

Original Article

Value Chain Upgrading and the Inclusion of Smallholders in Markets: Reflections on Contributions of Multi-Stakeholder Processes in Dairy Development in Tanzania

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Abstract Increasingly, value chain approaches are integrated with multi-stakeholder processes to facilitate inclusive innovation and value chain upgrading of smallholders. This pathway to smallholder integration into agri-food markets has received limited analysis. This article analyses this integration through a case study of an ongoing smallholder dairy development programme in Tanzania. Value chain upgrading and innovation systems perspectives were combined in an analytical framework to interpret the findings, which show that multi-stakeholder processes enhance horizontal and vertical coordination but limit process and product upgrading. The main conclusion is that, although such processes may catalyze smallholder market inclusion, their effects are largely bounded by existing value chain structures (e.g. production system, fragmented markets), timeframe and how prevailing institutional constraints are addressed, which may constrain the intentions of such collaboration action. This calls attention to the starting points of value chain interventions and the socio-political dynamics that are part of multi-stakeholder processes.

De plus en plus, on intègre l'approche de la chaîne de valeur à celle de l'étude des processus de diverses parties prenantes, afin de faciliter l'innovation inclusive et l'amélioration de la chaîne de valeur des petits cultivateurs. Le trajet d'intégration des petits agriculteurs aux marchés agroalimentaires n'a pas été très analysé. Cet article examine cette intégration à travers une étude de cas, celui d'une petite exploitation agricole et laitière, faisant partie d'un programme de développement en Tanzanie. Au sein d'un cadre analytique d'interprétation des résultats, on a intégré les perspectives d'amélioration de la chaîne de valeur et des systèmes d'innovation. On a vu que les processus impliquant divers parties prenantes renforcent la coordination horizontale et verticale, mais au même temps ils limitent la valorisation des produits et des procès. La conclusion principale est que même si ces processus servent de catalyseurs à l'intégration des petits cultivateurs au marché, leurs effets sont délimités par la structure existante de la chaîne de valeur (par exemple, le système de production, la fragmentation des marchés), par la période considéré, et par comment les contraintes institutionnelles sont abordés, puisqu'elles peuvent limiter les intentions de ces actions collaboratives. D'ici on veut porter l'attention sur le point de départ des interventions sur les chaînes de valeur, et aussi sur les dynamiques socio-politiques qui font partie des processus avec diverses parties prenantes.

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Introduction

Value chain approaches are increasingly promoted as holistic intervention frameworks for inclusive smallholder development in evolving agri-food markets in Sub-Saharan Africa. The value chain denotes the diverse actors involved in various productions to consumption activities, and their dynamic relationships for establishing value creation and market linkages (Ayele *et al*, 2012). This value chain evolution is partly characterized by transformation of agri-food systems linked to trends such as shifting demographics, increased incomes, and changing dietary patterns and consumer preferences, which offer opportunities but also pose threats to the integration of smallholders into remunerative local, regional and global markets (McCullough *et al*, 2008; Webber and Labaste, 2010). It is argued that smallholders capture minimal benefits from production-oriented interventions at farm level that have a limited focus on market integration and do not contemplate the broader value chain in which smallholders are embedded or from which they are excluded (Hounkonnou *et al*, 2012).

The drive to support smallholder commercialization increasingly dominates key policy and agricultural research and development efforts of governments, donors and development agencies (Webber and Labaste, 2010), notwithstanding calls to appraise these efforts critically in relation to sustainable and equitable outcomes (Poole *et al*, 2013). The application of value chain approaches in development interventions is thus seen as an opportunity for enabling inclusive smallholder innovation and enterprise development, and to contribute to broader development outcomes such as food, nutrition and income security (Bolwig *et al*, 2011; McCullough *et al*, 2008; Proctor and Vorley, 2008; Seville *et al*, 2011). Studies on smallholders' and other resource-poor actors' participation in value chain interventions indicate that many smallholders are finding opportunities in growing agri-food markets, thus pointing to inclusive value chain development, although inadvertently some outcomes have promoted the exclusion or adverse inclusion of others (Kilelu *et al*, 2013; Seville *et al*, 2011; Thiele *et al*, 2011; Tobin *et al*, 2016; Vellema *et al*, 2013).

The upgrading concept describes how firms and sectors shift towards making better products, making them more efficiently or moving into more skilled activities and improving their performance and rewards in high-value markets (Giuliani *et al*, 2005). Upgrading in agri-value chains relates to changes in production processes to improve productivity and products that are increasingly defined by domestic and international quality standards and food safety measures (Bolwig *et al*, 2011; Lee *et al*, 2012; McCullough *et al*, 2008). The upgrading of smallholder-focused agri-value chains is intrinsically linked to innovation processes, as noted in literature integrating value chain development and agricultural innovation systems approaches (Anandajasekaram and Gebremedhin, 2009; Ayele *et al*, 2012). These works emphasize the necessity of fostering multi-actor linkages and interactions that enable knowledge exchange, capacity strengthening, joint learning and continuous problem solving to enable poor producers to participate in remunerative markets. Consequently, an ubiquitous feature in recent agri-value



chain development initiatives, inspired by agricultural innovation systems approaches, is the facilitation of multi-stakeholder processes through interventions that have been variously conceptualized in the literature as well as operationalized in practice and go by different terms such as innovation platforms (Kilelu *et al*, 2013; Swaans *et al*, 2014; Thiele *et al*, 2011), public–private partnerships (Bitzer *et al*, 2013), public–private–producer partnerships (Thorpe and Maestre, 2015) and value chain collaboration (Ros-Tonen *et al*, 2015).

Most multi-stakeholder process studies in smallholder-dominated agri-value chain interventions have predominantly looked at how these processes are organized and how this facilitates concerted action for innovation (Swaans *et al*, 2014; Thiele *et al*, 2011), but studies have mostly not linked the functioning of these processes with specific outcomes relating to upgrading as the pathway towards smallholder integration into growing markets. This paper’s central question therefore is: how do multi-stakeholder processes enable upgrading for smallholder inclusion in agri-value chains? To answer this question, we analyse the initial experiences of what is envisioned to be a 12-year smallholder dairy research for development programme in Tanzania, during its third year of implementation.

In the next section, we briefly discuss the value chain literature, linking it to that on the role of multi-stakeholder processes in smallholder development to develop the conceptual basis for understanding inclusive value chain upgrading for smallholders. We then describe the methodology, followed by the presentation and discussion of the findings and conclusions.

