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# Feed the Future Feed the Future Kenya Crops and Dairy Market Systems Activity

## Dairy Midterm Assessment and Learning Report

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**DISCLAIMER**

This report was prepared by Joanna Springer, Joseph Dalley, Guhad Adan and Sinan Hatik, with substantial contributions from the KCDMS technical team, led by Irene Mue and Judy Odongo. The market system resilience study and outcome harvesting evaluation were conducted in partnership with Busara Center for Behavioral Economics. Field work for the market system resilience study was carried out by Guhad Adan and Busara in June—July 2021. The outcome harvesting evaluation was led by Boniface Musembi.

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**Cover photograph:** [redacted] processes a delivery of fresh milk at Kaiti Dairy Group in Makueni County, Kenya. Photo by: KCDMS

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# List of Acronyms and Abbreviations

| | |
|---|---|
| AI | artificial insemination |
| ASNET | Agriculture Sector Network |
| AVCD | Accelerated Value Chain Development program |
| B2B | business to business |
| BDS | business development services |
| COVID-19 | coronavirus disease 2019 |
| DFA | dairy farm assistant |
| ECF | East Coast fever |
| FSP | financial service provider |
| FY | fiscal year |
| GDP | gross domestic product |
| GEEL | Growth, Enterprise, Employment & Livelihoods |
| ICT | information and communications technology |
| ILRI | International Livestock Research Institute |
| KALRO | Kenya Agricultural and Livestock Research Organization |
| KCDMS | Kenya Crops and Dairy Market Systems |
| KDB | Kenya Dairy Board |
| KEPHIS | Kenya Plant Health Inspectorate Service |
| KES | Kenyan shilling |
| KLBA | Kenya Livestock Breeder's Association |
| MFI | microfinance institution |
| MoALF | Ministry of Agriculture, Livestock and Fisheries |
| MSR | market system resilience |
| ODK | OpenDataKit software |
| PUE | power usage effectiveness |
| RTI | RTI International |
| SACCO | Savings and Credit Cooperative |
| SILC | Savings and Internal Lending Communities |
| SME | small and medium enterprise |
| SMS | short message service |
| USAID | United States Agency for International Development |
| VC | value chain |
| VSLA | village savings and loan associations |

# Introduction

Vulnerable producer households in Kenya face recurrent and compounded climate and economic shocks, making it challenging to improve their livelihoods and food security. Increasingly, evidence shows that markets support households' well-being by providing vital goods, services, and income opportunities. Resilient market systems have the potential to buffer sensitivity to shocks and stresses while helping households recover more quickly from shocks. The Feed the Future Kenya Crops and Dairy Market Systems (KCDMS) Activity takes a market facilitation approach to strengthening economic and nutrition outcomes of producers in 12 counties in eastern and western Kenya. KCDMS interventions are designed to support mango and dairy production by providing the necessary market stimulants in the value chains, including extension services, farmers, cooperatives, input suppliers, influencing policies, transport and handling systems, access to financing, and private sector partnerships among others. The activity aims to improve production through the widespread use of modern technology in production, provision of extension services, collective bargaining of farmers through cooperatives, private sector partnership, market linkages, and others.

As part of its learning agenda, KCDMS seeks to assess cost-effective methods for evaluating system-level outcomes and incorporating learning into adaptive management. The Market System Resilience (MSR) study applied the United States Agency for International Development's (USAID's) MSR framework to the Kenyan context to assess levels of MSR in fiscal year (FY) 2021 resulting from KCDMS programming and inform FY22 work planning. The study was carried out in conjunction with an outcome harvesting study[1] to evaluate KCDMS contributions to resilience. The MSR study relates to Learning Topic 6 in the KCDMS Learning Agenda, i.e., Collaborative Action, Learning, and Measurement for Market Systems. The study report has been updated with endline results in FY23 and recommendations for new programming. The study addresses the following learning questions using qualitative and quantitative methods and participatory learning activities:

1) What are the strengths and weaknesses of the dairy market system in Western and Nyanza Regions in terms of resilience capacities?

