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# The African Indigenous Vegetables Value Chain Governance in Kenya

Increasingly, food security interventions in developing economies are adapting value chain approaches to facilitate the integration of smallholders into high margin value chains. In Kenya, the resurgence of African Indigenous Vegetables due to their medicinal value and rich micronutrients is a case in point. The vegetables are cultivated by smallholders, and the supply has not matched the demand in the high margin markets among urban consumers. Access to such high margin markets necessitates that smallholders gain entry or upgrade into the networks of those buyers who possess considerable control of these value chains. There is limited value chain scholarship on chain governance and its implication for smallholder participation in Kenya. This study investigated how value chain governance influences farmer participation in vegetable markets and food security in Kenya. This study employed exploratory case study design to provide chain architecture, isolate primary actors, their roles, relations, constraints and opportunities for upgrading by smallholders. A mixed method approach involving a multistage sampling technique of 339 respondents was employed to bring to the surface insights on chain architecture, market margins and governance structures and their implications as regards upgrading trajectories for small-scale farmers in Kenya. Thematic analysis was used for data analysis. Spot market relations were found to dominate traditional value chains in rural areas while peri-urban areas exhibited both traditional and coordinated value chains. The value chains are characterised by very weak linkages between upstream actors and downstream partners, where wholesalers and supermarkets play the role of leading firms in traditional and coordinated value chains, respectively. The study recommends the inclusion of famers in market management committees and the establishment of binding contractual arrangements with supermarkets.

**Keywords:** Africa, indigenous vegetables, value chains, governance

**JEL classification:** Q13

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## Introduction

There is increasing recognition that smallholder commercialisation and integration of smallholders into high-value agro-food systems offer sustainable pathways for poverty reduction, food security, employment, women's empowerment, conservation and climate change in the developing economies (FAO, 2016). Kenya, like other developing countries in Sub-Saharan Africa, is experiencing growing supermarket penetration, fast urbanisation and rising per capita income resulting into changing consumer preferences (Trienekens, 2011). This trend has created emerging market opportunities for smallholders (World Bank, 2016). However, despite the growing market opportunities, many smallholders continue to encounter considerable barriers to accessing these markets (Poulton et al., 2012; Okello et al., 2011).

Many studies on firm participation decisions are based on Williamson's (1985) work on institutional economics and organisational theory, and are mainly concerned with establishing the link between transaction cost (TC) and channel choice. Transaction cost theory presupposes that a farmer's decision to participate in particular markets is based on comparative institutional efficiency: that is to say, the TC minimising condition (Gereffi and Fernandez-Stark, 2016). However, access to high value markets is more than a question of mere fulfilment of production volume requirements and minimizing TC; it is more about how farmers embed themselves into the networks of value chain lead actors (Kilelu et al., 2017).

For instance, supermarkets offer better opportunities but impose stringent quality and safety requirements, making it costly for smallholders to participate (Rao et al., 2012). The high margin segments of traditional markets, however, are dominated by opportunistic brokers and middlemen with exclusionary tendencies that drive smallholders out of participating in the market. Besides, the domestic traditional food value chains are characterised by poorly developed information channels, low productivity, lack of storage facilities, high transaction costs and limited value-adding activities (Barret, 2010).

This study investigated how value chain governance influences smallholder participation in the emerging markets for African indigenous vegetables and its implication on food security in Kenya. In this study, value chain governance (VCG) is construed as the framework and power relation dynamics among agents governing business transactions and the way these transactions are organised (Gereffi and Fernandez-Stark, 2016). Understanding the governance structure of the value chain would be important in that it would provide information on the constraints and opportunities involved in drawing up food systems policy-related recommendations for Kenya. Extant scholarship proposes VCG mechanisms such as a relational or contractual form, or a combination of both, to improve value chain integration (Gereffi and Fernandez-Stark, 2016). In this study, the relational mechanism is conceptualised so as to describe the level of trust between value chain agents that causes repeat transactions. The contractual mechanism is meanwhile con-

ceptualised so as to describe the degree to which contracts minimise uncertainties when establishing exchange transactions between actors.

The rest of the paper is organized as follows. First, given the renaissance of the African indigenous vegetables (AIVs) in Kenya, we give a brief overview of traditional vegetable production systems in the study areas. In the subsequent sections, we briefly discuss value chain governance, linking it to understanding inclusive value chain upgrading for smallholders. We then describe the methods, the study area and techniques of data analysis. This is followed by a presentation of the study findings with a highlight of value chain mapping, opportunities and constraints following a SWOT analysis and upgrading strategies. Finally, we conclude by outlining the associated agribusiness investment implications and recommendations.

## African Indigenous Vegetables in Kenya

African indigenous vegetables (AIVs) are vegetable crops whose natural habitat originated in Africa (Maundu et al., 1999). In Kenya, there are more than 210 species that are important in traditional diets (Mwaura et al., 2014). However, many of them have often been ignored in favour of exotic vegetables such as kales and cabbages (Muriithi and Matz, 2015). The most popular AIVs include both wild and cultivated leafy greens such as slender leaf (*Crotalaria brevidens*), African kale (*Brassica carinata*), African eggplant (*Solanum aethiopicum*), pumpkin leaves (*Cucurbita pepo*.), amaranth (*Amaranthus* spp.), nightshade (*Solanum* spp.), spider plant (*Cleome gynandra*), cowpea (*Vigna unguiculata*), and jute mallow (*Corchorus olitorius*) (Abukutsa, 2010). They are more popular with smallholder farmers because they require fewer inputs and are better adapted to local agro-ecological conditions (Ekesa et al., 2009).

The AIVs present a niche market for smallholders in the emerging lucrative value chains in Kenya. They are predominantly produced by smallholders in rural and peri-urban areas but many consumers in urban areas access them through traditional and supermarket channels (Gido et al., 2017). Consumer preference literature argues that although these vegetables may be consumed in small quantities by many households, they are more affordable and improve household dietary diversity by influencing the intake of cereal staples, manage hunger and play a central role in household food security (Mayekiso et al., 2017). Besides their importance to household diets, they can also be important in addressing micronutrient deficiencies because they are rich in micro-nutrients such as vitamins A and C as well as calcium, zinc, and iron (Abukutsa, 2010) and possess bioactive compounds with antioxidant potential (Kamga et al., 2013). Therefore, improved production, distribution, marketing and consumption of indigenous vegetables could help mitigate food insecurity and alleviate malnutrition in developing countries like Kenya.