Theoretical Background

Upgrading Along Value Chains Linked to Inclusive Smallholder Development

The application of value chain perspectives to smallholder agricultural development draws from the literature on global value chains, which analyses how emerging economies are being integrated into global markets and the governance of these processes (Gereffi *et al*, 2001; Humphrey and Schmitz, 2000; Kaplinsky and Morris, 2000; Trienekens, 2011). The global perspective emphasizes that firms’ access to global market chains is not merely about production, but also about how firms gain entry or upgrade into the networks that form these value chains. Thereby, they aim to maximize value creation through acquiring technological, market and institutional capabilities in order to catalyze innovation to improve productivity, competitiveness and entrepreneurship within a particular value chain (Giuliani *et al*, 2005; Humphrey and Schmitz, 2000). In the global value chain literature, upgrading has been discussed in relation to governance, in which market structures shape the possibilities for actors to upgrade their capacities and activities (Gibbon, 2004). Governance forms range from spot markets, characterized by loose short-term trading relationships governed mainly by price, to hierarchical and hybrid (modular, relational, captive) forms governed by longer-term ongoing business relations (see Gereffi *et al*, 2005 for elaboration).

The literature distinguishes four upgrading trajectories, presented as sequential: process, product, functional and inter-chain upgrading. However, these upgrading trajectories have been mainly applied to analyse industrial contexts (see Humphrey and Schmitz, 2000 for details). Specific literature on upgrading in agri-value chains for smallholder producers in international and domestic markets denotes upgrading as processes of identifying leverage points for change (Bolwig *et al*, 2011; Gibbon, 2004; Giuliani *et al*, 2005; Lee *et al*, 2012; Trienekens, 2011). These go beyond general arguments on market integration, production efficiency and growth, to unlocking socio-technical (e.g. equitable access to technology, inputs, credit, market



information, physical infrastructure, environmental issues) and institutional barriers that limit the integration and performance of poor men and women rural producers in agri-food systems. These processes have broadly been characterized as inclusive value chain development in which interventions aim to transform agri-food markets by encouraging competitiveness and sustainable resource use in ways that equitably benefit and empower poor smallholder producers (Bolwig *et al*, 2011; Ros-Tonen *et al*, 2015; Seville *et al*, 2011; Swaans *et al*, 2014). Other scholars nuance the conceptualization of inclusion as the degree of alignment between value chain logics of competitive enterprise development (especially in global value chains) and the complexities of the institutional context and local actors' capacities, in which interventions in smallholder-focused value chain development are embedded (Helmsing and Vellema, 2011). These scholars recognize that some conditions of value chain development efforts may result in the exclusion of some poor producers.

Building on Bolwig *et al* (2011), with additional inputs from other work, we briefly summarize four broad upgrading strategies for smallholder agri-food value chain development:

1. *Improving value chain coordination*: This has two dimensions. *Horizontal coordination* is characterized by cooperation between producers that enables collective action to reduce costs, increase revenue and reduce risks (Poulton *et al*, 2010; Trienekens, 2011). To ensure additional outcomes such as reducing poverty, enhancing equity and sustainability, horizontal coordination also entails collaboration with non-chain actors (e.g. development organizations) to address power relations that disadvantage smallholders from achieving the broad outcomes (Ros-Tonen *et al*, 2015). *Vertical coordination* is characterized by moving towards longer-term business relations between different types of actors in the value chain (e.g. producer, traders and processor) through varied contractual arrangements (Poulton *et al*, 2010; Trienekens, 2011).
2. *Improving process and product*: This entails enhancing performance within a particular node in the value chain by improving technology and management practices. *Process upgrading* involves improving productivity to increase volumes or reducing production costs. *Product upgrading* involves improving product quality (e.g. certification, safety standards, traceability) or moving to more sophisticated products (e.g. processing, packaging) and is often linked to process upgrading.
3. *Changing and adding functions*: This includes *functional upgrading* where producers or other actors in the chain take on new functions such as the provision of inputs or services. It can also be *inter-chain upgrading*, where an actor takes skills and experiences developed in one value chain to engage productively in another.
4. *Upgrading the institutional environment*: Here, the focus is on improving institutional voids – including support services and legal and policy frameworks – that constrain value chain operations (Poulton *et al*, 2010; Trienekens, 2011).

Multi-Stakeholder Processes and Value Chain Upgrading for Inclusive Smallholder Development

The aim underlying upgrading strategies is to change both actors' practices and the institutional context in which these practices are embedded (Bolwig *et al*, 2011; Poulton *et al*, 2010; Ros-Tonen *et al*, 2015; Trienekens, 2011). Following Giuliani *et al* (2005), we identify three broad strategic actions needed to support value chain upgrading:



- (i) enabling cooperation and collective action (e.g. through clusters, farmer groups) to perform joint actions at lower transaction costs;
- (ii) influencing the governance or coordination patterns in value chains through market (e.g. contracts) and non-market (e.g. quality and standards) mechanisms;
- (iii) steering learning and innovation processes (e.g. capacity building on technical and business dimensions, continuous improvement and problem solving).

Value chain upgrading is centrally related to innovation (Giuliani *et al*, 2005). This usually requires concerted action and interaction that result in the re-ordering of relationships between heterogeneous actors and continuous learning (Ayele *et al*, 2012; Hounkonnou *et al*, 2012; Swaans *et al*, 2014). As indicated in the introduction, various multi-stakeholder process arrangements (platforms, partnerships, networks) have been promoted to catalyze innovation processes and increase opportunities for beneficially integrating smallholders into agri-food value chains (Kilelu *et al*, 2013; Ros-Tonen *et al*, 2015; Swaans *et al*, 2014; Thiele *et al*, 2011). Multi-stakeholder processes provide the arenas where diverse actors interact, articulate their demands, experiment and co-learn, foster collective action, coordinate and enhance business linkages, coordinate building capacities and advocate to support inclusive smallholder development (Bitzer and Bijman, 2015; Hounkonnou *et al*, 2012; Poulton *et al*, 2010; Swaans *et al*, 2014). Such processes are often marked by power dynamics and tensions (e.g. on distribution of benefits), thus requiring strategic actions to influence the terms of participation and inclusion, especially for marginalized groups (Cullen *et al*, 2014; Gupta *et al*, 2015; Tobin *et al*, 2016). Multi-stakeholder processes may result in what Vellema *et al* (2013) refer to as *proto-institutions*: important intermediate mechanisms that determine smallholder integration in value chains within local institutional dynamics. When sufficiently embedded, such proto-institutions can result in systemic shifts that may positively influence sustainable smallholder market integration.