2) What resilience domains are most important for business adaptation to shocks and stresses and why?

# 1. Background

## 1.1 Overview of markets in Western and Nyanza Regions

Kenya is experiencing a growing demand for milk and dairy products driven by expanding urbanization and the rising middle class. The Kenya dairy value chain can be classified into formal and informal value chains. The formal milk value chain entails a market segment licensed by the Kenya Dairy Board dairy corporative, processor, and organized markets until processed milk and products are delivered to market and sold. The informal value chain, which became prominent following the liberalization of the dairy industry, entails the trade of raw milk at the farm gate with its value chain consisting only of the input and supplies stage, production stage, retail, and consumption. The key players along the dairy value chain include more than 600,000 small-scale dairy farmers, 80+ dairy cooperatives, and more than 200 dairy farmers self-help groups.

The Western and Nyanza regions are not traditional dairy production areas, albeit having significant resources supporting dairy production. Along with other common challenges in dairy production, the use of local cattle breeds, cows being used for multipurpose (such as plowing), and lack or limited access to improved high production breeds of cattle, are specific to farmers of these regions.

Since 2016, the USAID-funded Accelerated Value Chain Development (AVCD) program has provided opportunities for more households in these regions to tap into the lucrative dairy products market. With the support of ILRI, AVCD promotes accelerated breeding in smallholder farming systems through fixed-time artificial insemination to improve breeds in the region, which leads to increased output from the sector.

Despite the significant contribution to the national GDP and livelihoods of more than 1.7 million in Kenya, the dairy industry is besieged by several constraints affecting the sector's growth. Challenges in the chain identified by KCDMS include breeding quality of dairy cows, poor quality extension services, lack of minimum access to

[1] The outcome harvesting evaluation is available separately.

nutritious animal feeds, deficiency in quality fodder, poor governance skills of producer organizations, inadequate milk safety protocols, and poor handling of marketing and distribution. Bottlenecks are present in each node of the dairy value chain, with constraints at input supplies and service provision being most rampant.

**Input and supplies**: the critical challenge under this value chain node is animal nutrition and feeds, which comprise 80 percent of the total dairy production costs. Inadequate allocation of land causes challenges in fodder production, limited availability of quality fodder seed and planting, lack of fodder planting and harvesting equipment, poor post-harvest handling and storage, and unstructured business models for fodder aggregation. In addition, there is difficulty in manufactured feeds, as 90 percent of feed manufacturers in Kenya are small-scale producers, with the majority producing less than 1,000 tons per month. In addition to the gap in quantity, the feeds also reach the market at higher prices to the farmers who opt to make their homemade concentrates, with only 14 percent of livestock keepers using dairy concentrates. The lack of adequate and quality feeds has contributed to low milk production capacity.

**Extension services:** The main challenges in this node include farmers' limited knowledge about modern dairy production, inadequate extension delivery systems, and limitations on public extension services, which are mostly unstable because of their dependence on nongovernmental organizations (NGOs) support. These challenges have led to the erosion of genetic quality, resulting in low sector productivity, especially among the smallholders. Due to the poor provision of extension services, the sector has faced low use of artificial insemination to accelerate breeding improvements to produce better dairy animals. Other challenges that further derail the sector include poor transportation and road networks that limit the accessibility of farmers, a lack of nitrogen semen containers to store semen, and shortage of technically competent and adequately trained inseminators. Similarly, the provision of health services for dairy cattle, especially vaccinations (which have been partially privatized), has become disorganized and, in some cases, reported as substandard. Significant supply-demand gaps prevail due to the inability of the private dealers to meet the demand.

**Production constraints**: Key challenges under this node include low density of improved dairy cows, low adoption of artificial insemination (AI), minimal private sector breeding services, limited knowledge by farmers resulting in long calving intervals, short lactation lengths, high mortality rates, and, ultimately, low milk productivity. Other specific constraints influencing production include over-reliance on rain-fed dairy production, low-quality agricultural by-products for feeds, and lack of adequate quality feed and forages. The small dairy farmers produce about 56 percent and 70 percent of the total and marketed milk production, respectively, with the total productivity per animal remaining low.