The above benefits have led to concerted promotional campaigns by development agencies, research institutions and government agencies as a strategic crop for addressing households' income, food and nutrition in Kenya (Irungu et al., 2007). Presently, the demand for AIVs in the domestic market is growing and remains unmet (Ngugi et al., 2007). However, despite the potential to improve household food and nutritional security, empirical evidence on smallholder participation in AIV markets and food security still remains poor, missing, mixed and inconsistent (Mayekiso et al., 2017). There is anecdotal evidence so far of possible positive income, employment and technology adoption, and market demand (Olabode et al., 2017; Weinberger and Msuya, 2004), plus differentials in urban and peri-urban production and marketing (Oluoch et al., 2009; Ambrose-Oji, 2009), but these largely emanate from analysis of incomplete sections of value chain segments or else focusing on peri-urban areas and supermarket chains (Mwaura et al., 2014). The global market literature emphasises that access to such emerging markets depends on more than just production efficiency, so farmers must gain entry or upgrade into the buyer networks that form these markets (Kilelu et al., 2017). Linking agri-food value chains to food and nutrition security in the face of transformations in food systems would be important in informing policies and designing strategies for better smallholder integration in the emerging high margin segments of the AIVs value chains in Kenya.

There is a lack of information on the power relations between various actors along AIV value chain right from seed production and distribution, production processes, produce marketing up to the consumption point. Extant studies do not explain the exclusion of smallholders under the prevailing value chain governance and the upgrading opportunities available for AIV farmers. Moreover, conclusions from many of such studies are derived from econometric analyses that may not adequately account for exclusionary effects induced by power relations, trust, coordination and other social dynamics. This situation gives a strong impetus to the identification of actors and their activities and socio-economic elements influencing inclusive participation and upgrading in the in the AIV value chains. A holistic inquiry capturing the entire value chain governance for AIVs and its effects on food security and sustainable livelihoods is needed to inform decisions concerning effective upgrading strategies potentially available for improving value chain participation for small producers (Kilelu et al*.,* 2017).

## Governance in Agro-food Value Chains

Value chain governance is defined as "authority and power relationships that determine how financial, material, and human resources are allocated and flow within a chain" (Gereffi, 1994). Governance defines the structure of relationships and coordination mechanisms that exist between transacting partners across time and space of a given value chain (Gereffi and Lee, 2012). It refers to the inter-firm relationships and institutional mechanisms through which non-market coordination of activities, the setting and enforcement of product and process parameters to be met by actors

in the chain take place (Humphrey and Schmitz, 2001). More often than not, buyers play an important role in setting and enforcing private standards and rules of engagement with the producers because of the (perceived) risk of producer failure. These parameters are also set and enforced by government and international agencies concerned with quality standards or labour and environmental standards (Humphrey and Schmitz, 2001).

Extant literature has referred to governance structures variously as distribution styles, channel types and vertical coordination. Humphrey and Schmitz (2001) distinguish three possible types of governance: network, quasi-hierarchy and hierarchy. However, Gereffi and Fernandez-Stark (2016) build on this work to point out a continuum-like transactional power dynamics between lead firms, subordinate firms and suppliers ranging from spot market to hierarchy. In the spot market, goods are exchanged between multiple buyers and sellers at the current time period with price as the main determinant of the final transaction. The other end of the chain continuum is the vertical integration, which refers to a situation where products move between various stages of production, processing and distribution as a result of within the firm managerial orders rather than at the direction of prices (Gereffi and Fernandez-Stark, 2016).

In between the two polar forms are the intermediate types of governance structures like modular, relational and captive. However, value chains are not static and change their organisation, governance, and linkages with changes in markets and competition (Pietrobelli and Staritz, 2013). The governance structure changes as the industry evolves and matures and governance patterns within an industry can vary from one stage or level of the chain to another. Firms and actors sometimes operate in multiple and interacting governance structures and these affect opportunities and challenges for economic and social upgrading (Gereffi and Lee, 2012). They observe that the degree of power of the buyer over the supplier decreases as value chains move from hierarchy to market. Gereffi and Fernandez-Stark (2016) contends that the variables that determine governance structures include: the complexity of information and knowledge transfer required to sustain a particular transaction; the extent to which this information knowledge can be codified and, therefore, transmitted efficiently and without transaction-specific investment between the parties to the transaction and the capabilities of actual and potential suppliers in relation to the requirements of the transaction.

An extensive body of literature on smallholder participation on higher value agro-food markets focuses on Global Value Chains (GVCs) (Trienekens, 2011; Gereffi and Lee, 2012; Minten et al., 2009). These studies robustly explain the vertical coordination by dominant lead firms from developed economies and resource-constrained producers from developing countries and the impact of such value chains on income and development. Despite these efforts, if we adopt the perspective of Gereffi and Sturgeon (2013), GVC in the context of the AIV value chain has not been explored; hence, this study is highly relevant as it aims to investigate the implications of value chain governance mechanisms on smallholder participation in AIV emerging markets and food security in Kenya.

## Materials and Methods

A multistage sampling procedure was employed to select regions, smallholders and other actors for the study. In the first stage, four counties of Nairobi, Kiambu, Kisii, and Kakamega were purposively selected for the study. The choice of the four counties was based on their known differentials in factors that are crucial to market participation by smallholder AIV farmers. In particular, they provided an opportunity to assess differentials in market participation between rural and peri-urban farmers as well as a chance to contrast procurement arrangements between supermarkets and traditional wet market traders. For instance, Kisii and Kakamega are rural counties where there is a significant volume of production and marketing by smallholders. Kiambu is a peri-urban area where farmers have significant interactions with wholesale, supermarkets and urban retail traders. Nairobi city was selected because it is the largest urban market with highly differentiated market outlets, including supermarket outlets, to provide cases for coordinated value chains.