To analyse the Tanzanian case study, we elaborate a framework that connects multi-stakeholder processes for fostering innovation and inclusive agri-value chain transformation to three dimensions of upgrading: improving value chain coordination, improving process and product and upgrading the enabling environment (Figure 1). Functional upgrading is not included, as smallholders are typically not involved at this level. We now apply this framework to our research question.

Methods

Case Selection: Smallholder Dairy Development Project in Tanzania

Our case study is an agricultural research for development programme in Tanzania with the goal of enhancing dairy-based livelihoods through intensification of smallholder production and enhanced commercialization. In the framework of the Livestock and Fish CGIAR Research Programme, the International Livestock Research Institute (ILRI) – alongside Sokoine University, International Center for Tropical Agriculture (CIAT), Heifer International, Faida Mali, TALIRI (Tanzania Livestock Research Institute) – formed a team that has implemented the project interventions since 2012, in collaboration with respective district livestock ministries. The intervention was informed by a detailed value chain assessment, conducted by ILRI, which showed the opportunities and challenges of the smallholder-dominated dairy sector in Tanzania (ILRI *et al*, 2011; Katjiuongua and Nelgen, 2014; Sikira *et al*, 2013). The Tanzania dairy value chain is fairly underdeveloped, characterized by largely informal channels of

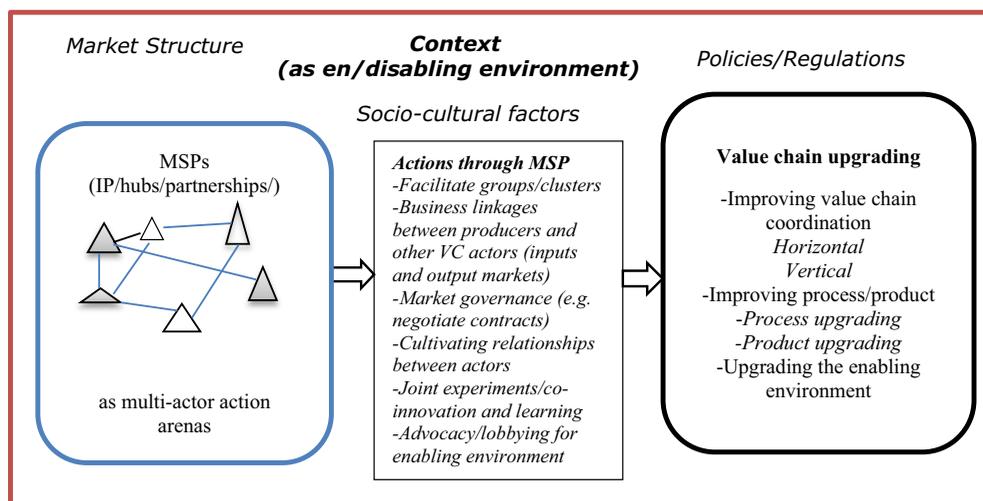


Figure 1: Analytical framework: linking MSPs to smallholder upgrading for inclusion in agri-value chains.

distribution in which farmers sell to consumers and local restaurants directly or through traders, and a small formal market (between 5 and 10 per cent of marketed volume), organized around a few processing firms. The main processors in Tanzania include Tanga Fresh Limited, the largest milk processor in the country, and a few smaller competitors that target consumers in major cities (ILRI *et al.*, 2011; Katjiuongua and Nelgen, 2014; Njombe and Msanga, 2007; Omore *et al.*, 2015; Sikira *et al.*, 2013). The sector's development is hampered by low milk prices, seasonal fluctuations and high production costs for a myriad of reasons, including lack of adequate feeds, diseases and poor access to services. Despite these constraints, the programme assessment identified opportunities for significant growth in the sector, driven by demand growth linked to low per capita milk availability.

The programme intervention comprised two complementary projects on inclusive smallholder dairy development aiming to promote scalable value chain approaches to upgrade poor livestock producers to sustainably participate in the expanding dairy value chain, with projections of increased demand for more and better quality milk (ILRI *et al.*, 2011). One project, MilkiT, focused on enhancing feeds and feeding (<http://bit.ly/1SzLA5S>) using innovation and value chain approaches. A sister project, MoreMilkiT, focused on further leveraging pro-poor dairy value chain development through the development of dairy market hubs as coordination mechanisms to facilitate business linkages between the smallholder livestock producers and input, services and output market actors (<http://bit.ly/1TB2iRk>; Kilelu *et al.*, 2016; Omore *et al.*, 2015). MilkiT was implemented in eight of 30 villages covered by MoreMilkiT in two regions, Tanga and Morogoro. In Tanga, the sites were located in Handeni and Lushoto districts and in Morogoro in Mvomero and Kilosa districts. Handeni and Kilosa districts represent mainly extensive agro-pastoral systems with a pre-commercial orientation of rural production for rural consumption, but with opportunities for growing the market. Lushoto and Mvomero districts are characterized by an intensive agro-livestock system with relatively more commercial rural production for urban consumption. At village level, innovation platforms that later evolved into hubs were the arena where project partners catalyzed multi-actor

interactions between dairy producers, input and service providers, to stimulate various socio-technical innovations.

To address producer-level bottlenecks affecting the dairy sector, including policy issues relating to breeding, feeds (especially access to pasture and forage seeds), milk quality and marketing, the MoreMilkiT project initiated a national Dairy Development Forum. This was a sub-sector platform for policy engagement and for knowledge and information sharing among diverse stakeholders. The Forum was convened by the Tanzania Dairy Board, a government agency mandated to steer the development of the sector (Omoro *et al*, 2015).

Research Design, Data Collection and Analysis

The case study design selected allows assessment of the extent to which such processes create the interface to contribute to positive value chain development outcomes (Vellema *et al*, 2013). The study was conducted in Tanga region, Handeni and Lushoto districts, to cover both extensive and intensive systems. Six project villages were purposively selected, three in each district. These included two sites first initiated as local innovation platforms through the MilkiT project and then continued under the dairy market hubs approach with the expanded MoreMilkiT, and a third site that started as a hub. The sites in Handeni were Kibaya, Sindeni (initiated as innovation platform) and Kwediyaamba (hub); and in Lushoto the sites were Ubiri and Mbuzi (initiated as innovation platform) and Wena (hub) as shown in the map (Figure 2). The data were collected between May and July 2015.

