processes. They report that knowledge exchange happens horizontally. Furthermore, interaction between farmers and official actors is often not participatory, resulting in the fact that local knowledge systems and traditional solution pathways are still disregarded; this was particularly stressed during the interviews (#1, #2 and #4).

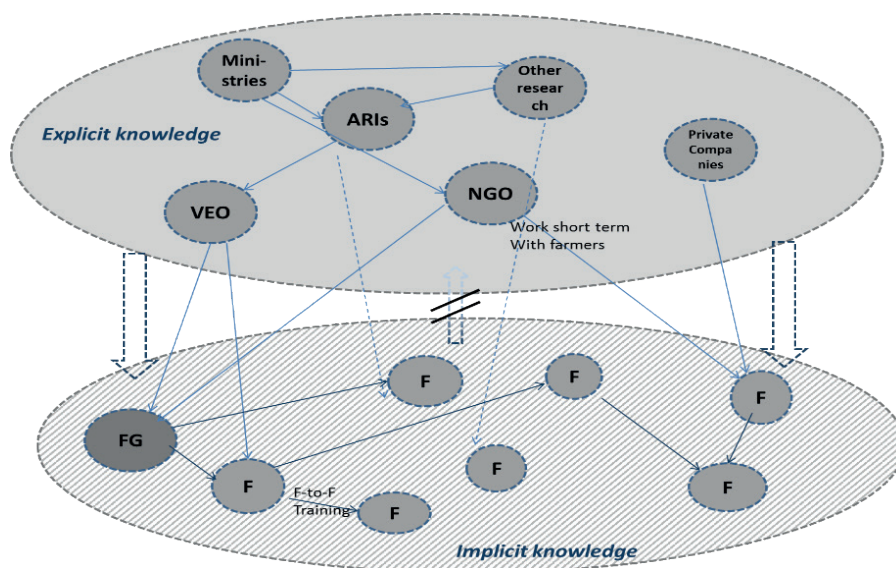


Figure 2. Spheres of knowledge (authors' figure) ²

When asked about the way knowledge was shared among fellow farmers and what the information routines were, the farmers from the groups stated consistently that they had never used written information to find out about innovations or new practices and that the extension service often had no resources to 'translate' the material for the local context and adapt it to the problems the farmers were facing.

² VEO - village extension officer, ARI - Agricultural research Institute, FG - Farmer Group, F - Farmer.

From a more conceptual angle, empirical results show that on a local level *implicit knowledge* (know-how) is accessible for farmers. This generally originates from fellow farmers, friends or family and is not available in written form (FG, 1,2,3; Interviews #2 and #8). Implicit knowledge is indispensable for learning processes but it needs input from outside. In contrast, results show that knowledge rotates horizontally rather than interacting with other levels. The farmers mentioned that they lacked information on marketing possibilities or on keeping different kinds of livestock (FG 1, 3). On a district and national level, research institutions, universities and other actors only produce *explicit knowledge*. It is labeled “*Know-Why*” and may be generated by researching.

The consequences such routines have for food security innovation processes on the ground can be *discussed*. During the FG interviews, farmers were asked for knowledge gaps in the innovation they were testing. It seems that gaps often relate to what Rogers called “know-to knowledge” (Rogers, 2003 p.173) and the learning process: both types of knowledge are necessary for integrating new insights into local knowledge bases and thus to initiate learning processes. Learning creates knowledge necessary for the successful implementation of an innovation: a central reason for discontinuing the adoption of processes or rejection is that users did not learn about the specific requirements that come with an innovation. An example of this is shown in the following section.

Processes, attributes and conditions.

The main result from this research is that innovation processes are strongly influenced by the other system elements (e.g. by lack of knowledge sharing as mentioned above) and this also happens in reverse; the innovation's characteristics give hints on how the system could be improved. In general, the interviews revealed that there was only a very imprecise understanding of how decision processes influence the adoption of food security innovation on the ground (Interviews #1,2 and 4) (see Methods). There was information on necessary characteristics for innovations to be successful in the first field phase: innovative approaches that promise to solve clearly visible and observable changes in the landscape (soil degradation, erosion processes), that have a direct impact on yields etc. are more likely to be taken up than solutions for problems that are not observable. If the farmers feel a perceived need, like e.g. higher yields, improved seeds etc., innovations are more likely to be adopted. Innovations also need to be simple or even able to be divided up. If they can stand for themselves and do not require other inputs and so forth, it is easier to understand and use them. They also need to show results after a short period of time. An example is given here to illustrate how and why farmers take decisions for rejection or adoption. This example thus sheds light on a specific part of the innovation process: neither the invention of a machine, nor the construction of an improved stove, but the adoption process on the users' side.

The case of improved cooking stoves (ICS): in rural Tanzania this innovation was introduced to a group of farmers (mainly woman). The group was informed about the goals of the project and received training from a local NGO on ICS. In the next phase, the group members were given the task of collecting the materials that were needed to build the stove and which were available locally (e.g. clay soil). Having collected the materials, the group member who was chosen to build the stove, built it for every group member. For the cooking holes, the woman in the family was asked to bring her biggest pot to make sure it fitted inside the new stove. Several months after implementation, we asked the group members about their motivation to join the stove group and not one of the other groups. They could not exactly say why, but

mentioned that they enjoying being on the project. When interviewed about their experiences with the ICS, they reported back positively. But they also mentioned that ignition in the morning sometimes took longer than with the traditional three-stone-stove as firewood collected could be wet and would not burn properly. However, they reported that they used the ICS on a regular basis instead of the stove they had been using before. On visiting some of the families (including the family that hosted us) in the village we lived in, we realised that in many cases they did not use the new stove, but had reverted back to the old stove they had before.

In the same village, we observed that some villagers not included in the project had started to adopt the idea of ICS and build some on their own. When these people were interviewed and questioned about their motivation, they told us that they had long wished for ICS in their households: it reduces eye diseases, is faster, makes it possible to cook two things at the same time, and it is less dangerous because children often get burned when playing too close to the fireplace. In contrast to the original group members, they had already started to improve the stove and added additional functions to it e.g. by widening the hole for the firewood. Surprisingly, they reported no problems. They told us that the fire lit easily after having used the stove several times because it had dried out. They also stored and dried the firewood. They knew each other and sometimes met to discuss problems and solutions almost as a group. For the future they mentioned that they wanted to acquire more knowledge on the building process of the stove, so that everybody could build them and so that they could create a small stove business to increase household income.