In the second stage, two sub-counties with a high concentration of farmers and farmer groups involved in production and marketing of AIVs were purposively selected from each county. In the third stage, purposive sampling was used to strategically select information-rich farmer groups and key informants that would assist the study with in-depth understanding of actor relations and upgrading opportunities in the AIV value chains.

Data was obtained through focus group discussions and individual in-depth interviews using semi-structured discussion guides. Discussion topics orbited around governance themes such as private safety and quality standards, market information flow, price setting, repeat transactions and contractual arrangements. In each sub-county, two focus group discussions (FGD) were carried out with purposively selected participants of between eight and twelve farmers per session. Care was taken to ensure that selected farmers had certain commonality and heterogeneous characteristics and similar levels of understanding of a topic. Besides, deliberate attempts were made to attain a fair mix of participants based on gender, age, socioeconomic background and education level. In addition, 25 in-depth interviews were conducted with key informants drawn from supermarket managers, government offices, value chain consultants and managers with NGOs involved in promoting AIV value chains.

Discussions were further held with 99 traders including middlemen, transporters, retail traders and wholesalers. Separate discussion guides were prepared for different actors. Discussions and in-depth interviews entailed examination of patterns and explanatory factors, first at each node of the chain, and, secondly, through exploration of the nature and range of the relationships between actors at different nodes in the chain. Emphasis was given to governance dimensions such as coordination of value creation activities, contractual arrangements, access to information, market competition, price determination, private rules and standards, trusts and uncertainties. Researchers also made observations of the actors' interactions and business practices such as price negotiations, units of measure, product quality, the presence

of storage facilities and condition of the general environment and value addition among others.

Qualitative data was first transcribed and thematic analysis was performed as devised by Mertens (2010) and Braun and Clarke (2006). Value chain map was developed using functional analysis. The core processes, actors involved, flow and quantity of product at each node of the value chain were determined. A flow chart was used to represent the activities in the value chain.

# Results and Discussion

## Mapping of the AIV Value Chains

Mapping of key activities of the whole economy is the first step in conducting the chain analysis and this process explores input-output structure as well as territoriality of the value chain. Gereffi and Fernandez-Stark (2016) assert that mapping assists in identifying important nodes, how the distribution of rewards takes place through social relations and a range of interconnected economic activities. This study dealt with four dimensions: types of value chains; core processes (segments); actors involved and their functions as well as the existing types of relationships and linkages. Caution should be taken that this study only provides a snapshot of the value chain structure and does not adequately represent all factors that influence the conduct of individual value chain participants. For instance, this study did not look into consumer (end market) requirements and opportunities. Two value chains represented by traditional and coordinated value chains co-exist side by side as shown in Figures 1 and 2. Parameters such as contractual arrangements, retail practices, and private food safety and quality standard requirements to delineate traditional value chain from coordinated value chains. The traditional value chains were defined by traditional market sourcing where producers and traders had no prior arrangements on production, quantities delivered or payment arrangements. Coordinated value chains, on the other hand, featured modern procurement arrangements where farmer activities were aligned based on contracts with supermarket which specified quantities, vegetable qualities, delivery timing and prices (Bijman et al., 2011).

## Key actors and their functions in AIV value chains

The study categorized actors into those from peri-urban areas and rural regions. Generally, the segments and actors were similar for rural and peri-urban regions (Figure 1). Actors included input suppliers (agro-vets), farmers and farmer groups, middlemen, wholesalers, retail traders and supermarkets. Marketing segments had the largest and most complex network of primary actors. For example, farmer groups, middlemen, wholesalers, brokers and retailers all converged at this node. The ensuing section provides detailed account of the functions of various actors.

*Input Suppliers*

Input suppliers fell in four categories: agro-vets, NGOs, local seed retail traders and farmers preparing their own seeds. The major inputs for indigenous vegetables included seeds, fertilizers, water and labour. In the rural areas, retail traders were supplied seeds by farmers regenerating from own farms. Some NGOs also provided farmers with certified AIVs seeds