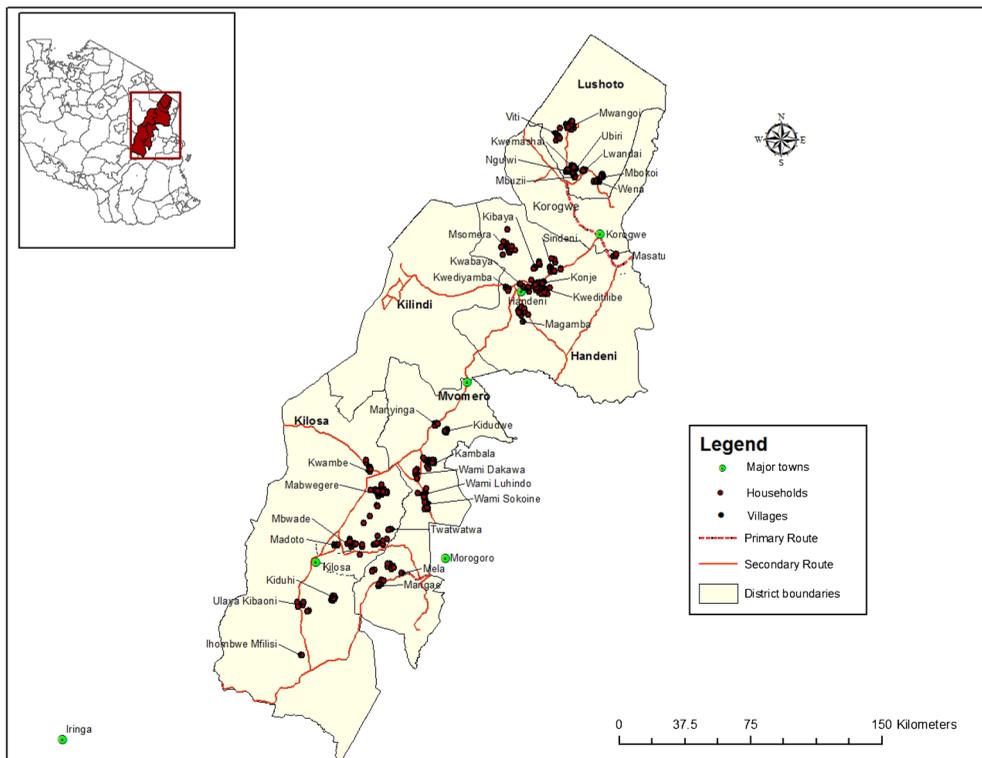


Figure 2: Map of MoreMilkiT project sites.

**Table 1:** Summary of data collection process

<i>District</i>	<i>Sites</i>	<i>Farmers' FGDs/ reflection meetings</i>	<i>Agri-input dealers</i>	<i>Artificial insemination service providers</i>	<i>Milk traders and collection centres</i>	<i>District/village livestock extension officers</i>
Handeni	Kibaya	17 (9 women)	3	3 district livestock officers	2 milk traders	3
	Sindeni	19 (10 women)			1 milk collection centre (Tanga Fresh)	
	Kwediyamba	20 (10 women)				
Lushoto	Mbuuzi	20 (11 women)	2	2 district livestock officers 1 private service provider	2 milk traders	3
	Ubiri	25 (12 women)			2 milk collection centres (Uwalu and Bumbuli)	
	Wena (Hub)	21 (14 women)				

To understand both the processes and the outcomes of multi-stakeholder processes in value chain upgrading, primary data were collected using multiple approaches, summarized in Table 1. The focus group discussions concentrated on understanding platform and hub structures and operations and assessing resultant outcomes through members' assessments. The interviews with the input and service providers captured their views on the platform and on how and whether this enhanced linkages, interactions and transactions between them and farmers. In addition, we reviewed various project documents (monitoring data, annual reports, etc.), had discussions with project team members and collaborators and participated in two project review meetings and in the national Dairy Development Forum.

The data were transcribed and coded and analysed using NVivo 10 software. The analysis was guided by the conceptual framework, which provides analytical variables a priori for the identified value chain upgrading strategies and the actions of the multi-stakeholder processes.

Findings

Structure and Functioning of Multi-Stakeholder Processes in the Smallholder Dairy Development Project

The multi-stakeholder processes were structured to bring together different actors to resolve various constraints facing the smallholders that limited their inclusion in the dairy value chain. The projects facilitated consultation between the various stakeholders to understand local-level barriers to livestock producers' integration in the dairy market. This led to the formulation of site-specific (village) action plans to guide interventions and indicate which actors to mobilize. The project documents (see Duncan *et al.*, 2015; <http://bit.ly/2ceuk6f>; <http://bit.ly/2ceB0QB>) and interviews revealed that those initially involved in the local platforms included livestock producers, the district livestock officers and the project partners (first eight sites). The project partners facilitated platform activities including technical training sessions (e.g. breeding, improved animal husbandry, feeding and feeds) and establishing pasture demonstration plots, with various exchange and learning visits. The diversity of activities and actors expanded with the hubs, with a focus on building business linkages and entrepreneurship when input and service providers (agri-dealers, AI and animal health services) and a few milk buyers became involved. The activities were led by Heifer International and Faida Mali and included training on business



and organizational skills (e.g. group management, cost/benefit analysis, record keeping). The producer groups were also expected to organize meetings and continue facilitating local-level interactions with other value chain actors with the project team's support. The project partners held meetings every six months to reflect on progress and review and revise project activities.

Processes for Upgrading Smallholder Dairy Producers

Tables 2 and 3 summarize how multi-stakeholder processes facilitated interactions and joint action at multiple value chain levels. Below, we discuss the outcomes.

MSP and improving horizontal coordination

From interviews, it emerged that the multi-stakeholder processes facilitated the establishment of a number of livestock producer groups, which were registered legally as community-based organizations. This is confirmed by recent data in the progress report showing that an increased number of livestock producers in the sites had joined a producer group (Twine and Omere, 2016). The groups are an indication of improved horizontal coordination. The interviews revealed that group membership was open to any interested livestock-keeper in the area, but there were membership entry fees and regular contributions (agreed by members) to support group activities. It was noted that some of the requirements affected group functioning in both locations (meetings not convened, dormant working committees). In Handeni, many members were inactive, because the idea of working in heterogeneous groups was new in the pastoral community who preferred working collectively along kinship lines. In addition, most of the producers in this region were widely dispersed, making it logistically difficult to work together; in addition, milk marketing was not a high priority activity for most of them.