**Logistics for aggregators**: The critical challenge under this node revolves around limited chilling and pasteurizing equipment and poor handling and transport practices that affect milk quality and safety, leading to delays, especially in collecting milk from farmers. Further, the amount of time needed to collect the small volumes of milk along the milk delivery routes, long distances to chilling and bulking centers, and poor transportation infrastructure result in milk spoilage. The small volume of milk is inefficient and bears a high cost in milk collection. Moreover, poor transportation infrastructure is a constraint, especially during the rainy season. Other challenges include insufficient management capacity of the cooling plants in the chilling centers and their high costs.

**Processing challenges**: The most limiting constraint in this node is that the milk market is largely characterized by oligopolists, with main milk processors setting the raw milk prices to the detriment of farmers. Moreover, the sector experiences a shortage of processing equipment and high costs of packaging materials. Currently, the cost of packaging material for processed milk constitutes the highest cost element, more than the cost of raw milk itself.

**Marketing and distribution**: Constraints in marketing and distribution are contributed mainly by unorganized markets and low marketable surplus that limits market participation by smallholder farmers, perpetuating low farmer income. Additionally, milk buyers do not have the infrastructure to expand collection capacity. This has led to larger uptake of raw milk due to unbalanced equity with the processed milk sector. However, raw milk, which has a cost advantage over processed milk, is largely influenced by seasonality. As the informal market cannot absorb all the raw milk produced in the rainy seasons, this results in heavy milk spoilage of about 30 percent to 40 percent of the milk produced.

## 1.2 Dairy market stakeholders

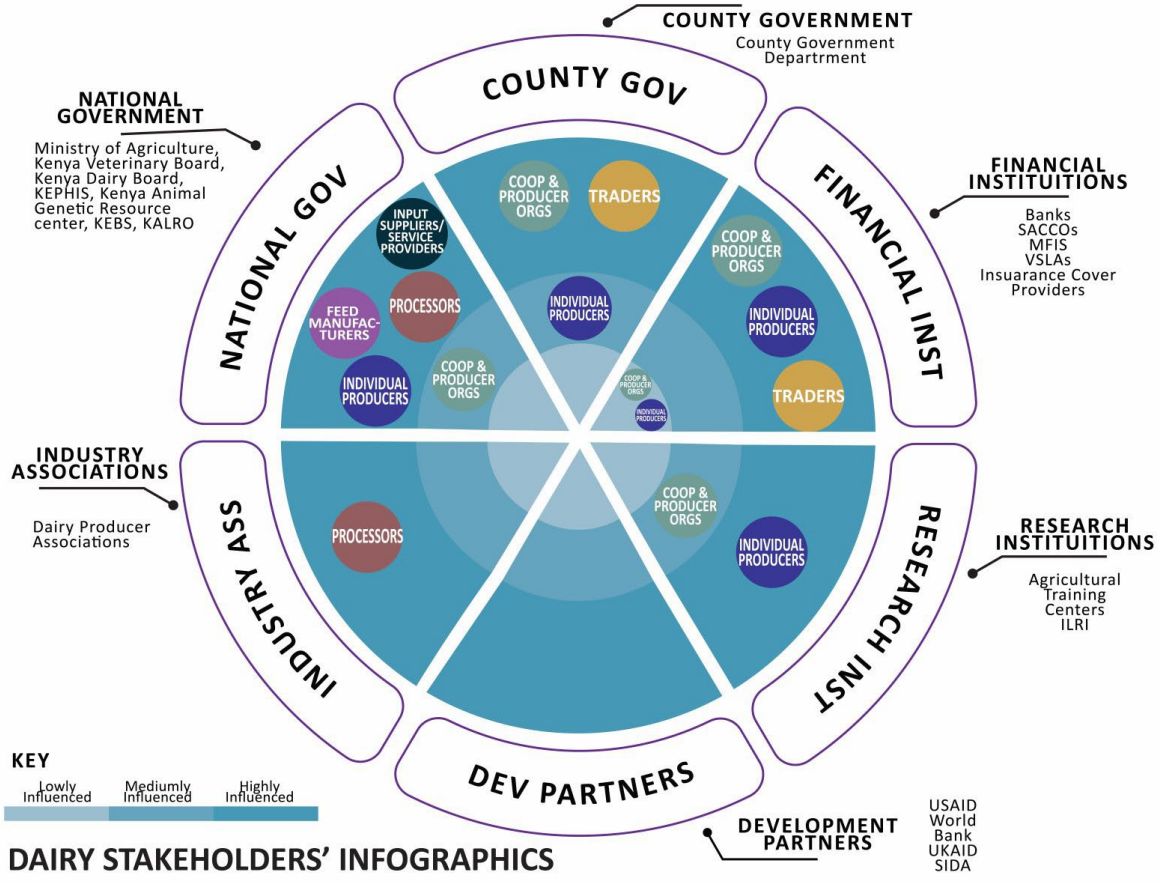
An external consultant senior expert in market systems development in the region facilitated a workshop with KCDMS staff to map out the key stakeholders in the dairy market system and their influence on each other. **Figure 1** shows the dairy stakeholder influence as discussed in that workshop. The workshop determined that the national