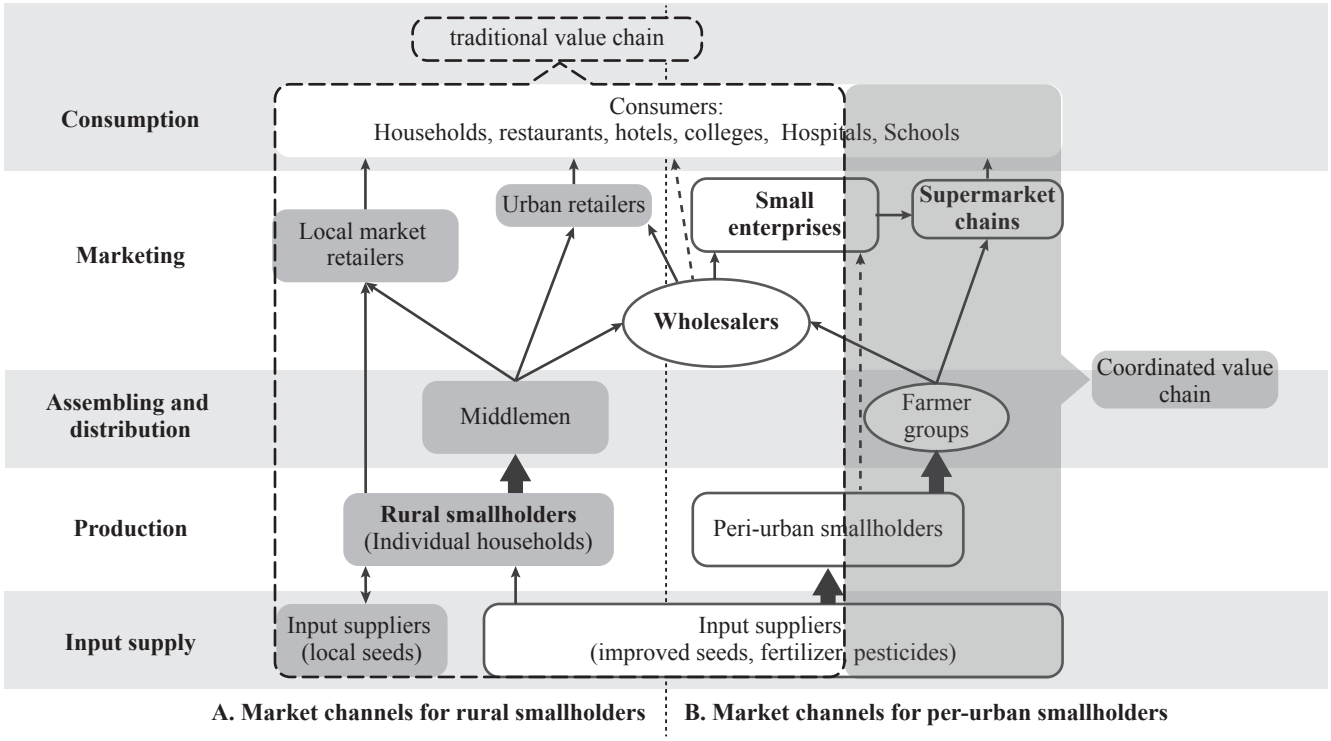


**Figure 1:** Value chain map for AIVs.
Source: Own composition

as part of input credit packages. In the peri-urban areas, agro-vets sold certified seeds, chemicals, farm equipment and also provided technical support to farmers. There were no contractual arrangements between input suppliers and farmers, indicating weak backward vertical linkages. These findings concurred with earlier works of Mmasa and Msuya (2012) who found that input suppliers for sweet potatoes in Tanzania were not vertically integrated with producers and that input suppliers played the least role in the value chains.

*Farmers and farmer groups*

The study established that farmers grew many types of indigenous vegetable crops. However, the scope of this study was limited to establishing the extent of production and marketing of five key vegetables, namely: African nightshades *(Solanum spp.),* leafy amaranth *(Amaranthus spp.),* spider plant *(Cleome gynandra),* cowpeas *(Vigna unguiculata)* and Ethiopian kale *(Brassica carinata)*. Farmer activities and practices included seed preparations, land preparation, nursery preparation, planting and sowing, weeding, irrigating, applying fertilizer, harvesting or selling their vegetables before harvest. There were differences in practices for rural and peri-urban farmers. For example, in the peri-urban areas, many farmers prepared nurseries where vegetable seedlings were transferred to the main plots. On the other hand, farmers from the rural areas mainly practised direct seeding. In the peri-urban areas, farmers planted indigenous vegetables as monocrops, while in the rural areas, vegetables were intercropped mostly with maize. In the rural areas, farmers planted between three and five types of vegetables, while in peri-urban areas, the majority of farmers grew averagely two to three types of vegetables.

The study also established that many farmers in peri-urban areas while only a few farmers in the rural areas irrigated their vegetable farms during dry seasons. Farmers made production decisions independently and were not influenced by group activities or contractual engagement with any buyer. All input costs and production risks were solely borne by the individual farmer.

All farmers sampled for this study belonged to farmer associations. There were two different organizational forms of farmer groups: the specialized 'farmer marketing groups' and the general-purpose 'farmer associations'. General-purpose 'farmer associations' were most common in rural areas. Their functions included organizing production technology demonstrations, member training and in some cases and member-to-member extension services. They provided platforms for collaboration with support service providers such as NGOs and government extension programs. Specialised farmer marketing groups were mainly found in peri-urban areas. In addition to functions undertaken by the general-purpose farmer associations, the specialized ones organised joint transportation of vegetables to the markets. In some instances, these groups were collective action marketing groups, which lobbied and negotiated with the wholesale market authorities for designated trading space and lower market access fees. For the farmer groups that were supplying supermarkets, they were involved in grading, bunching and negotiating contracts for their members.

*Middlemen*

In the rural areas, farmers loosely referred to middlemen as 'brokers'. Middlemen were the first link between producers and other downstream actors. There were two categories of middlemen: individual small-scale traders without formal registration or trade licensing and small to medium formal businesses. The small-scale traders assembled vegetables directly from rural farmers and sold to retailers at the local markets or wholesalers in urban markets. Those selling to wholesalers carried out additional functions such as sorting, aerating and re-packing vegetables. Middlemen from Kisii region were exclusively trading in AIVs throughout the year. This implies that indigenous vegetable trade was their major source of livelihood.

The second category of middlemen specialized in supplying supermarket outlets and other institutional consumers such as hotels, education institutions and hospitals. They bought vegetables from diverse sources ranging from farmers, middlemen, wholesalers and retail traders. Their functions included assembling vegetables, cleaning, trimming, sorting, re-bunching before they transported to buyers. They were mostly preferred by supermarkets as first choice suppliers of AIVs due to their financial capacities and ability to supply assorted vegetables within short notices.

In general, there were no contractual arrangements between middlemen and farmers. One unexpected finding of this study was that during off-peak seasons, some middlemen made pre-harvest payment arrangements with the farmers and harvested vegetables by themselves. Similar pre-harvest arrangements have also been found in Chile between medium and large-scale horticultural producers and their buyers (McCullough et al., 2008).

*Wholesalers*

Wholesale markets were located either in the peri-urban areas (Wangige) or within Nairobi city (Wakulima, Gikomba, and Kangemi). Wholesalers bought vegetables from middlemen in the rural areas or farmers from the peri-urban areas and then sell to retail traders. Their functions include assembling vegetables from different middlemen, repackaging the vegetables from the rural suppliers and selling to retailers. They are responsible for assessing market demands set prices and communicate their decisions to middlemen and retailers. Wholesalers are well networked with trusted middlemen from different parts of the country.

*Retail traders*

Retailers were the final links of downstream actors that delivered vegetables to final consumers. They bought vegetables from diverse actors such as farmers, middlemen and wholesalers. Retailers traded in relatively low quantities and were trading a whole range of vegetables and were not specialized in individual vegetables. There were two broad categories of retailers: traditional and modern retailers. This categorization was based on differences in their contractual arrangements with suppliers, quality and quantity requirement, capital investments and retailing practices.