This is not a unique story; the question is why the process in the two groups described ran so differently even though the existing conditions were the same: people from the same village, with similar educational background and eating habits? The innovation attributes were the same for both 'groups' too: the relative advantage was the same for both sides. Both used traditional three stone stoves in the beginning of the adoption phase. Both had the same opportunities to compare the suggested innovation of an ICS to the previous practice used and see if they felt the need to change their situation. The same applied to the complexity of the innovation, which required an understanding of how that innovation can be used in an everyday setting. Flexibility also plays a role here: it is possible for the user to improve and adjust the innovation to their specific needs and so forth. Nevertheless, the adoption of the innovation took a different course in both examples. It should also be stressed that similar observations could be made for the other cases (e.g. kitchen gardens, use of machines or crop production). Results based on all methods used so far have therefore led to the assumption that additional determinants, not directly related to the characteristics of the innovation itself and its technical or social compatibility, influence the decision to either reject or adopt.

In this regard, it can be *discussed* that the twelve selected innovation examples could give plausible indications for other influential factors which could either be related to the external situation individuals face (which they cannot change) or to personal aspects. We could call this situational internal and external conditions. We argue that understanding these conditions is important to initiate successful dissemination processes. Situational conditions derived from these case studies are not generally applicable to other cases or situations. Empirical results so far indicate that conditions are different for different types of innovation (e. g. technically based innovations, social innovations or knowledge innovations and so forth). Initial conditions developed can be introduced by re-employing the above mentioned example of the ICS; which can be characterised as a knowledge based innovation, as the ability to build the stove as well

as the ability to readjust it individually present the main challenge. The state of knowledge about the innovation on the users' side determines the dissemination rate of the innovation.

Situational internal conditions:

The most important condition for successful dissemination and implementation of ICS is *availability of a knowledge sharing system*. Encouraging schemes to govern the dissemination process and give incentives for farmers to share their knowledge with others is a major issue, as interviews with FG as well as with experts have revealed that farmers tend to keep their knowledge about innovations to themselves if they are not encouraged to share. In the case of ICS, we see two possibilities: (i) to appoint the task of knowledge sharing to the ICS farmer group and create a community based knowledge sharing system. Dissemination and knowledge sharing often takes place through group members' social networks along levels of trust with family or friends. This might exclude people who do not belong to the network, but follow traditional pathways; or (ii) to create a system that is based on a small individual business. This is not yet very common in rural Tanzania and would exclude people who cannot pay for the service.

Furthermore, a *proper understanding of the specifics of the innovation* itself favours permanent adoption and makes discontinuance less likely. Literature and interviews indicated consistently that if the handling of the innovation is not fully understood, adopters often change their mind and go back to their previous practice (traditional cooking). For ICS, this was the case if the users were not knowledgeable about the fact that the stove needed to dry out before it can work properly. When they observed that the ignition phase was longer than with the traditional three stone stove, they stopped using the stove. Some of them did not know that once the stove dried out ignition was much faster and wood consumption decreased by two thirds.

Situational external conditions.

A condition that will also influence the degree and pace of the dissemination of ICS is the *agro-ecological setting* (e.g. the degree of deforestation resulting from collecting firewood, availability of firewood or other fuels like charcoal). Poor facilities and highly degraded soils favour a more immediate adoption of this innovation. In the case of the semi-arid area of Dodoma, the scarcity of wood due to deforestation has raised the awareness of the need to reduce firewood consumption, which is addressed by the ICS. Fetching firewood from far away does not leave people enough time to do other income generating activities to improve their food security situation. In contrast, in the Morogoro case, people tended to use more charcoal and did not face such an immediate stress because of firewood unavailability. That had an impact on the degree of adoption.

Conclusions

It could be shown that due to several restrictions and limitations which are rooted in the system, several functions of the system could not be fully guaranteed. This refers to coverage of public extension services, but also to FG which exclude certain groups of farmers (e.g. very poor or remote), as well as to knowledge sharing and learning processes for food security innovations. Furthermore using the example on innovation processes it was possible to show how the attributes (by Rogers, 2003) refer back to, are linked to, and add to the concept of innovation system frameworks (by Malerba, 2002). Finally, the observation, that farmers in the same situation take different adoption decisions has led us to the assumption that we still need to get a deeper insight into the individual situations and decision making processes with

regard to food security innovations. However, it also reveals that even though selected methods were appropriate for observing FS innovations on different system levels, these methods are limited and other methods would be needed to get a more comprehensive picture. Nevertheless, it is already apparent that the conditions developed so far are able to support the implementation and dissemination processes by formulating recommendations for the specific innovative solutions tested for adoption here. This will be the next step in this research.

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Going beyond “add women and stir” in inclusive innovation processes: facilitating participatory activities with pineapple chain actors in Uganda

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Abstract: Transdisciplinary investigation of agricultural value chains can encourage innovation by bringing people together for knowledge integration and learning. The quality and result of the process is however dependent on how the diverse chain actors are identified, characterised and involved. Gender-sensitive approaches to innovation processes must go beyond mere rhetoric. Rather, inclusive innovation can be fostered when the gendered needs of women are considered in order to enable active involvement. This paper attempts to go beyond this, and shows how an iterative process containing a gender-sensitive stakeholder analysis can lay the foundation for facilitating inclusive innovation processes. This paper presents research that is part of a transdisciplinary project to reduce post-harvest losses and improve livelihood benefits among primary actors in pineapple value chains in two different regions in Uganda. We introduce an iterative process including: (i) actor identification and characterisation; (ii) establishing selection criteria and participation targets; (iii) identification of challenges and constraints for inclusion; and (iv) design and implementation of multi-stakeholder processes, as well as integrated feedback and reflection on each step. In order to obtain the information needed, a multi-methods approach was used, comprising semi-structured interviews, participatory group activities, and participant observation with actor groups along the chain in addition to multi-stakeholder meetings. This paper describes the gendered composition of the different actor categories. A variety of constraints and challenges for participation were identified particularly for women, e.g. time constraints, lack of resources and intra-household power relations. With feedback and reflection, it was possible to develop context-specific strategies to circumvent certain challenges. However, in order to achieve the desired inclusiveness, balancing the needs of different chain actors requires constant vigilance. This paper concludes with lessons learnt while applying this iterative process with pineapple chain actors in Uganda.