government stakeholders, mostly licensing and regulators, have the highest influence on market actors. Other stakeholders with high influence include county governments, financial institutions, and dairy producer associations. Equally, some government institutions, such as Kenya livestock breeder associations and research institutions like ILRI, had a medium influence on market actors.

National government stakeholders, including the Ministry of Agriculture, Kenya Veterinary Board, Kenya Dairy Board, KEPHIS, Kenya Animal Genetic Resource Center, KEBS, and KALRO, are highly important in the dairy value chain and have a high influence on input and service providers, cooperatives and producer organizations, individual producers, milk processors, AKEFEMA, and other small feed manufacturers. Their influence mostly relates to regulations, licensing, quality control and certifications, and procedural systems, without which the market actors cannot operate. The county governments also highly influence cooperatives and producer organizations and traders, while their influence is medium on individual producers and development partners. Interestingly, the Kenya Livestock Breeder's Association (KLBA) has a medium influence on producers, including cooperatives and other dairy producers.

Research institutions, including ILRI, and agricultural training institutes have a medium to high influence on cooperatives and producer organizations, development partners, and individual producers. Equally, financial institutions, including banks, SACCO/microfinance institutions (MFIs), and village savings and loan associations (VSLAs) highly influence cooperatives and producer organizations, traders, input and service providers, and individual producers. The only industry association is a producer association, which lacks influence among dairy market stakeholders aside from processors.

**Figure 1. Dairy market stakeholder map**




## 1.3 Defining market system resilience

MSR is the ability of a market system to respond to shocks and stresses in a proactive fashion to sustain inclusive market functions that serve vulnerable producers, business owners, workers, and consumers. A market system is a "dynamic space…in which private and public actors collaborate, coordinate, and compete for the production, distribution, and consumption of goods and services" (see USAID's Market System Resilience Assessment

Framework). KCDMS applies an MSR approach within the context of USAID's food system framework to understand and address the drivers of resilience for improved income, health, and nutrition outcomes (see RFS Food System Conceptual Framework). USAID's MSR framework encompasses eight specific and interrelated domains. Through a participatory, country-led process, KCDMS adapted definitions of the domains for the purpose of this study (see **Table 1**).