Traditional retailers were mainly found in traditional market channels. They carried out their businesses in diverse locations such as alongside wholesalers within municipal wholesale markets, in wet markets, temporary estate stalls, and kiosks, by roadsides and in public bus parks. No business licensing was required for retail trading except for daily market fee charged by municipal market authorities. Their functions included buying vegetables, transportation, re-bunching, cleaning, displaying and selling to consumers. The study observed that some retailers within urban residential areas were hawking vegetables, while others were selling vegetables that were pre-washed, chopped, and packed. Most retail traders were women confirming earlier assertions by Maundu et al. (1999), who indicated that 95% of indigenous vegetable traders in Nairobi were women. Retailers sold more than one type of indigenous vegetable alongside other exotic vegetables.

Modern retailing of fresh fruits and vegetables in supermarkets is a new phenomenon in Kenya like other developing economies (Macharia et al., 2013). Supermarket procurement system and retailing of AIVs typifies the coordinated value chains (Figure 2). Their functions included advertising and selling vegetables. It was also observed that some supermarkets sell cooked AIVs in addition to fresh vegetables.

The study established that supermarkets only bought vegetables from some formal farmer groups. However, supermarkets preferred dealing with a few prequalified middlemen because they were able to meet quantity and consistency requirements. This finding is consistent with the observation of Hichaambwa and Tschirley (2006) about supermarkets in Zambia, which also preferred engaging farmer groups and a few intermediaries to reduce transaction costs. The results further agree with the findings of Bidogeza et al. (2016), whose study on the indigenous vegetables value chains in

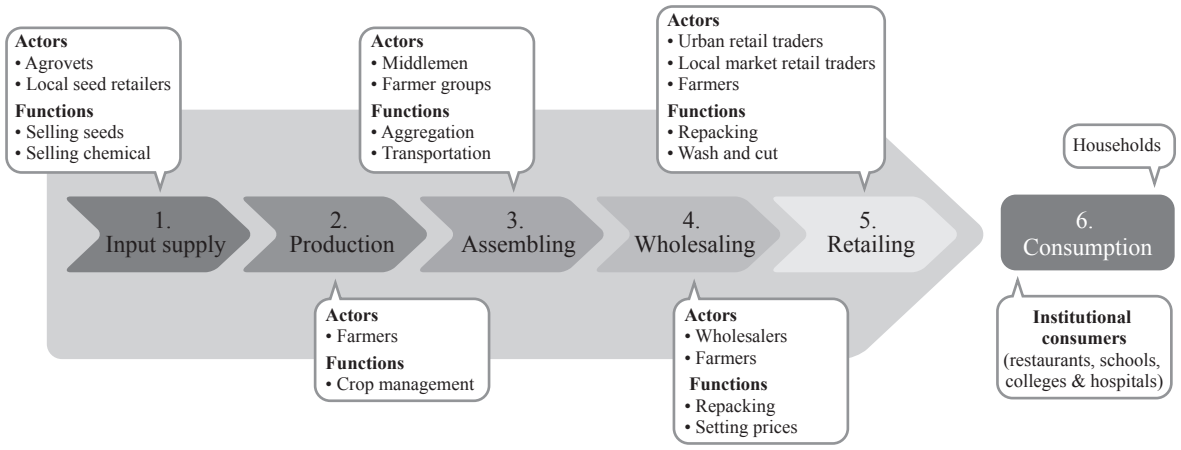


**Figure 2:** Chain segments of traditional AIV value chains.
Source: Own composition

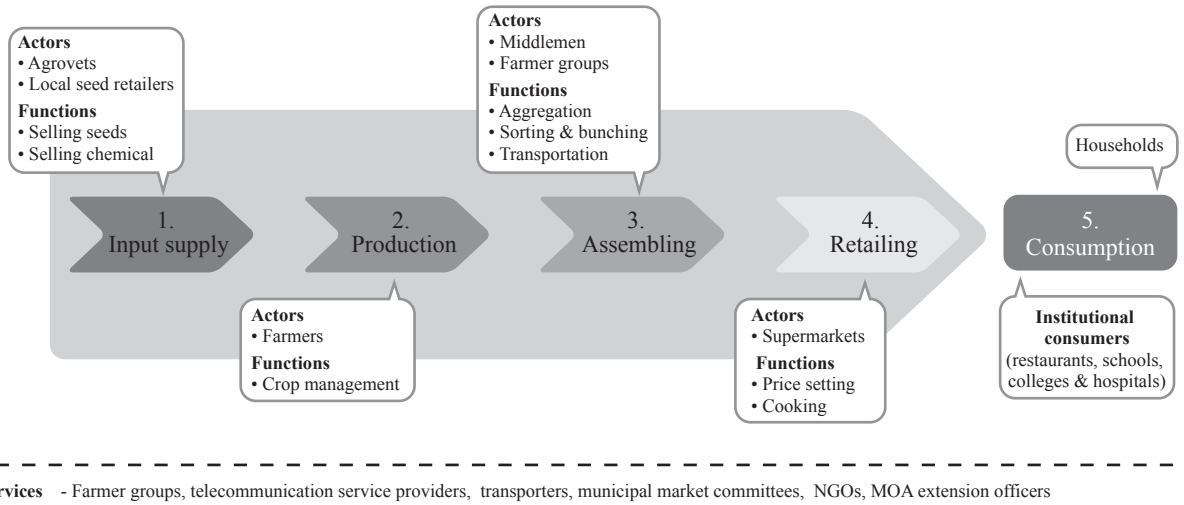


**Figure 3:** Chain segments of coordinated AIV Value chains.
Source: Own composition

Cameroon found that major nodal points in the traditional value chain consisted of input supply, production, harvesting, marketing and consumption.

Table 1 summarizes the actors and functions in the AIV chains.

## The chain governance structure

In this study, "chain governance" encompasses the systems of coordination, regulation and control within and between value chain segments through which value is generated. Various scholarly works have proffered different forms of chain governance models. Governance models as identified by Gereffi and Fernandez-Stark (2016), are market, modular, relational, captive and hierarchy, were employed to explain AIV power relations. The findings on parameters of value chain governance are presented below.

*Horizontal coordination*

As has been highlighted earlier, many farmers and market traders had formal and informal relationships with actors in similar positions or other nodal points in the value chains.