Keywords: Gender, inclusive innovation, value chain, multi-stakeholder processes, gender-sensitive stakeholder analysis, design

Introduction

In transdisciplinary research scientists collaborate with societal stakeholders, for instance through collaborative learning processes (Jahn et al., 2012; Lelea et al., 2014). As highlighted by Mayoux (1995), Agarwal (1997; 1998; 2001) and Cornwall (2003), participatory processes are not equally beneficial to those involved, and the quality of participation is dependent on how stakeholders are identified, selected and included in the process. Therefore, the needs

and constraints of diverse stakeholders must be carefully considered to enhance inclusivity of participatory processes.

This research is conducted on pineapple value chains in Uganda in the frame of a transdisciplinary research project which seeks to reduce losses and add value in East-African food chains (RELOAD). We understand food value chains as purposeful human activity systems (Kaufmann et al., 2013), and aim to enhance systems understanding in order to foster innovation using multi-stakeholder processes.

This paper presents an iterative process on how to increase inclusivity of participatory activities that can promote systems learning among primary actors in the pineapple value chain. A gender-sensitive stakeholder analysis was conducted to prepare for multi-stakeholder meetings. The iterative process involves actor identification and characterisation, identification of targeted participants' challenges and constraints to participation, the process design and implementation of multi-stakeholder meetings. With each step feedback and reflection allows for needed adjustments. As aspects of the cycle are repeated, action can be taken to increase inclusivity of activities alongside consideration of the researchers' own constraints. We present and discuss the lessons learned from facilitating this process in two value chains.

After a brief overview of the literature, the methodology section includes background and the study area, along with an explanation of the data collection methods. Results are presented on actor identification and characterisation including constraints and challenges. These then inform strategies which aim to enhance inclusivity of multi-stakeholder processes. Finally, we reflect on lessons learned from application of this iterative process.

Literature Review

Learning and innovation processes

Transdisciplinary research can take the form of participatory processes for learning, whereby stakeholders share ideas and perceptions to capitalise on each other's knowledge and skills to co-create new knowledge. The facilitation of actor learning and reflection within a transdisciplinary research project "*may help actors challenge and redefine the very structures that hinder their progressing...*" (Loeber et al., 2007 p.97), leading to changes in understanding, perceptions and actions, which may allow for improvements of a particular problem situation (Kaufmann et al., 2013; Lang et al., 2012). Moreover, social learning can occur through dialogue and social interaction, and changes that arise may go beyond the learning of individuals but rather extend to wider communities of practice (Röling, 2002; Reed et al., 2010; Coudel et al., 2011). In this paper, the term 'collaborative learning' is used as the umbrella term to understand the process of bringing actors together for learning and developing new ways of doing things.

Challenging and redefining structures of behaviour and perception, can be considered as 'innovation process', when these new insights are translated over time into innovation - which is the introduction of new things, ideas or ways of doing something. This interactive learning process occurs among people, e.g. actors in a value chain who are participants in a transdisciplinary research project. The agricultural innovation systems (AIS) approach associated with systems theory focuses on analysing complex relationships and innovation processes in agricultural systems (Clark, 2002).

The diversity of actors, institutions and processes involved in value chains emerge as complex systems and have associated challenges. These challenges, typically linked to a variety of actors, can be addressed by multi-stakeholder processes where actor groups come together and interact in collaborations such as meetings, training sessions, interactive activities and field visits (Klerkx et al., 2012; Spielman et al., 2009). Commonly, intermediaries are involved as facilitators, e.g. researchers who initiate multi-stakeholder processes (Röling, 2002). However, these processes are also context-specific and differ (Leeuwis & Pyburn, 2002), so that the real application of methods and steps must be tailored to the given context.

Drawing from learning and innovation literature, the design of the presented research ideally enhances actors' awareness and understanding of the relations between the activities and practices which shape the structure of the system they act in, and the resulting impacts and practices. The crucial assumption is that this awareness may encourage collaborative action and innovation for improved management, enhanced value creation and greater livelihood benefits.

Gender-inclusivity in participatory and innovation processes

Formalising participatory innovation processes to improve livelihood benefits for actors requires awareness about their different levels of access to the process and, in turn, necessitates careful process design. Thus, it is important to understand actors' constraints and interests, and reflect on the target group so that innovation processes do not create unintended negative side effects such as creating greater inequalities among actors. The responsibility of researchers to prevent exclusion in innovation processes is increasingly recognised and conceptualised as 'pro-poor innovation', 'grassroots innovation' or 'inclusive innovation' (Cozzens & Sutz, 2014; George et al., 2014). 'Inclusive innovation', has been defined as the inclusion of groups who are currently marginalised within some aspect of innovation (Foster & Heeks 2013). The actors comprising marginalised groups however, vary according to the context and research focus, and also differ depending on the innovation process in question (Joseph, 2012). Typically marginalised groups in innovation processes are those who face the greatest barriers to inclusion, such as women and those living in remote locations.

The exclusion of marginalised actors in participatory processes can occur outright regarding 'who does and does not' attend activities, and can also occur more subtly during the process itself (Agrawal, 1998; Cornwall, 2003). Studies have identified various constraints for actors, particularly women, to attending participatory processes. These include lack of knowledge, resources and skills (e.g. literacy levels) (Egunya & Reed, 2015); limited mobility to attend meetings and activities due to lack of transport means, safety, living in remote locations; needing permission from others (Mayoux, 1995; Chaudhury et al., 2012); time constraints due to high workloads or domestic chores (Mayoux, 1995; Cornwall, 2003; Agrawal, 1998; Chaudhury et al., 2012; Swaans et al., 2014; Egunya & Reed, 2015); and additional constraints related to roles and relations in society (Mayoux, 1995, Agrawal, 1997; 1998; Chaudhury et al., 2012). Furthermore, power imbalances between actors (Cornwall, 2003; Agarwal, 2015) and a lack of regard when voicing opinions (Agrawal, 1997; 1998; 2001) can restrict participants from fully engaging and benefiting from participatory activities, even when they are present.

The understanding that attendance in participatory activities does not automatically entail being fully engaged and benefiting from the process echoes a critique given to programmes which only superficially address gender with empty rhetoric. Referring to the instances when women would be included in programmes, jobs and meetings simply to fill gender quotas without adequate consideration of the context-specific differences between persons and the complex relations between women and men which are root causes of inequalities (Cornwall, 2003), Charlotte Bunch named this phenomenon “*Just add women and stir*” (Harding, 1995).