**Table 1. Adapted MSR domains for KCDMS**

| BEHAVIORAL DOMAINS |
|---|
| **Evidence-based decision-making**<br>Businesses rely on dependable sources for market data, investing in information gathering and analysis, and confident in their own and their employees' ability to use digital platforms for business purposes. Early warning information is widely available and used by actors throughout the market system, and the local and national government manages effective pest and disease surveillance programs. |
| **Business strategy**<br>Businesses maximize value to customers rather than profit when making their revenue strategy, plan one season or one year in advance, and adopt virtual platforms for marketing and sales. Market actors segment products and services according to customer demographics, use multiple methods for branding their products, and invest in customer service. Businesses also invest in staff capacity development and retention. |
| **Cooperation**<br>Businesses are served by businesses or professional groups. Market actors of various types work together collectively in response to disturbances and engage in joint initiatives and partnerships. Businesses work jointly with suppliers and service providers to proactively address issues and resist negative forms of collaboration, such as collusion or monopolies. |
| **Competition**<br>The market is open and competitive, with adequate regulation to encourage new market entrants and discourage monopoly control over any aspect of the market. Businesses adhere to agreements despite shocks and, generally, trust other market actors to treat them fairly. The direction of change in the number of new market entrants is positive across market activities. Business owners generally have positive perceptions about entrepreneurship and the market is competitive across the range of market activities. Grades and standards support improvements along the value chain and are consistently applied. |
| **STRUCTURAL DOMAINS** |
| **Power dynamics**<br>There is a balance of power between various actors in the market system, aligned with capacity and readiness to fulfill appropriate market functions. Government, private sector, and civil society groups have resources to fulfill their mandates. Marginalized groups are represented through broad-based professional groups and associations that advocate for the interests of the most vulnerable, as well as the majority of their members. Business owners across value chain segments believe they can influence issues affecting their markets through inclusion in the policy-making and review process. |
| **Rule of law**<br>Formal and informal rules are widely known and adhered to. Disputes among market actors are handled fairly, regardless of a business owner's influence or identity, reinforcing the value of being a good actor. Taxation is fair and not unduly burdensome. |
| **Diversity**<br>Flexible and dynamic supply and sales chains enable businesses to access different markets, buyers, or suppliers in case of a shock. Specialized services are available to meet a range of market needs, and business owners are willing to engage with start-up businesses and businesses with innovative models. In regard to norms and perceptions, a resilient market system will have women represented throughout the range of market activities, including those with higher value. Business owners will show confidence in the predictability of market trends to take risks to grow their businesses or branch out into new activities. |
| **Connectivity**<br>Businesses have multiple channels to access finance, both formal and informal, and leverage their business networks to negotiate credit to manage risk and adapt to shocks. Business networks are not based on friend and family networks, such that marginalized groups are able to enter business networks and agreements on level ground and gain access based on merit rather than identification with a particular group. Cooperatives have robust networks to traders. |

# 2. Approach

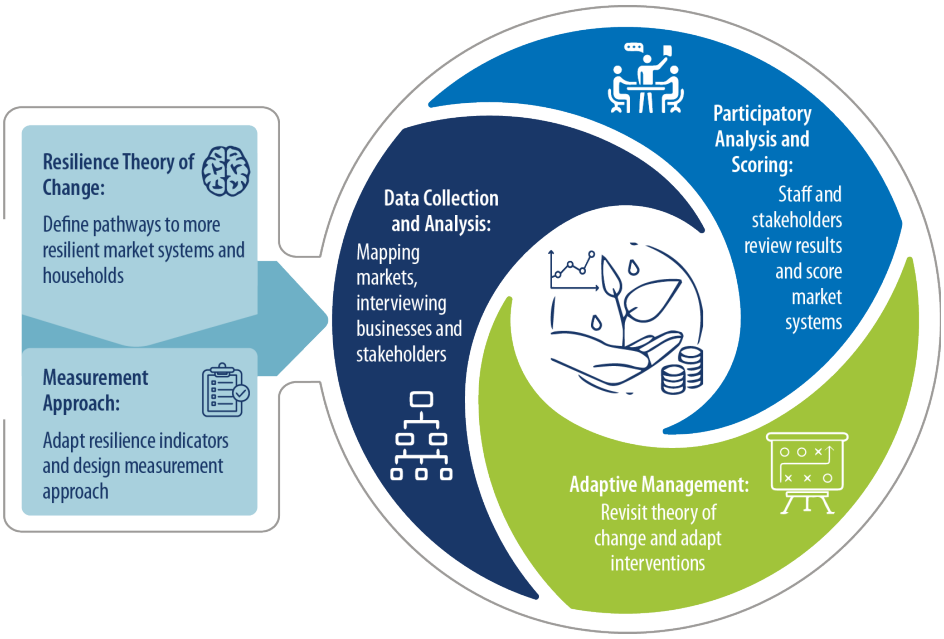
## 2.1 Participatory design

Participatory design sessions with KCDMS staff led by senior experts were used to select markets and actors for sampling, develop indicator measures, and design data collection instruments and sampling strategies. The process started by developing resilience theories of change for target market functions for the dairy market system. Target market functions include the following:

- Quality dairy products are locally available, with more stable prices, during and after shocks
- Dairy farmers and other dairy value chain (VC) actors access productive inputs/services to prepare for, absorb, and recover from shocks
- Actors in the dairy VC generate income from sale of milk and related products during and after a shock/stress.

As much as possible, we aligned our measurement with domains of market system programming that are within the manageable interest of KCDMS, while bearing in mind the various risks and constraints inherent in the local context (**Figure 2**). Indicators were developed based on the resilience Theory of Change, which were adapted from the operational indicators RTI developed for USAID/Somalia Growth, Enterprise, Employment & Livelihoods (GEEL) based on USAID's Market System Resilience Assessment (MSRA) framework. Additionally we adapted and contextualized indicator measurements and developed survey and interview/discussion questions for new indicators that were tailored to KCDMS activities. To the extent possible, KCDMS instruments drew on existing instruments, either used for Somalia GEEL or from other measurement activities in the KCDMS project.

**Figure 2. RTI's participatory MSR approach**




## 2.2 Stakeholder mapping and qualitative sampling

To better identify the most influential stakeholders in the dairy VC and understand their level of influence and inform qualitative sampling, an external research consultant conducted a stakeholder influence mapping workshop with KCDMS staff in May 2021. During the workshop, the team reviewed a set of market stakeholders and market groups that were prepared in advance by the consultant. Using Mural, an online collaboration and organization tool, the team moved each stakeholder and market group onto a quadrant indicating their level of influence and importance on the market as a whole. The team subsequently linked each market stakeholder with the groups they influence, indicating a high, medium, or low influence level. Then, they linked market stakeholders with each other, again indicating level of influence. Respondents for in-depth interviews and market actors for focus group discussions were identified and purposively sampled using the results of the stakeholder mapping. A senior member

of the research team with fluency in Kiswahili conducted 28 focus groups and 15 key informant interviews with market actors and stakeholders in June 2021.

## 2.3 Market actor survey

Busara Center for Behavioral Economics was the research partner for the study. The sampling approach for the market actor survey involved mapping businesses and preparing a proportional sampling based on the total number of market actors in each strata. During a 3-day enumerator training, enumerators from each of the sample counties reviewed survey questions and response options and contributed to finalizing adaptation of the questions and responses to local contexts. Following the pilot test and debrief, enumerators returned to their homes and conducted the survey in their own counties to minimize cross-border travel due to COVID-19.

The study team conducted face-to-face interviews in June and July 2021 with a random sample of 355 micro, small, and medium enterprises in the dairy market system (175 in Western and 180 in Nyanza). Sampling strata included smallholder producers, petty traders, input suppliers, farmer cooperatives, processors, service providers, commercial producers, collection centers and transporters and institutions (milk bars, schools, hotels). Busara also conducted high frequency checks on the data, which were uploaded daily to Busara's server and reviewed using code to search for missing data, track enumerator performance, and check data quality. Following the completion of data collection, Busara cleaned and analyzed the data using R software to generate descriptive statistics.

## 2.4 Learning and adaptation

The KCDMS senior experts led a series of workshops to reflect on MSR findings in conjunction with outcome harvesting results. The workshops revisited the resilience theories of change and resulted in a set of recommendations to guide the remaining two years of KCDMS programming. Key takeaways from the workshops are included below, along with updated recommendations based on further learning and analysis over the life of the project.