Multi-stakeholder processes and improving vertical coordination

As Tables 2 and 3 indicate, these processes facilitated the establishment of business linkages between the producer groups and at least one agri-input dealer or service provider (mainly artificial insemination), as confirmed in Twine and Omere's (2016) progress report.

In Handeni, agri-input providers indicated that vertical linkages were not well established, because pastoralists generally have a low demand for inputs. This reflected their use of traditional medicines and the high cost of purchased inputs (especially vaccines, which are not available in smaller economical packs). On links to output markets, the producers noted that most of their milk was consumed at home, with only a small portion sold to traders, some of whom then delivered to Tanga Fresh Limited, which had a milk collection centre in Handeni. The collection centre was operating at about 40 per cent capacity. Some producers explained that they did not sell their milk because of past experiences with traders not honouring payment. Traders, on the other hand, noted the challenge of covering long distances with poor infrastructure to collect from dispersed households.

In Lushoto, an intensive agro-livestock system region with a more commercial orientation, business links with agri-input dealers and service providers were more established in all sites, resulting in some formalization (i.e. signing of contracts) of links between producers and agri-input dealers and service providers. Although not legally binding, the contracts were intended to guide the agri-input dealers to meet farmers' demand for various inputs. In addition, the dealers were willing to offer inputs on credit. However, interviews revealed that only a few producers had availed of such agreements. Several limiting factors were highlighted, including the high cost of inputs coupled with low milk production, making producers averse to considering credit. It also emerged that milk marketing remained a major constraint. Group

**Table 2:** Value chain upgrading outcomes and emergent issues from the process in Handeni

<i>Handeni</i>	<i>Activities/ interventions guided by site-specific action plans</i>	<i>Emerging outcomes towards value chain upgrading</i>	<i>Feedback/emergent issues from process</i>	<i>Comments/contextual challenges</i>
Sindeni	<p>Training on group formation and dynamics</p> <p>Farmer training on improved dairy keeping (animal husbandry) and pasture establishment</p> <p>-Demonstration plot for improved forage and seed distribution established</p> <p>Facilitation of business meetings between farmer group and agri-dealer to formalize links (for inputs access)</p> <p>Farmer training on business skills (farmer records, gross margin), leadership</p>	<p>Formation and formal registration of livestock-keepers' group (<i>horizontal coordination</i>)</p>	<p>Most members not active</p> <p>Feed demonstration not well established because of limited follow-up technical support (including extension) resulting in poor seed access</p> <p>Low adoption at individual level of newly introduced feeds (e.g. improved Napier grasses) and feed conservation (e.g. silage making). Seasonality of feeds a major challenge</p> <p>Land and water conflict between pastoral and farming communities a major constraint</p> <p>Agri-inputs and services use inconsistent because of high costs and limited capital and is unattractive for agri-input business</p> <p>Low milk productivity and mainly informal marketing (low price a factor)</p>	<p>Poor participation in interventions because of socio-cultural dynamics (working through groups is not a norm culturally) and expectations of payment by project</p> <p>District livestock officers responsible for extension/animal health and artificial insemination services facing operational challenges (transport, equipment)</p> <p>Local government not cooperating with group to address land and water conflict/access issues</p>
Kibaya	<p>Training on group formation and dynamics</p> <p>Farmer training on improved dairy keeping (animal husbandry) and pasture establishment</p> <p>Demonstration plot for improved forage and seed distribution established</p> <p>Facilitation of business meetings between farmer group and agri-dealer on formal links (for inputs access)</p> <p>Farmer training on business skills (farmer records, gross margin), leadership</p>	<p>Formation and formal registration of livestock-keepers' group with some active members (<i>horizontal</i>)</p> <p>Business linkages formalized (contractual) with AI and agri-input supplier (<i>towards vertical coordination</i>)</p>	<p>Feed demonstration not well established because of limited follow-up technical support (including extension) resulting in poor seed access. Seasonality of feed a major challenge</p> <p>Low adoption of newly introduced feeds (e.g. improved Napier grasses) and feed conservation (e.g. silage making)</p> <p>Land and water conflict between pastoral and farming communities a major constraint</p> <p>Low milk productivity and mainly informal marketing (low price a factor)</p>	<p>Local government not cooperating with group to address land and water conflict/access issues</p> <p>District livestock officers responsible for extension/animal health and artificial insemination services facing operational challenges (transport, equipment)</p> <p>Access to agri-inputs (especially vaccines) costly because most are bulk packaged (small-dose packs would be more affordable)</p>



Table 2: *continued*

<i>Handeni</i>	<i>Activities/ interventions guided by site-specific action plans</i>	<i>Emerging outcomes towards value chain upgrading</i>	<i>Feedback/emerging issues from process</i>	<i>Comments/contextual challenges</i>
Kwediyamba	Training on different types of feeds and feed conservations Facilitation of business meetings between farmer group and agri-dealer to formalize links (for inputs access) Sensitization on collective marketing	Formation and formal registration of livestock-keepers' group – recently formed (<i>horizontal</i>) Farmers discussing formal links with agri-input supplier and milk trader (<i>towards vertical coordination</i>)	Producers prefer practical training (farmers' field schools, field visits). Agri-input dealers wary of formal contracts because of producers' low production and limited input demand Seasonality of feed a major challenge (no training on new feeds at time of study) Low milk productivity and mainly informal marketing (low price a factor)	District livestock officers responsible for extension/animal health and artificial insemination services facing operational challenges (transport, equipment)

members sold milk individually to local milk traders linked to *Uwalu*, an existing cooperative society, which was a member of the larger Tanga Dairy Cooperative Union. The union then sold its milk to Tanga Fresh Limited. The dominant position of Tanga Fresh and the long chain of the formal market operating below capacity resulted in low milk prices that discouraged farmers but also created mistrust of traders, who collected and delivered to the cooperatives and were perceived to profit more than the farmers. The informal milk channel offered slightly better prices but was not consistent because of seasonal fluctuations. This fragmented output market was a key factor limiting enhanced vertical coordination.