Kingiri (2013) draws upon this line of critique and provides direction on how gender can be integrated into thinking around innovation processes in agriculture, suggesting a shift from gender analysis to gender learning, which is defined as the way that “*new experiences and local context should inform the process of making agricultural innovations gender sensitive*” (Kingiri, 2013 p.538). Thus, this paper explores the beginning of a process which might be similar to gender learning, and provides an empirical example of how such innovation processes may be facilitated to become more gender-sensitive. A gender-sensitive stakeholder analysis sets the stage for the initiation of stakeholder processes, through identification, characterisation, and targeted selection of actors, as well as identifying gendered challenges and constraints for attending and participating during multi-stakeholder meetings. Feedback and experiences from setting up these innovation processes allow researchers to learn about the gendered system and subsequently inform, reform and reframe the methodology for subsequent multi-stakeholder processes to increase inclusivity.

Methodology

Background of the study

This paper is situated within a larger study that investigates post-harvest losses in pineapple value chains in Uganda. It aims at improved system understanding through learning and multi-stakeholder processes with primary chain actors¹. Various participatory methods are used, focusing on bringing actors together for activities such as mental modelling and sharing perspectives. This larger study is on-going and is being carried out with several field stays in Uganda. This paper is based on experience gained during the second field stay between July and September 2015 and presents the approach and result of the initiation of innovation processes, including gender-sensitive stakeholder analysis.

Study area

Field research was conducted in Masaka district in the central region, and Ntungamo district in southwestern Uganda (Figure 1a and 1b). In both areas, pineapples are predominantly produced by smallholders, and traded fresh. Study areas differ in some social and environmental characteristics (Table 1).

¹ Primary actors are understood in this paper to be actors whose income and business are dependent on the sale of pineapples. In contrast, supporting actors are understood as those who make an income working as wage labourers.



Figure 1a. Map of Uganda, marking study regions.

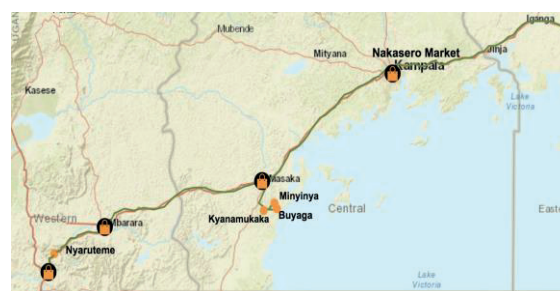


Figure 1b. Section of Uganda showing the main pineapple collection centres and markets for pineapples included in the study.

Table 1. Characteristics of study areas. (Sources: *Field data, **UBOS (2009), ***Rücker (2005))

District	Ntungamo	Masaka
Dominant ethnicity	Banyankole	Baganda
Mean annual rainfall**	Bimodal high rainfall >1200 mm/year	Bimodal high rainfall >1200mm/ year
Elevation	1500m	1200m
Soil type***	Loam, clay loam	Loam, sandy loam
Primary crops grown*, **	Beans, banana, coffee, sweet potato	Beans, sweet potato, banana, cassava, coffee, maize
Distance to main markets (Figure 1b)	Ntungamo town (10km), Mbarara (80km), Rukungiri (40km), Kampala (350km)	Masaka town (30km), Kampala (150km), Nairobi (800km)
Main mode of transportation used in to transport pineapples*	Bicycles and motorcycles used from farms to Nyaruteme collection centre; cars transport to markets (Ntungamo, Mbarara, Rukunjuri); trucks transport to Kampala.	Pick-up truck used from farm to collection centres; trucks from collection centres to Kampala and Nairobi. Motorcycles and cars used from farms to Masaka town markets.

Data collection and analysis methods

The fieldwork was carried out by two female researchers², each accompanied by one female field assistant who acted as translator, cultural broker and mediator (Caretta, 2014). The data used for this paper was collected in the frame of a gender-sensitive stakeholder analysis. This was then used to inform the facilitation of multi-stakeholder processes. A summary of the

² Authors Bitzan and Tröger

activities conducted within this multi-method approach and their gender distribution is depicted in Table 2.

Table 2. Summary of sessions and gendered participation in fieldwork activities

Activity	Session	Ntungamo		Masaka	
		N = male	N = female	N = male	N = female
Semi-structured interviews		14	8	13	15
Value chain mapping	1 st	4	1	3	3
	2 nd	2	3	-	-
	3 rd	1	5	-	-
Daily activity clock	1 st	3	1	x	-
	2 nd	1	4	-	-
Group discussion	1 st	1	4	0	15
	2 nd	3	0	0	4
Multi-stakeholder meeting	1 st	8	5	6	2
	2 nd	6	4	6	3
	3 rd	7	3	-	-

Researcher-practitioner socialisation and identification

Aiming for a broad representation, value chain actors were identified through purposeful snowball sampling and observations at locations where transactions within the value chain take place. The aim was to gain insights regarding which male and female actors are involved in the value chain and what diverse roles and functions they have. As formal organisational structures (e.g. groups and cooperatives) were not common in the study area, many individual relations between researchers and chain actors needed to be established. Researcher-practitioner socialisation occurred through informal discussions and engaging in practical value chain activities such as selling pineapples with local traders in Ntungamo, or digging and planting pineapples with farmers in Masaka. These activities built trust and raised interest in our participatory activities.

Semi-structured interviews (SSI)

In order to gain understanding about value chain functions, activities, challenges and constraints, chain actors were interviewed using semi-structured questionnaires (SSI). In light of the planned participatory group methods, focus was also given to gender-based constraints, challenges and differences. Additionally, respondents were asked about their interest and motivation in taking part in group activities, meeting other stakeholders, and collaborative learning. Narrative questions during interviews were used to gain an understanding of the complexity of the gendered actor landscape, and to identify possible entry points for collaborative learning processes.

Participant observation

Throughout the field stay, the researchers lived in or near the communities and spent time engaging with chain actors, their families and their activities, which provided opportunity for participant observation further validating responses. Notable observations and daily

interactions between actors outside of interviews or group activities were recorded as field jottings (Emerson et al., 2011).