# 3. Findings

## 3.1 Overview of assessment findings

Using a simple two-point scale of low vs. moderate resilience, we briefly summarize key indicators for each resilience domain. Across all domains, there were some strengths and some weaknesses; therefore, we do not characterize any domain as having either extremely weak or high levels of resilience. The results indicated progress made by midterm, attributable to program interventions based on the program Theory of Change and highlighted outstanding areas of weakness for the project to tackle in the remaining years of programming. Comparing the relative strength or weakness of each domain contributes to our understanding of the midterm drivers of resilience, as far as business recovery in FY21.

Illustrative results from the outcome harvesting evaluation are included below for each domain in text boxes. Outcome harvesting results showed improvements that resulted from interventions for each domain. Since we do not have baseline information for MSR domains, we cannot establish the extent that change in the overall level of resilience of that domain can be attributed to KCDMS interventions. In other words, some domains are still at a low level of resilience despite some gains; alternately, domains that are at a moderate level of resilience, may not have started from a low level, while nevertheless gaining ground as a result of KCDMS activities.

### Evidence-based decision-making

#### *Moderate resilience*

- 82 percent of businesses in Nyanza and 86 percent in Western have access to early warning information; at least half of the respondents receive information in time to prepare for shocks.
- More than 40 percent reported receiving timely information many times or all of the time; however, a slight majority believe higher capital actors receive more information than lower capital actors.
- Respondents in both Nyanza (68 percent) and Western (74 percent) rely primarily on first-hand sources for market information; however, a substantial proportion also turn to friends and family.
- Only one-third of businesses dedicated resources to information gathering activities in the dairy VC. Of those businesses, approximately half dedicated financial resources.

- Respondents indicated they are comfortable using multiple digital platforms for marketing and are similarly confident in their employees' ability to do the same.

**Evaluation Results – FY21**

- The project engaged Business Development Services (BDS) providers to improve the capacity of cooperatives and facilitated acquisition of information and communications technology (ICT) equipment and software to improve operational efficiency. For example, Bomabobo Dairy Farmers Co-operative Society Limited reported that with the ICT infrastructure they have installed, they intend to use short message service (SMS) to notify farmers of how much milk they have delivered, how much has been paid, and any balances.
- In similar fashion, an AI service provider attached to an AI distributor reported that they can now collect data systematically from farmers using a phone installed with the ODK software. This includes tracking the number of inseminations done, uploading data, and keeping track of the animal's lineage.

## Business strategy

### *Moderate resilience*

- Only 29 percent of businesses in Western and 36 percent in Nyanza plan at least one month in advance, while 8 percent in Western and 11 percent in Nyanza reported not planning at all. However, respondents reported making plans regarding multiple types of business decisions. Close to 60 percent of the respondents in both regions made business plans centered around negotiating prices and quantities with suppliers.
- Of the 67 precent of businesses in Western and the 57 percent in Nyanza with employees, the majority reported offering their staff training in the last 12 months as an effort at staff retention. Businesses in Western were more likely to offer their staff skill-building opportunities, mentoring, and "learning-by-doing" than in Nyanza, where training was somewhat more common.
- 55 percent of businesses had a revenue strategy that depended on maximizing profit over customer retention. However, 23 percent in Western and 19 percent in Nyanza strongly agreed that they will occasionally reduce their profit margin to ensure good value for customers.
- More than one-third of businesses in both regions have tailored products or services for different customer segments, such as service provision options and flexible business agreements.
- The majority of businesses invest in customer service in multiple ways. For instance, most provide customers product-related advice, have adapted products or services in response to customer feedback, and have established complaint handling procedures.
- The majority of the businesses reported asking customers for feedback. A slight majority of respondents used branding methods to increase the visibility of their businesses.
- In Nyanza, only 9 percent of market actors set up online platforms in the last 12 months to market their goods and services, compared to 25 percent in the Western Region.