The coordination examined *at the production level* was to establish whether farmers align their production and marketing activities to some collective decisions by their groups. Many farmers in the rural areas considered their associations to be helpful in enabling them to acquire new production skills and attracting collaboration with NGOs and government extension agencies. Farmer groups provided platforms through which development agencies carried out farmer capacity building activities. All groups had formal or informal group constitutions and executive office bearers consisting of a chairperson, secretary and treasurer who were entrusted with mobilizing members for group activities. No

**Table 1:** Summary of actors and functions in the AIV value chains.

| Segment | Actors | Function | Activities | Traditional value chains | Coordinated value chains | Linkages |
|---|---|---|---|---|---|---|
| Input Supply | Agrovets | Input suppliers | – Sell certified seeds, chemicals and provide technical assistance to farmers | - + | + + | Seed companies, farmers |
| | Local seed traders | Supply seeds | – Sell local seeds | + + | - + | Farmers |
| | NGOs | Input Supply | – Provide input credit in the form of certified seeds, chemicals and light equipment | + + | - - | Farmers, Agrovets and extension service providers |
| | Farmers | Local seed production | – Prepare seeds from own harvests<br>– Sell local seeds traders in local markets | + + | - + | Neighboring farmers, seed traders in local markets |
| Production | Farmers | Produce AIVs | – General crop management | + + | + + | NGOs, Ministry of Agriculture, |
| | Farmer Associations | Farmer mobilization | – Mobilize members for trainings | + + | + + | NGOs, Ministry of Agriculture, |
| | NGOs | Facilitators | – Technical assistance to farmers | + + | + + | Farmers, MOA |
| | | | – Input credit | - + | - - | |
| | Ministry of Agriculture | Coordination of extension services | – Technical assistance to farmers through extension services | + + | + + | Farmers, NGOs |
| | | | – Input subsidies | - - | - - | |
| Assembly and Distributions | Farmer groups | Aggregating vegetables | – Organize transportation to wholesale markets<br>– Supply vegetables to supermarkets | - + | + + | Farmers, transporters |
| | Middlemen | Buying vegetables | – Packaging for transportation | + + | - + | Farmers, transporters |
| | Transporters | Transportation | – Delivering vegetables to the markets | - + | + + | Middlemen, wholesalers |
| Wholesaling | Farmer groups | Secure market space | – Pay markets fee for members | - - | + + | Market management, famers |
| | Famers | Selling vegetables | – Sell vegetables to wholesalers or retailers | - - | + + | Wholesalers, urban retailers |
| | Wholesale traders | Selling to retailers | – Setting price for middlemen and retailers | + + | - + | Middlemen, retailers, market management |
| Retailing | Retail traders | Selling to consumers | – Bunching of vegetables<br>– Cutting vegetables | + + | - - | Wholesalers, middlemen, market management, brokers |
| | Intermediaries | Sell to supermarkets | – Clean, sort and re-bunch | | | Wholesalers, farmers, supermarket |
| | Supermarkets | Selling to consumers | – Cold storage, pack and display<br>– Cook vegetables | - - | + + | Farmer groups, intermediaries, banks |

Note: Actors presence = -- not present, -+ partly present, ++present
Source: Own composition

farmer group was involved in collective actions towards joint procurement of inputs or marketing in the rural areas.

However, farmer groups in peri-urban areas engaged in collective actions especially through joint transportation of vegetables to wholesale markets and supermarkets. A farmer group in Kabete sub-county negotiated with Wangige market authorities for reduced market access fees and a designated space within the market, where farmers directly engaged in wholesaling. However, farmers were not procuring inputs collectively except for the shared water resources for irrigation. Farmers also sold vegetables individually and not as a group. Therefore, collective action was limited to costs sharing on transportation and market access fees. The case for farmer groups contracted with supermarkets was slightly different. Such farmer groups were required to be formally registered, operate bank accounts and have group constitutions. Group members shared transportation costs and losses proportionately.

*At the assembly and distribution level*, middlemen from rural areas had informal welfare associations based in the local markets. They were mainly rotational savings and credit associations (ROACAS). Middlemen were represented in the market management committees which enabled them to negotiate and secured lower market access fees. The associations were not involved in collective actions such as joint transportation that would help them minimise transaction costs. Middlemen transporting vegetables to Nairobi were merely using same transporters but each trader met their costs separately. Association members relied on each other's knowledge about a prospective wholesaler before one could engage them. Middlemen never competed with each other over wholesaler customers. Middlemen colluded in setting daily producer prices. The associations were also cartels for preventing farmers and new suppliers gaining entry into the business. Middlemen supplying institutional consumers and supermarkets were not organised into associations.

*At the marketing (wholesaling and retailing level),* trader associations operated cartel-like informal business association making it difficult for new entrants into the business. Wholesalers, on their part justified the cartel tendencies as mechanisms for maintaining price stability. Traditional retail traders were not organised, and entry into the retail business was free. This could be attributed to their large numbers and the diversity of their operation locations.

*Vertical coordination*

The traditional value chains were dominated by arm's length spot market chain governance with no vertical coordination between smallholders and buyers. In the case of coordinated value chains, supermarkets had loose and intermittent informal agreements with some farmer groups in Kiambu region, thereby exhibiting weak vertical coordination. Unlike in the Global Value Chains, the contracts in the AIV value chains in Kenya were informal in nature and less binding to both parties. For instance, supermarkets were not obliged to offer any technical or financial support to farmers, while farmers were not compelled to supply every order placed by the supermarkets.

## Private food safety and quality standards

Vegetable quality was an important element in transaction negotiations between farmers and buyers. However, traders used quality arguments to suppress prices offered to farmers especially when the vegetables appeared to be of low quality. In the coordinated value chains, the supermarkets set private rules and standards. Supermarkets in Kenya do not have production process certification schemes such as GLOBALGAP quality protocols in horticultural exporters markets. Nevertheless, there were common basic codes of practice and quality standards adopted by the supermarkets. The vegetable quality requirements were based on the physical attributes similar to the traditional value chains except the standards were higher. Supermarkets did not offer premium prices for high-quality vegetables.