Participatory group activities

Group activities were first organised with chain actors belonging to the same actor group (e.g. farmers). This was done either by researchers or by asking chain actors to organise a group of people who would be interested in sharing knowledge and learning. Group activities aimed to contribute to gender-sensitive stakeholder analysis including actor identification and characterisation regarding function, activities, constraints and challenges in the chain. In addition, group activities aimed to initiate the sharing of ideas, knowledge and perspectives towards systems learning. The methods employed were gendered value chain mapping, daily activity clock, and group discussions where dialogue was primarily on the topic of gender differences and inequalities.

Multi-stakeholder meetings

Informed by the interview responses and single group activities, innovation processes were initiated by bringing various chain actors together (e.g. farmers, traders and brokers) in the form of multi-stakeholder meetings and activities. The goal of the meetings was to develop a common understanding of the chain and its challenges and to work towards improving communication and collaboration among chain actors. To encourage learning, different participatory tools including cognitive mapping, problem/opportunity tree, card collection, ranking and role-play were applied. Moreover, team building exercises and games encouraged communication and trust-building among participants (e.g. Helium stick and building a paper tower). Following multi-stakeholder processes, informal feedback discussions were held to help researchers identify points of improvement for continuing the process. Methodological adjustments occurred in the field according to the context-specific needs of chain actors.

Accounting for the situation, researchers made decisions on targeting specific chain actors to attend the multi-stakeholder meetings. These participants were selected according to several criteria including their function, characteristics and interest in collaborating with others. Targeted participants were more closely considered when planning the logistics of multi-stakeholder processes regarding time and arrangement of activities so that they would be able to attend. The general research and facilitation approach is presented in Figure 2. The diagram depicts the iterative steps that can be involved in facilitating inclusive innovation processes.

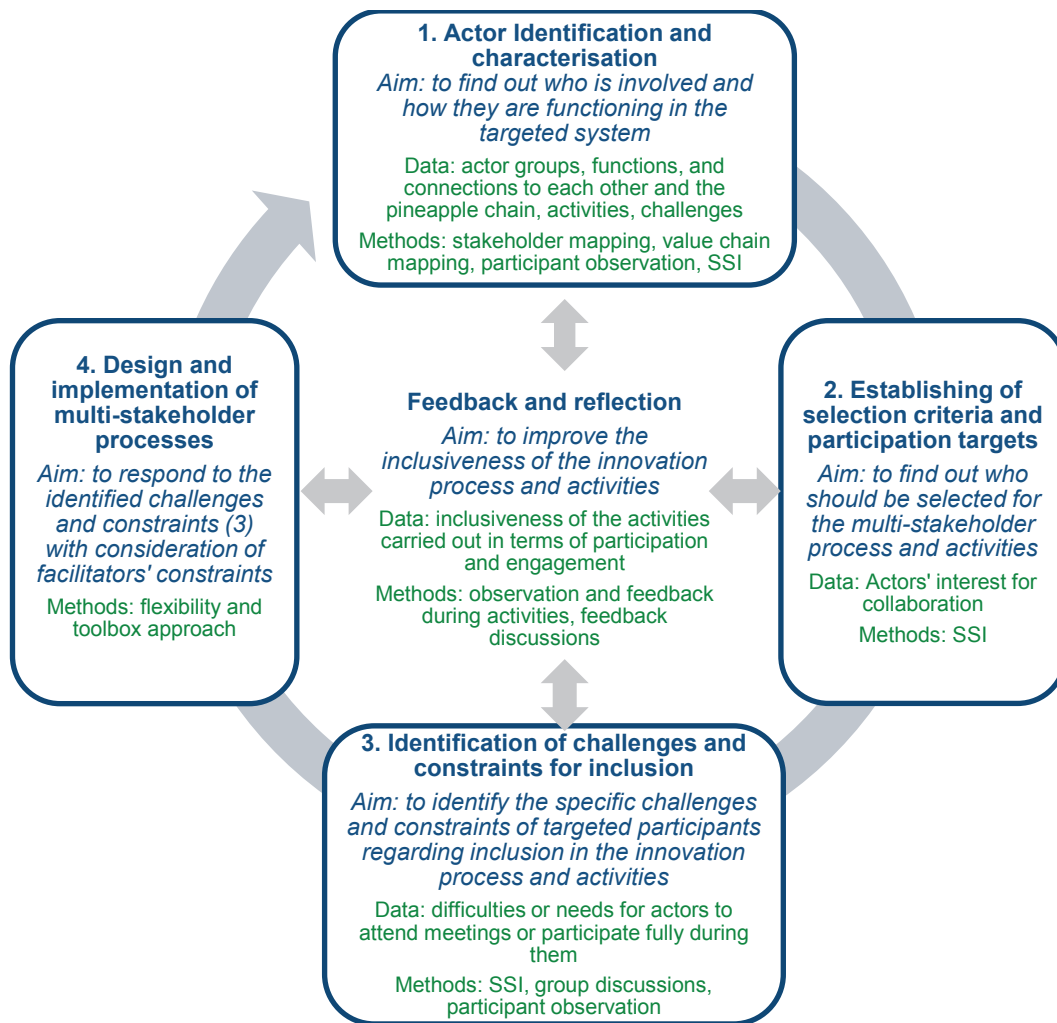


Figure 2. Diagram of steps to facilitate inclusive multi-stakeholder processes.

Data analysis

Interviews and group sessions were audio-recorded and subsequently transcribed and translated verbatim (Regmi et al., 2010) from the languages Luganda and Ryankole into English. When audio recording or transcription was not possible or not desired by participants, detailed field notes in the form of jottings were taken (Emerson et al., 2011). Transcripts and field notes were analysed through thematic coding, using MAXQDA software for qualitative data analysis.

Results

Results are presented in this section according to the described steps for facilitating inclusive innovation processes in the methodology section (Figure 2). At every step of the process, researchers had to remain flexible and adjust their plans for activities and meetings to take account of feedback from participants, and reflection from their and their field assistants' own observations. This feedback and reflection and associated adjustments to the process are noted under every step.

Step 1: actor identification and characterisation

In each study area, participatory value chain mapping and responses from the semi-structured interviews provided insight into the structure of the value chains with regard to chain functions and the respective actor categories as well as their linkages and challenges. Figure 3

(Ntungamo) and Figure 4 (Masaka) show the gendered participation in actor categories along the value chain.