Multi-stakeholder processes and process and product upgrading

The interviews with producers and milk traders indicated that milk productivity remains generally low in the intensive system, and only a few farmers in the extensive system reported an increase. This suggests overall low process upgrading in the target sites (i.e. improved milk production) despite the targeted interventions (Tables 2 and 3). The activities included training producers on improved animal production and breeding practices and the establishment of feed demonstration plots at some sites. During farmer discussions, only a few farmers indicated having tried new practices (feed conservation, breeding) or technologies (e.g. planting improved fodder crops, use of artificial insemination). The producers expressed a preference for more practical training than that offered. In addition, it was noted that most demonstration plots used for seed multiplication and dissemination performed poorly (e.g. planted grasses and legume crops had withered). This was attributed to drought, as also noted in a project report (<https://cgspace.cgiar.org/handle/10568/72744>), coupled with a halt in technical support (researchers and extension officers could not follow up because of budgetary constraints). Therefore, the interventions did not yet yield the expected result of making improved fodder seeds accessible to livestock producers to begin to address feed seasonality.

On product upgrading (i.e. improving milk quality), the interviews show that some quality testing was being integrated at different stages along the chain (Tables 2 and 3). More traders

**Table 3:** Value chain upgrading outcomes and emergent issues from the process in Lushoto

<i>Lushoto</i>	<i>Activities/interventions guided by site-specific action plans</i>	<i>Emerging outcomes towards value chain upgrading</i>	<i>Emerging issues/gaps from process</i>	<i>Comments/contextual issues</i>
Wena	<p>Training on different feeds and feed conservations</p> <p>Training on breeding and facilitation of business linkages (meetings) with artificial insemination and agri-input service provider</p> <p>Sensitization on collective marketing</p> <p>Facilitation of business meetings between farmer group and agri-dealer on formal links (for input access)</p>	<p>Formation and formal registration of livestock-keepers group (<i>horizontal</i>)</p> <p>Business linkages formalized (contractual) with 1 artificial insemination and 1 agri-input service provider with credit arrangement (<i>vertical</i>)</p> <p>Exploration of formal linkage with dairy cooperative society (with collection/chilling tank) in Bumbuli but mainly sell informally (<i>vertical</i>)</p> <p>Some farmers report increased milk productivity (<i>limited process</i>)</p> <p>Cooperative enforcing milk quality checks of traders'/farmers' delivery quality (<i>product</i>)</p>	<p>Farmers prefer practical training to support innovation/adoption</p> <p>Members active but group structures (committees) not functioning well</p> <p>Delivery of artificial insemination challenging because of semen quality, liquid nitrogen (shortage) from national insemination system, limited availability of qualified AI service providers</p>	<p>The district livestock office has an artificial insemination revolving fund, but it is not well managed</p> <p>The milk collection centre operates below capacity: the business not well developed to attract producers. Operational challenges including unreliable power supply, high transaction costs resulting in lower milk price to producers</p> <p>Low milk price linked to monopoly of a dominant milk processing firm as end buyer</p> <p>Producers' demand for improved heifers not met because of lack of market linkages and government multiplication centres not well managed</p>
Ubiri	<p>Training on feeds and feed conservation</p> <p>Demonstration plot for improved forage established</p> <p>Training and sensitization on collective action</p> <p>Facilitating and formalizing links with agri-input and service providers</p> <p>Training on breeding</p>	<p>Formation and formal registration of livestock-keepers group (<i>horizontal</i>)</p> <p>Business linkages (contractual) with 1 agri-input service provider (<i>vertical</i>)</p> <p>Negotiations with milk trader for collective marketing but most producers sell informally (<i>vertical</i>)</p> <p>Milk trader started to enforce milk quality checks (with lactometers) to ensure quality as demanded by cooperative (<i>product</i>)</p>	<p>Members active but group structures (sub-committees) not functioning well</p> <p>Most farmers not seeking inputs through linked services (contract inactive) – but many, especially women, were not clear about contract details</p> <p>Milk productivity and marketing low (low price a factor)</p> <p>Milk traders are perceived to benefit from high prices when they deliver to the cooperative</p> <p>Low adoption of newly introduced feeds (e.g. improved Napier grasses) related to limited seed access (demonstration plot not well established due to drought) and limited feed conservation (e.g. silage making)</p>	<p>Low milk price that discourages producers linked to monopoly of a dominant milk processing firm that is the end buyer</p> <p>Producers shy away from credit (socio-cultural influence)</p>



Table 3: *continued*

<i>Lushoto</i>	<i>Activities/ interventions guided by site-specific action plans</i>	<i>Emerging outcomes towards value chain upgrading</i>	<i>Emerging issues/gaps from process</i>	<i>Comments/contextual issues</i>
Mbuuzi	Mobilizing various actors to train farmers on feeds and feed conservation Demonstration plot for improved forage established Training and sensitization on collective marketing Facilitating and formalizing links with agri-input and service providers Training on breeding Mbuuzi linked to artificial insemination service providers (government officer and private provider) and contract signed	Formation and formal registration of livestock-keepers group (<i>horizontal</i>) Business linkages (contractual) with 1 agri-input and 1 artificial insemination service provider (<i>vertical</i>)	Demand for artificial insemination services low as farmers not seeking services through linked artificial insemination service providers Members active but group structures (sub-committees) not functioning well Most farmers not seeking inputs through linked services, not clear about contract details Milk productivity and marketing low (low prices) Milk trader is collecting less milk in the area because of low production and no longer delivering to cooperative (low price) – most sell informally Low adoption of newly introduced feeds (e.g. improved Napier grasses) and feed conservation (e.g. silage making) at individual farm level	The artificial insemination service providers Face challenges of unreliable supply and quality of semen and liquid nitrogen (sourced mainly from government National Artificial Insemination Centre) The district livestock office has an artificial insemination revolving fund, but it is not well managed, resulting in delayed procurement Producers’ demand for improved heifers not met because of lack of market linkages and government multiplication centres not well managed

were incorporating lactometer tests to measure adulteration (addition of water) at the farm gate. Additional microbial quality testing (alcohol test) was incorporated at the cooperative and processors’ collection (chilling) centres. In addition, producers were encouraged to shift from plastic to aluminium cans when transporting milk, although from observation plastic was still widely used. These new practices link to the Tanzania Dairy Board’s regulatory push for quality assurance in the dairy sector. Through project support, the Tanzania Dairy Board was piloting a training programme for milk traders’ certification.

The emerging issues were discussed during project team and stakeholder meetings. Although some changes were made to the implementation plan to include new activities based on feedback, the changes effected were limited because of budgetary constraints and in some cases limited flexibility to adapt contractual agreements, as noted in discussions during project review meetings.