## Contractual arrangements

There were no contractual arrangements in traditional value chains. However, during dry seasons, some middlemen entered into oral contractual agreements with farmers whereby they paid for unharvested vegetables. Contract values were estimated based on prevailing market prices and projected yield estimates. In such arrangements, middlemen assume all risks and costs related to harvesting and marketing.

The coordinated value chains contracts were based on oral informal arrangements. Supermarket managers would call farmer group leaders a day or two in advance to make specific orders. Such oral orders were not scheduled and only specified prices, vegetable types, quantities required, and time of delivery. Orders were irregular and unpredictable, making it difficult for farmers to schedule harvesting activities. The orders did not specify payments dates. In spite of all these challenges, farmers considered supermarkets as better options since prices were predictable and relatively stable throughout the year. The arrangements between supermarkets and farmer groups were more inhibiting to achieving smallholder integration. For instance, supermarkets paid farmers on quantities sold and not quantities delivered. Suppliers were informed with every order to replace unsold vegetables by supermarkets. On average, suppliers replaced 4-7 bunches with every order placed.

## Information flow

Many farmers in rural areas received market information through middlemen. The traditional chains were characterised by asymmetrical access to information on the part of actors. The study found that market information originated from wholesales to other actors. Wholesalers were the gatekeepers of information flow in the chain. They knew of market demand because of forward linkages with retailers and supply availability due to their backward linkages with middlemen and farmers. For example, every morning, wholesalers contacted middlemen to inform them of prices offered, quantities and vegetable types required. On the contrary, middlemen did not share such information with farmers but, instead, used it for negotiating prices. Similarly, downstream

information flow from wholesalers to the retailer was weak. Retailers did not have prior knowledge on prices and vegetable type availability until they met with wholesalers. It was observed that some urban retailers passed price information to consumers through small boards placed on the displayed vegetables. In the coordinated chains, however, supermarket managers passed market information directly through group leaders. Such information included aspects such as vegetable types required, quantities and prices offered. Additional information related to payments due and required replacements for unsold quantities.

## Product flow

Along the traditional value chains, vegetable flows started from farmers, who, after harvesting, transported them to the middlemen at collection centres or local trading centres where the middlemen assembled, packaged and transported them to wholesalers and retail traders. Wholesalers repacked and sold to retail traders based on quantities demanded. Retailers further re-bunched the vegetables into smaller units and sold directly to consumers.

Supermarkets procured their vegetable supplies directly from farmer groups. Group members assembled their vegetables at on point where they were sorted and selected. Good quality vegetables were sent to the supermarket, while the rest were sold to buyers in the traditional markets. Supermarkets also bought vegetables from intermediaries who sourced the vegetables from diverse sellers. Middlemen were preferred by supermarkets because smallholder farmers did not have the capacity to supply the consistent volumes that they required throughout the year.

The results further revealed that many farmers sell vegetables through channels in the traditional value chains, only farmers from peri-urban areas sold vegetables to supermarkets in Nairobi. The governance parameters discussed above indicate that wholesalers and supermarkets were the lead actors in traditional and coordinated value chains respectively. The AIV value chains exhibit multiple and, sometimes, alternating governance arrangements within some market channels. Nonetheless, the dominant governance arrangements in the traditional value chain is characterized by "arm's length" spot market systems, where actors engaged at random to discover prices with every transaction. The information and knowledge of vegetable quality standards was minimally based on physical attributes such as freshness, greenness, and tender leaves. It was also characterized by low trust levels between farmers and traders, with farmers blaming traders for offering low prices, on the one hand, and traders blaming farmers for supplying inconsistent quantities, on the other. In the midstream, however, the relationship between middlemen and wholesalers was characterised by relational governance arrangements as shown in Figure 4. Middlemen and wholesalers had high levels trust due to long-term trade relationships to the extent that transactions no longer involved face-to-face contact.

In the coordinated value chains, the relationship between farmers and supermarkets was by modular governance, where vertical linkages were limited to suppliers meeting procurement conditions only. This finding was consistent with other studies on domestic value chains in developing countries (Trienekens, 2011). Farmers had minimal bargaining power and were forced to sell vegetables at the price offered by supermarkets.