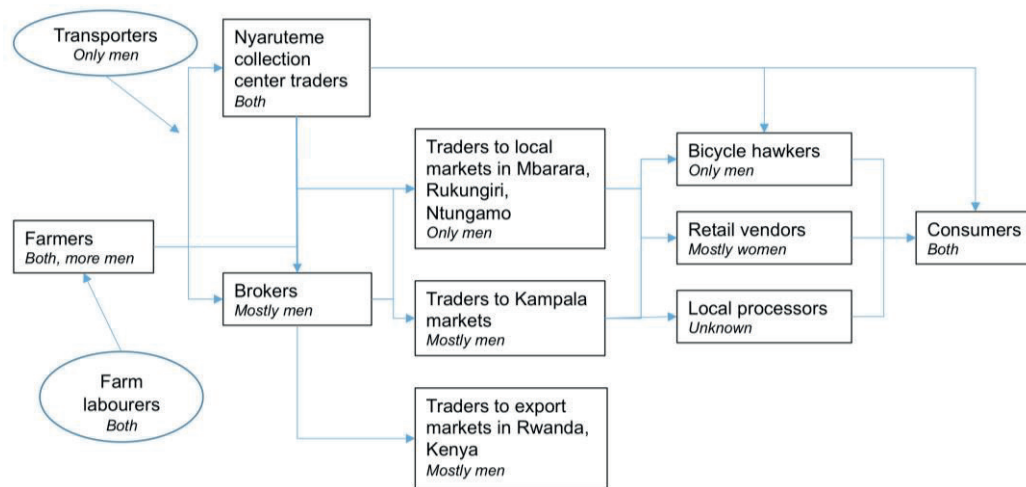


Figure 3. Value chain structure and gendered composition of actor categories in Ntungamo.

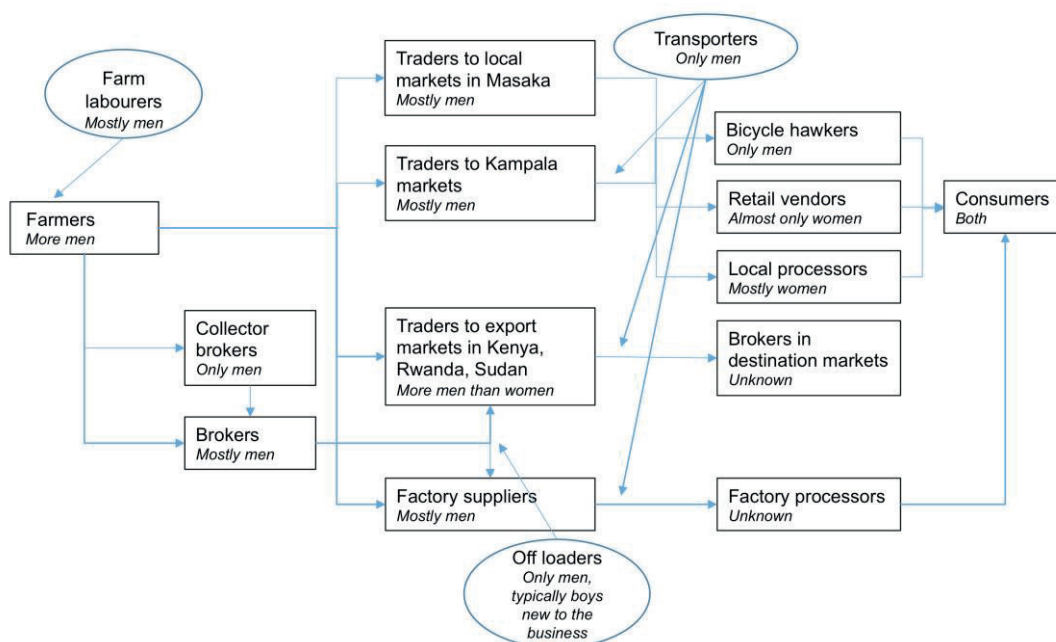


Figure 4. Value chain structure and gendered composition of actor categories in Masaka.

Data on gendered participation shows that there were fewer women present in some of the actor categories along the pineapple value chains. The majority of women involved act as pineapple farmers (Ntungamo and Masaka), local traders (Ntungamo), retail vendors (Ntungamo and Masaka) and local processors (Masaka). Some women were identified who acted as brokers and large traders (Masaka), while only men were identified in some primary

actor categories such as brokers (Ntungamo), bicycle hawkers (Ntungamo and Masaka), and collector brokers (Masaka). These findings meant that for inclusive multi-stakeholder processes it would be important to try and include women from those actor categories in which they were active.

Step 2: establishing selection criteria and participation targets

For the selection of chain actors to participate in the meetings and activities the following criteria were established. Targeted participants were primary actors from the pineapple value chains who (1) expressed an interest in meeting other actors from the chain and in learning, (2) engaged in the pineapple business as their primary source of livelihood, (3) have experience and knowledge about the business (i.e. were not new to it), and (4) represent a diversity in terms of gender, socioeconomic level, activities and location. Further, we also aimed to include those who normally have less opportunity to interact and share ideas (e.g. coming from remote locations). Through these criteria, we sought to bring willing and engaged people together who have relevant knowledge to share with one another and would benefit from system learning.

Some chain actors expressed interest in participating in multi-stakeholder meetings because they wanted to exchange with actors of their own actor category:

“I [would] talk with my fellow trader because theft of pineapples is on the rise; there are some people who harvest unripe pineapples and then some have deserted the business because they are stolen pineapples. [...] Another thing, as traders we need to have good moral over the farmers; and when there is some disagreement, then it becomes hard to manage” (SSI, female trader, Masaka).

Or because they wanted to learn about other chain actors’ business and strategies:

“I would like to meet a broker, I would like to ask how he manages his job, the benefits that he gets and I also share with him how I benefit from the business as a farmer and a trader.” (SSI, female farmer trader, Ntungamo)

“I would love to meet brokers from other areas. [...] When I meet them I would like to hear from their side how they fared during the season and how they are running their business. This way I would get their experiences such as boss fraud, non-payment and the likes” (SSI, male collector broker, Masaka)

Participants were not limited only to those selected by the researchers. Meetings and activities were open and the invitation was extended to multiple individuals from each actor category. This allowed chain actors to self-select and choose to attend, as well as to bring friends who were interested in coming. Researchers made efforts to select chain actors to participate in multi-stakeholder meetings with whom they had built rapport and relationships (through researcher-practitioner socialisation), as these chain actors would also be familiar with the learning-based approach and collaborative goals of the research.