Dynamics in the Operating Environment and Smallholder Value Chain Upgrading

As summarized in Tables 2 and 3, various contextual issues in the operating environment affected other upgrading outcomes. In Lushoto, some notable issues were linked to local



government operations. First, the interviews revealed that only one of the four district livestock officers trained in artificial insemination (predominantly a public service function in Tanzania) was active due to various reasons (e.g. lack of equipment; deployment to other areas). Because of the resultant limited artificial insemination service access, producers' demand for the service tended to be low. In addition, several respondents pointed to the district livestock office's ineffective management of a revolving fund established to support promotion and delivery of artificial insemination services. The fees collected for these services were not used to replenish the semen stock as expected, but diverted to other district government office services.

In the extensive system in Handeni, the contextual issues affecting upgrading included socio-cultural factors and unsupportive local government. From interviews, we found that, although the district livestock office was offering subsidized artificial insemination services, there was low demand for the service because of cultural perceptions around its use, which the pastoralists saw as unnatural. Furthermore, local dynamics relating to competition for water and land (grazing) between livestock-keepers and farmers, contested and unresolved land access by-laws and limited investment in public infrastructure (e.g. dams, water pans) resulted in conflict. The livestock-keepers indicated during discussions that they had raised these issues with the village-level government, but the leaders had failed to act because of what the livestock-keepers perceived as negative bias towards them.

The project team in its facilitative role sought to create an enabling environment by including representatives from local government authorities from the respective districts on the project steering committee that met semi-annually to review progress and to advise on additional activities. Moreover, the team through consultative processes aimed to align project activities with the annual local government authorities' livestock development plans. Discussions during team meetings, however, revealed that progress towards such alignment was slow. Other notable issues reflected a disabling policy environment at national level. For example, on artificial insemination, a recurring challenge highlighted by service providers was the poor quality of semen and shortages of liquid nitrogen at the National Artificial Insemination Centre. Semen provided by this centre is supposed to be cheap and accessible for poor producers. This issue was raised at the first national Dairy Development Forum, but there was no indication of progress made to resolve these bottlenecks in subsequent meetings, as observed during the fifth Dairy Development Forum because of limited follow-up on the planned action points. Key informants also mentioned the lack of enforcement of certification for agri-input dealers. The growing number of uncertified agri-input dealers (especially handling veterinary drugs) affected the quality of service delivery.

Discussion

Dynamics of Upgrading for Smallholder Inclusion in Emerging Agri-Value Chains

As the findings show, the target Tanzania dairy value chain is characterized by low formal marketing capacity, with most of the milk consumed at home and some marketed, mainly informally. This, however, is expected to change consequently to increasing demand, suggesting opportunities in expanding markets. The literature suggests that opportunities for smallholder upgrading lie in markets that offer scope for adding value – reliable and consistent supply, improved product quality, safer products (Helmsing and Vellema, 2011; Lee *et al*, 2012; Thiele *et al*, 2011; Trienekens, 2011). This is line with our findings, which showed how

the upgrading of poor dairy producers, through intensification of production and enhancing commercialization, was at the core of supporting the development of an inclusive Tanzania dairy value chain. An important additional insight from this study is that different upgrading strategies interact and shape smallholder inclusion depending on the opportunities presented in the specific agri-value chains. Thus, upgrading in emerging and fragmented agri-value chains is not a sequential process, as others suggests (Gereffi *et al*, 2001; Humphrey and Schmitz, 2000); rather, simultaneous efforts are required.

In view of this need for simultaneous efforts, it is recognized that, in the context of emerging agri-value chains, mobilizing collective action groups (horizontal coordination) and strengthening business linkages with input and output market actors (vertical coordination) are important steps for integrating smallholders into agri-value chains (Kilelu *et al*, 2016; Poulton *et al*, 2010; Shiferaw *et al*, 2011). However, such improved coordination is only effective if it enables smallholders to act and invest in other upgrading strategies (process and product) that enable them capture more value; and here there may be different paces of development for the different upgrading strategies. For example, facilitating process and product upgrading may entail adopting technologies (e.g. breeding) whose outcomes are long term; this, coupled with an unfavourable institutional context, may affect willingness to adopt (Duncan *et al*, 2015; Hounkonnou *et al*, 2012).

Furthermore, the study confirms that smallholder inclusion in value chains through upgrading is highly dependent on the characteristics of the market (e.g. is it traditional, high value, domestic, international?), how smallholders are integrated into these markets, and their market orientation, i.e. do they have access to market information and does this translate into market intelligence (following Poulton *et al*, 2010; Trienekens, 2011)? The dairy value chain assessment study conducted to guide the project indicated increasing domestic demand for milk and dairy products, signalling opportunities for a market-led growth of the dairy value chain (ILRI *et al*, 2011). However, these 'pull' dynamics did not begin to translate the enhanced value chain coordination efforts into a considerable upgrading of process (increased milk production) and product (milk quality) elements in the pre-commercial livestock production system. This can be linked to an underdeveloped Tanzanian dairy market that continues to be dominated by an informal spot-market structure in response to consumer demand (Omoro *et al*, 2015) as opposed to hierarchical or hybrid markets, which are noted to offer more opportunities for upgrading. In hierarchical or hybrid value chain governance structures, lead firms or actors (e.g. processors or large traders) may play an important role as drivers of smallholder links to better markets (Gibbon, 2004; Helmsing and Vellema, 2011), through providing interlocking arrangements to enable access to services and inputs necessary to promote process and product upgrading (Bolwig *et al*, 2011; Kilelu *et al*, 2013; Poulton *et al*, 2010).

Additionally, the findings indicate that the operating environment was characterized by inadequate public services (e.g. extension), poor infrastructure, and unfavourable regulation and policies (e.g. land tenure and water access) that constrained poor producers from upgrading. This links to findings elsewhere that supporting inclusive smallholder development has little impact if smallholders are embedded in a disabling institutional environment and a context with no realistic opportunities to expand their production and marketing (Hounkonnou *et al*, 2012; Trienekens, 2011).

Thus, despite the potential, our findings show limited coordinated output market opportunities in the target regions. There was inadequate development of a coherent dairy value chain *per se* in this context that could entice poor producers to invest in upgrading; this indicates the necessity in this type of intervention to assess critically the starting conditions and the degree of overall system change needed. This is in line with arguments made by Gibbon



(2004), who contends that the first step in understanding upgrading opportunities is to spell out the reward structure linked to integration into a particular value chain and its institutional logics, as well as assessing the institutional and local capacities needed to make the effort towards inclusive dairy value chain development (Helmsing and Vellema, 2011). The broader implication here is that, although inclusion can be an aspiration, the prevailing or evolving market structures with changing demands (e.g. consistent and quality product supply) and the broader institutional environment can have overruling features that are exclusive and render inclusive value chain development ineffective (Bitzer *et al.*, 2013, Lee *et al.*, 2012; Tobin *et al.*, 2016). This connects to what other scholars have referred to as the phenomenon of ‘adverse inclusion’ (Laven, 2010; Ros-Tonen *et al.*, 2015): although smallholders are included in the project, this does not mean they are better off.