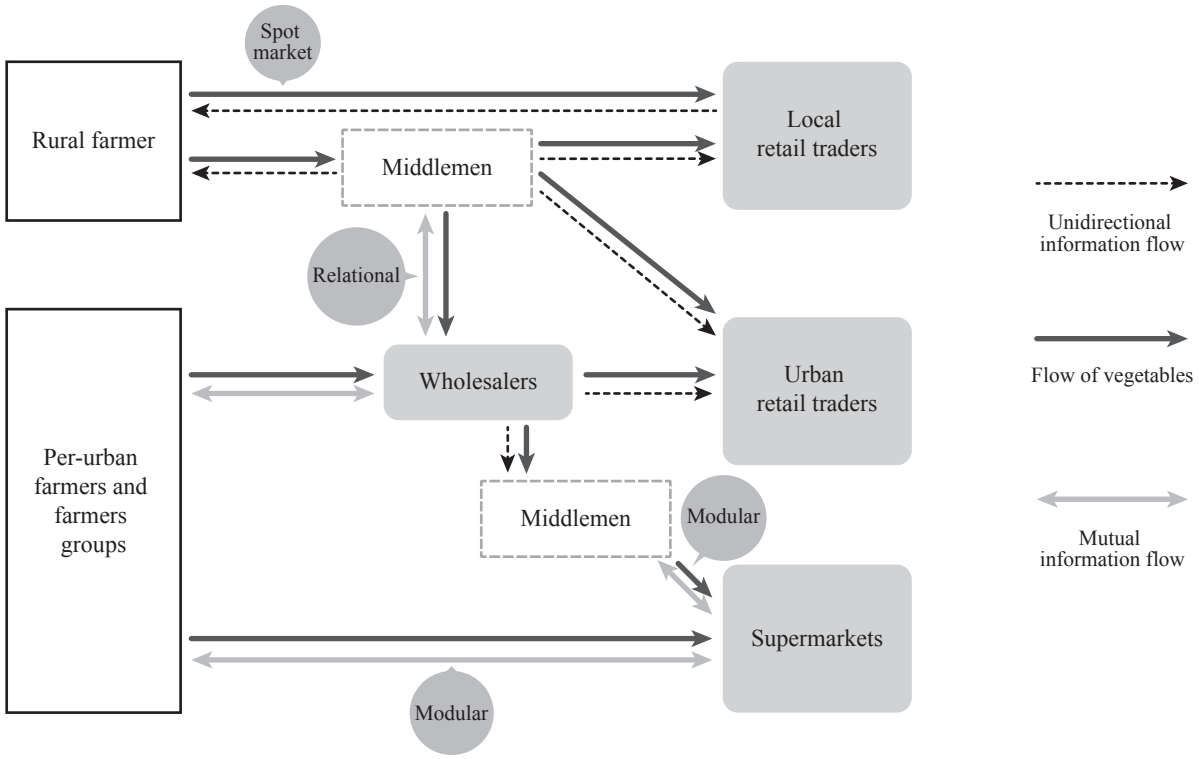


**Figure 4:** Governance structure of AIV value chains.
Source: Own composition

There were two alternating and sometimes overlapping modes of governance in the traditional value chains (Figure 4). The grey dotted arrows show the unidirectional information flow from middlemen and wholesales to farmers and retail traders signifying spot market governance arrangements. The thick grey arrows show mutual market information sharing between actors, which demonstrate either relational governance arrangements between wholesalers and middlemen or modular governance arrangements between supermarkets and their suppliers (farmer groups or middlemen). The multiple nature of governance arrangements in the traditional value chains was such that from farmers to middlemen, the transactions were spot market, then they turn to relational between middlemen and wholesalers and, finally to spot market arrangements between wholesalers and retailers or other middlemen and supermarkets. The green arrows are indicative of the flow of vegetables between actors.

## Discussion and conclusions

Our discussion of chain governance has been predicated on the three dimensions suggested by (Gereffi and Lee, 2012); the results have then been interpreted through the lens of the global value chains theory. The findings have shown that intermediaries govern the AIV value chains and as such, determine the accessibility of these vegetables to non-producing households through distribution and food costs. In the traditional value chains, wholesalers determine quantities and prices, while in the coordinated chain, supermarkets set parameters such as quality and quantity requirements as well as prices. The ensuing sections interpret the dynamics of AIV value chains based on the dimensions of governance.

*As to complexity of the transactions,* in the traditional value chains, there are no quality specifications and the main information sharing between actors revolves around simple daily prices. Vegetables sold in the traditional market outlets were found not to be graded and therefore farmers did not require additional information, other than knowing the prevailing market prices, in order to supply the markets. Execution of every transaction was purely based on the ability of the negotiating partners. Equally, consumers in the traditional chains preferred higher quality vegetables but as Gido et al. (2017) observed, quantities per unit price greatly influence consumer choice for retail outlets. As explained in the previous section, middlemen do not share adequate and reliable market information with farmers. Poor transmission of product quality information to farmers may explain why there was value addition in the chains.

In the coordinated chains, retailing of indigenous vegetables is a niche for supermarkets. Consequently, the product and process specifications required were not relatively simple to transfer. Suppliers were to comply with quantity and vegetable type specifications that varied with every order. In addition to high-quality requirements, suppliers were to deliver vegetables at specific locations at scheduled time. Such specifications were communicated directly to contracted suppliers as and when supermarkets required vegetables. These consistency requirements make transactions more complex especially because of the seasonal nature of vegetable production.

*As for the ability to codify transaction information,* quality standards related information and knowledge on indigenous vegetables in both traditional and coordinated value chains were not codified. Farmers entirely determined production process and assumed all risks. There were neither private standards nor certification of indigenous vegetables produced in Kenya. Our results suggested that compliance with the physical quality requirements as set by supermarkets were not in themselves too complex for farmers so as to impede access to coordinated chains. Rather, it was the execution of the incomplete contracts on the part of supermarkets that made it costly for farmers (Williamson, 1985). The contracts were incomplete and shifted the risk burdens to farmers. In essence, these contractual arrangements were ridden with uncertainties incapable of providing incentives for upgrading. Such uncertainties on payments and verification of sales were likely to affect trust between farmers and supermarkets (Singh, 2002). Contrary to this study's expectation, the contractual arrangements between some intermediaries and farmers during dry seasons were comparatively better. In such arrangements risks and marketing costs burden were transferred to middlemen.

*As to supplier capabilities,* farmers in the rural areas engaged in less intensive production characterised by low application of productivity-enhancing technologies such as improved seeds and irrigation practices. Production decisions were not based on market demands. In addition, farmers were not able to supply adequate vegetables throughout the year. Comparatively, more farmers in the peri-urban areas used improved seeds, fertiliser and irrigation. These technology adoptions were indicative of a more commercialized approach to production, albeit with shortcomings. On average, farmers produced two types of AIVs yet there was a huge demand for other varieties (Gido et al., 2017). The demand for more varieties provided opportunities for product upgrading but it appeared that farmers did not have adequate information regarding market demands for other AIV types. This partly explained why supermarkets preferred the loose oral contractual arrangements with farmers. The inability to consistently supply adequate vegetables to the market affects food availability in the markets and regular income to smallholders.

On the whole, the value chain for African indigenous vegetables in Kenya was replete with weak producer collective action towards marketing, incapable of fostering beneficial vertical coordination with buyers. Differentials in the structure and dynamics of the chain, such as the rural and peri-urban perspectives, provided diversity of marketing outlets within the same value chains. Interestingly, participation in the coordinated value chains provided greater income security due to low price volatility. However, such stable prices were not attractive compared to traditional market channels during dry seasons.

This study contends that contractual arrangements in the modern value chains for AIV were not precipitating vertical integration. The governance arrangements in the AIV value chains was beset with low trust between farmers and downstream actors which negatively impacted on year round

availability of AIVs to poor households in urban areas. A more beneficial contractual arrangement between farmers and other coordinated value chain actors is feasible when farmers strengthen their collective actions towards production and marketing. The County Governments efforts to promote inclusive markets should emphasise the importance of infrastructure investments and establishment value chain platforms that inform policies and trade agreements.

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