Finally, despite the efforts made, it was not always possible to include important or suggested practitioners in the entire process, and some chain actors chose to opt-out of the process. For example, those who generally had critical perceptions of group activities, expressed

reluctance to participate. Urban market vendors who were invited to attend multi-stakeholder meetings were not interested in investing a significant period of their day to travel to rural areas where the meetings were held.

Feedback and reflection

Reflection on and feedback from the first multi-stakeholder meeting in Ntungamo showed that there were significantly more farmers attending than traders, despite the meeting being held at the Nyaruteme collection centre where traders work. Furthermore, a village chief and a farmers' group leader who attended the meeting tended to dominate the discussion. Informal discussions after the meeting with individuals indicated that some did not feel they were able to speak openly during the discussions or disagree with certain points because of the hierarchical power relationships between participants. For subsequent meetings, researchers made sure to include a balance of actor categories.

Similarly, in Masaka individual feedback with a woman farmer who participated in the first multi-stakeholder meeting indicated that she perceived the meeting to have shortcomings in terms of the balance of actor groups. She said that she felt inhibited when speaking because there were few farmers, and that if there had been 4-5 farmers she would have been more willing to talk to the traders in a better way. When the researchers asked if her discomfort speaking had anything to do with being a woman, she was clear that this was not the case.

Step 3. identification of challenges and constraints for participation in multi-stakeholder processes

In this section, challenges, constraints and needs of targeted participants regarding their inclusion in multi-stakeholder processes are presented. They were identified during the interviews but also during group activities.

Time constraint

The gender-sensitive stakeholder analysis revealed particular time constraints for women to directly participate in multi-stakeholder processes. Women actors have a high burden of household chores alongside activities in the pineapple value chain. Their schedules are very full:

"I wake up at 5:30 am then I wash clothes, light the charcoal stove, ...then prepare breakfast around 6am; meanwhile as the breakfast is on the stove, I wash the utensils and clothes. After having breakfast... at around 8am I start work in the pineapple garden until 11am... I wash, and then come here [Nyaruteme collection centre]. I can say that it takes me about 30 minutes from the garden to home and also about 30 minutes to wash up; so that I can reach here at 12pm... I stay here selling until 6pm... when I leave, I have to do domestic work like washing utensils, clothes, and then prepare supper" (daily activity clock, female farmer trader, Ntungamo).

Observations further showed that women respondents, particularly those with young children, found it difficult to take time off to give interviews and to join group activities. Often when they did agree to give interviews, they would need to multi-task - engaging in child-care, household or business work such as selling pineapples (Nyaruteme collection centre; Masaka retail vendors) during the interviews. This daily activity clock data showed that women had greater time constraints discouraging attendance at multi-stakeholder meetings. They were often unable to take time off from productive and reproductive work. When participants were asked

directly about their time constraints regarding meetings and group activities, they mentioned for example having to return home to cook for children during lunchtime (SSI, female local trader, Ntungamo), for the family in the evenings (daily activity clock, female local traders, Ntungamo) and having to know about meetings early enough to be able to free some time in their schedules and make arrangements to attend meetings (informal discussion, female farmer, Masaka). The time constraint facing women was most pronounced for the few women who were brokers and large traders (Masaka). These women had to manage household and business responsibilities and it was very difficult to schedule interviews with them.

Lack of transportation and communication resources

Some participants, primarily farmers who lived in remote locations mentioned challenges with mobility associated with the costs of hiring transportation, or otherwise having to spend a significant time walking to the locations where the meetings took place. Furthermore, researchers noted that some chain actors lived in areas with poor or no mobile phone reception or did not own mobile phones, creating challenges around communicating with researchers to be informed about meetings. For some women this was exacerbated as some households only owned one mobile phone, which was commonly in the husband's possession. The challenges of transportation and communication were most significant during periods of heavy rain, when researchers observed that some areas and homes were only accessible on foot due to bad roads and steep hills.

Intra-household power distribution

Discussions regarding gendered dimensions shed light on intra-household power relations, particularly in male-headed households. Women farmers in Masaka said they needed permission from their husbands to engage in group activities. Reasons they cited were: that men did not want their wives to be moving around alone; working with new people; getting involved in 'bad things'; or, making more money than them (group discussion, female farmers, Masaka). Additionally, in one instance in Ntungamo the husband of a female trader insisted that he attend rather than his wife.

Feedback and reflection

In Ntungamo, a woman local trader who held an important role at the collection centre was never able to attend any of the meetings due to several urgent family matters coming up and business to conduct. In Masaka, feedback from the second multi-stakeholder meeting indicated that a female broker had not participated but rather sent a trader colleague to represent her instead, as she suddenly had business activities to deal with and could not attend herself. Similarly, when asking other participants why they had not come despite agreeing to earlier, they cited reasons such as illness of children, business activities or urgent family matters.

In both places, meetings were often delayed and extended due to participants arriving late, unexpected heavy rain (which halted activities held in venues with tin roofs due to the noise), or other factors, such as a snake being found in the collection centre, which interrupted and delayed the meeting. Researchers realised that unforeseen circumstances were very common and created challenges and constraints to attend meetings beyond those identified in the interviews.

Step 4: design and implementation

The challenges and constraints to inclusion of chain actors required researchers to design and implement multi-stakeholder processes in such a way as to try and circumvent these barriers.

Attending meetings

To address the time constraint of participants, particularly women, meetings were scheduled as short blocks of time (e.g. 1.5 – 2 hours) at times convenient for them, usually afternoons after they had finished working in the garden and preparing lunch for children. Meetings needed to conclude before dark to allow participants a safe return home and to allow women to have time to prepare supper for their families. Meetings were also planned to be open, allowing participants to join and leave at any time, as well as bring their children. Meetings in Ntungamo were scheduled at Nyaruteme collection centre to be close to the local traders' work place. In Masaka meetings were held in a local school in Mininya, a relatively central village close to many women pineapple farmers that had been identified.

To reduce transportation constraints for remote chain actors, transport costs were reimbursed by researchers, or motorcycle-taxis were hired to directly pick up participants and bring them to meetings. When prospective participants were identified who could not be reached by mobile phone, researchers would visit them directly or find ways to pass information to them through contact persons (e.g. neighbours, friends or group leaders) to inform them about activities. In addition, participants were encouraged to bring friends who would have similar interests in the process.