In the next section, we reflect further on the role of facilitated multi-stakeholder processes in supporting the inclusion and upgrading of smallholders and catalyzing the evolving dairy value chain.

Limitations of Multi-Stakeholder Processes in Smallholder Upgrading for Inclusive Value Chain Development

The debate around inclusive value chain development focuses on how interventions that integrate multi-stakeholder processes find leverage points through engaging diverse chain and non-chain actors to meaningfully insert smallholders into value chains (Helmsing and Vellema, 2011; Ros-Tonen *et al.*, 2015). In line with this, the Tanzania smallholder dairy projects aimed to catalyze innovation for inclusion of poor livestock-keepers in the dairy value chain through local platform hubs and the Dairy Development Forum. The findings demonstrate that facilitating multi-stakeholder processes is an efficient approach to identifying socio-technical constraints along the value chain and triggering the diverse actors to collaborate and experiment with various proto-institutions (e.g. producer groups, hubs, demonstration plots, local and national platforms) to support smallholder insertion into markets, as other studies have shown (Duncan *et al.*, 2015; Kilelu *et al.*, 2013, 2016; Swaans *et al.*, 2014; Vellema *et al.*, 2013).

However, these processes had mixed outcomes in relation to actions linked to the various upgrading strategies as a pathway towards inclusive value chain development, although a longer timeframe may be needed for a more conclusive assessment. The findings suggest that enhanced horizontal and vertical coordination was attainable, but it did not trigger other upgrading (process and product), which is considered the litmus test for inclusive innovation and agri-value chain development (Anandajayasekeram and Gebremedhin, 2009). The findings show that multi-stakeholder process deployment was hampered by various challenges such as non-participation of key actors, some inflexibility in funding and limited adaptive learning, resulting in inadequate traction with the broader institutional context (e.g. capacity challenges of the Tanzania Dairy Board to adequately facilitate the national Dairy Development Forum and ensure follow-up on action plans and stimulate momentum on identified policy bottlenecks in the sector). This indicates that it is essential for facilitators of multi-stakeholder process interventions to be aware of the value chain scales and levels at which they should intervene, understand the partners’ institutional objectives and constraints and have the capacity to steer the process (Duncan *et al.*, 2015; Swaans *et al.*, 2014). This would call, as recent work has indicated (Bolwig *et al.*, 2011; Klerkx *et al.*, 2013, Ros-Tonen *et al.*, 2015; van Paassen *et al.*, 2014), for enrolling key individuals (including non-chain actors, e.g. the research project team) with a good understanding of the characteristics of the value chain context and a position at the right levels and capacity to form alliances, who deploy strategic action towards adjusting the



institutional space to lead to the envisaged changes. Such action should not create artificial conditions for institutional change that is not durable (Hounkonnou *et al*, 2012).

As other studies have also revealed (Ros-Tonen *et al*, 2015; Schut *et al*, 2016; Swaans *et al*, 2014), the challenges described above render multi-stakeholder processes ineffective not only in aligning interventions to better target the various systemic constraints but also in nurturing conditions to empower marginalized actors in the effort towards inclusive value chain development. As Gupta *et al* (2015) emphasize, inclusive development can only emerge in a context committed to a strategic vision, efficiency, responsiveness, effectiveness, good governance, participation, accountability and equity. However, our findings also prompt a reality check of what multi-stakeholder processes can realistically achieve; this connects with a broader debate that calls for a more nuanced analysis of inclusive value chain development. Considering such processes as not neutral (Ros-Tonen *et al*, 2015) implies that distinguishing inclusive or exclusive effects is not always clear cut. As Poole *et al* (2013) note, development interventions to link smallholders to markets are connected to a meta-narrative approach that fails to adequately account for diversity and differences in rural populations; this implies that some smallholders would opt for different livelihood strategies including selective value chain engagement (Ros-Tonen *et al*, 2015). Furthermore, Bolwig *et al* (2011) argue that exclusion is not necessarily disadvantageous; this links to the phenomenon of 'adverse inclusion' discussed in the previous section.

Further reflection on the limited outcomes suggests that beyond a disabling institutional environment, other dynamics at household level may play an important role in influencing the integration of smallholders into markets. More attention should be paid to decision making about resource allocation or investments in households that enlist in such processes and how the household members apply competencies and learning expected to enable them to upgrade (Gereffi *et al*, 2005; <http://bit.ly/1SPR7nC>; Trienekens, 2011). Such analysis should equally look at the structural constraints underlying the inequalities among different households and between men and women that result in differentiated access to resources as well as power imbalances affecting their participation in value chains.

Conclusion

The novel insights of the study come from combining literature on value chains and innovation systems to provide a multiscale and non-sequential view of upgrading as a pathway to inclusive agri-value chain development. The main conclusion is that, although multi-stakeholder processes are important mechanisms for catalyzing the collaboration necessary to support smallholder inclusion, their effects are largely bound by the existing value chain structure (which may be exclusive and counteract such processes' intentions) and the timeframe needed to achieve the expected outcomes. In this case, enlarging smallholder opportunities for inclusion is tied to enhancing a type of value chain governance in which more coordinated (quasi-hierarchical or hierarchical) markets lend themselves to enabling various upgrading strategies. Furthermore, the findings show that the various upgrading dimensions are interdependent and cannot be pursued sequentially. Given the embeddedness of the institutional challenges (e.g. limited market opportunities, poor public and private service delivery systems) that surround smallholders, it would make sense only if the value chain interventions based on multi-stakeholder processes were designed to adequately diagnose and explicitly target the institutional logic underlying the seemingly intractable challenges. Therefore, addressing systemic constraints that underlie value chain development is inherently a politically laden



process. Thus, multi-stakeholder processes are more than technical interventions; they are social engagements that depend on effectively mobilizing key value chain and non-chain actors and require a flexible approach to respond effectively to emergent dynamics and progressive insights over time. In view of the ongoing debates on inclusive development and the initial conclusions drawn from the case study presented, more research is needed to understand whether there are optimal configurations of actors in multi-stakeholder processes to effectively support inclusive smallholder value chain integration. This can be tied to seeking further insight on how inclusiveness of multistakeholders processes is operationalized.

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