Intra-household power relationships were more difficult to address, and required careful consideration of what to do (depending on the specific context) to avoid causing conflict or tension within households. Discussing the research and multi-stakeholder meetings with both parties in a household was important in some cases where women may not have been allowed to attend without their husbands' permission. In these instances, the researchers invited both because they felt that otherwise the women would not have attended. In other cases, researchers stated directly that they would like the participation of a certain individual.

Sharing information outside of meetings to increase inclusivity

To increase inclusivity, researchers sought to disseminate information outside of meetings. In Ntungamo for example, researchers talked to traders who did not attend meetings individually and in small groups. These discussions aimed to share topics discussed at multi-stakeholder meetings and seek additional opinions on the content in less formal settings. For example, such conversations were used to check that the joint problem identified at the multi-stakeholder meeting was also considered of high importance to traders who did not attend. Furthermore, chain actors were encouraged to send a representative to meetings if they could not attend themselves. At the last multi-stakeholder meeting held in Ntungamo, researchers facilitated the participants to nominate two contact persons - one to represent farmers and the other traders - to continue communication when the researchers returned to Germany. Together the researchers and the group agreed to nominate one woman and one man. Furthermore, feedback seminars conducted at the end of the field stay in both Ntungamo and Masaka aimed to disseminate the knowledge and discussions across the whole community. In Ntungamo participants and the local community were invited to Nyaruteme collection centre to view all the output from multi-stakeholder meetings and group activities and ask questions.

In Masaka researchers travelled to each village they had worked in and briefly displayed the visualisations from group work to share with the community, answer questions and get feedback.

Inclusivity during meetings

Attempts were made to facilitate meetings in which all participating chain actors could have an equal opportunity to have their voice heard and their opinions considered.

In Ntungamo the first multi-stakeholder meeting was set up as a discussion round, where a representative from each actor category shared cognitive maps made during group activities and participants identified and discussed connecting factors which spanned several actor categories. This set-up aimed to share the knowledge gained during group activities with single actor categories, and to stimulate discussion on how actors' activities influence one another and their value chain.

In Masaka, during the first multi-stakeholder meeting, participants separated into two working groups, with each group consisting of farmers, brokers and traders, and then came together after one hour to share and discuss. One group used cognitive mapping to identify challenges which affected all chain actor categories. The other group used a problem tree to delineate the topic of trustworthiness, which was one of the topics mentioned often by both women and men as something they would like to speak about.

Feedback and reflection

Observations during multi-stakeholder meetings and feedback from participants after meetings suggest that subsequent meetings were more inclusive than the first meetings in both Ntungamo and Masaka. In the first multi-stakeholder meeting in Ntungamo dialogue and exchange was dominated by men and also heavily led by two more powerful actors. Also, beginning the meeting by having participants share cognitive maps may have already put those participants who had not been involved in the mental modelling activities into the role of listeners rather than equal participants able to contribute to the discussion. In subsequent meetings, icebreaker games were used to enhance team building. Activities were structured so that participants could each present and discuss their contributions, either writing them on a card or contributing verbally when it was their turn, which helped to encourage more participants to share their ideas. Observations during the meetings showed that this led to more dialogue and exchange, as ideas and opinions were obtained from each participant and discussed, rather than participants simply responding to the statements made by a few.

In Masaka a multi-stakeholder meeting contained a role-play in which participants acted out different chain functions to those they normally engaged in. During the role-play they demonstrated how the pineapple moves from farm to the market. A subsequent discussion about the role-play and connecting factors was set-up in a structured way, whereby each participant was given a turn to stand in front of the group and lead discussion about the influence of a particular factor (e.g. quality of pineapples) on other actors - farmers, brokers and traders - in either positive or negative ways. Positive feedback from chain actors about the meetings, as well as observations during the activities, showed that all participants were having fun, were engaged and actively sharing opinions. This performative method enabled more inclusive communication than methods focused on verbal interactions.

Lessons learned

Critical reflection based on feedback and observations during activities and meetings suggest that the strategies applied to increase inclusivity according to gendered needs were not consistently effective. However, attendance and quality of participation during meetings seemed to improve consecutively. This underlines the importance of an iterative repetition of the described steps when striving for inclusive innovation processes.

Lessons learned:

- It is particularly challenging to sufficiently account for and balance the different time constraints of targeted participants. Particularly, more consideration needs to be given to accommodate the time constraints of women. Moreover it is necessary to remain flexible and to identify alternative ways of planning and structuring meetings, for instance by including activities that account for late arrivals by participants, unforeseen circumstances and interruptions.
- Trying to bring multiple stakeholders together without considering power relationships reduced knowledge sharing and made it more difficult to facilitate and direct activities. As the level of confidence to interact and speak out at meetings varied, and also depended on the level of familiarity with participatory methods and mutual trust among those gathered, it might be worth considering the involvement of more powerful stakeholders at a later stage. This gives all participants a chance to get to know the process first, gain confidence and finally voice their opinions.
- Interactive activities such as icebreaker games or role-play that involve movement created an atmosphere conducive to team building and establishing trust. They were important in improving communication and creating a fun atmosphere, thereby encouraging participants to continue attending meetings.
- Suggesting that chain actors bring friends or colleagues who have similar motivation to learn and with whom they feel comfortable seemed to encourage more active participation in meetings.
- Having time and opportunity for ample socialisation between researchers and practitioners before initiating innovation and multi-stakeholder processes is important, especially to encourage women to join. Socialisation must also continue in between meetings, where researchers check in with participants through phone calls and visits to maintain a friendly, trustful relationship. In this regard the cultural and political context of the study site as well as previous experiences that the targeted practitioners had with former projects needed to be taken into consideration.
- As the agreement and support of husbands played an important role for some of the women's attendance, it is equally important to find out about their specific influence and what can be done to improve their attitude towards the research in order to ease participation for women.

This study has faced many challenges in making participatory processes inclusive. We found that understanding the situation, including constraints and challenges of individuals within actor groups, is necessary to inform the design of participatory processes. Moreover, this study goes beyond mere discussion around the need for inclusiveness by documenting its application. We conclude that an iterative process is necessary because analysis of participants' constraints only at the beginning of a process is not sufficient. Ideally, steps are repeated to take into consideration feedback and reflection in order to make the whole process

more inclusive. Finally, the experiences and lessons learned can further inform participatory processes by seeking inclusivity beyond simply “add women and stir”.

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