**Evaluation Results – FY21**

- Farmers reported the desire to access and use new technologies, such as AI and improved fodder production. Farmers said that AI has improved their cow breeds and guarantees increased milk productivity and household income. With AI, the cows now calf yearly, compared to using traditional breeding methods, which would take as long as three years to get results.
- To make them efficient in their operations, the cooperatives and producers have adopted ICT through the facilitation of KCDMS. This has led to easy record-keeping for the cooperatives, while farmers enjoy easy follow-up on milk delivery. Vihiga Dairy can send text messages to farmers about their milk deliveries, while trained AI providers use ODK for data collection on the number of animals inseminated, the dates, and the corresponding farmer.
- Farmers and cooperatives have reported an increase in milk volumes and improved quality of dairy cows reared. Nuru Enterprises, for example, reported improved daily milk collection—increasing from below 200 liters to more than 500 liters. Farmers affiliated to Nuru also reported improved milk production from the local cows, from as low as 1 to 2Lto 3.2L. This was attributed to increased knowledge, access to better technologies such as AI, establishment of improved fodder, and vaccinating cows against East Coast fever

(ECF) which was a real danger before KCDMS intervened. Cooperatives and processors have access to a steady supply of quality milk that they pasteurize and produce various value-added products; hence, meeting consumers' varied dairy needs.

- KCDMS facilitated breeding infrastructure development and promotion of quality AI services in partnership with county governments. For instance, GenePlus worked with 12 AI-equipped business centers and trained the AI providers in Western and Nyanza Regions, leading to improved access to quality genetics and efficient distribution of genetic material. Note that although this started well, delivery was not as expected. Some AI service providers had to change semen sources due to a delayed supply from GenePlus. Regardless, the infrastructure put in place has enabled more players to supply their genetics. For example, ABS also distributes through the same AI centers and some service providers source from other semen suppliers like the Agricultural Development Corporation (ADC)Kitale.
- Through BDS services, many cooperatives have reported improved operations at the management level. Cooperatives are now able to keep better records and earn trust from member farmers; write good proposals to access grants and loans for expansion; access better markets for their products; and get proper certification and approval from the Kenya Dairy Board (KDB), public health departments and county governments.
- Cooperatives like Osiepe Dairy Cooperative Society reported that they are empowering farmers to adopt new technologies aimed at improved dairy productivity. The goal is to see farmers access services through the cooperative, such as cheaper loans, subsidized fodder seeds, access to cheaper hay, and other services, that the cooperative can offer. This is expected to continue even after KCDMS' exit.

## Cooperation

### *Moderate resilience*

- The majority of producers and petty traders belong to a professional group: approximately half belonged to a savings or credit group, such as a VSLA or Savings and Internal Lending Communities (SILC). An overlapping third belong to farmers' groups, cooperatives or field schools. In Western, 54 percent belonged to self-help groups.
- Non-producers were also, generally, involved in groups or associations, with percentages somewhat higher in Nyanza—about half of businesses belonged to a trade or business association.
- There are fairly robust levels of cooperation between businesses, indicating a high number of initiatives or joint partnerships. Only about one-fifth of businesses did not engage in joint initiatives or partnerships with other businesses.
- The majority of respondents were motivated to help their suppliers and service providers address problems or concerns and approximately 40 percent have actually provided support. Assisting with access to a steady supply of seeds during droughts, training farmers in drought-resistant farming methods, and assisting with access to extension services were the most commonly reported.
- Market actors have multiple types of platforms they use to work together to address problems. In Western, focus group respondents emphasized the way cooperatives and cooperative unions enable market actors to address problems. In Nyanza, smallholder focus group participants indicated that cooperatives are weak, and many farmers do not belong to cooperatives.
- There are low levels of collusion in Nyanza and Western, in large part due to the government, especially the KDB's activity in preventing collusion and addressing complaints raised regarding unfair practices.
- Businesses in Nyanza objected to the influence of illegal milk hawkers on prices, while businesses in Western perceived [redacted] price-setting behavior to be monopolistic.

**Evaluation Results – FY21**

- Findings showed that KCDMS facilitated and enhanced cooperation among cooperatives and other stakeholders for improved services to their farmer members. Cooperatives currently either own or collaborate with agro-vets to provide correct drugs and timely services. More recently, they have hired dairy farmer assistants, or contracted external extension workers, to provide timely and quality extension services.
- Cooperatives coordinate with government and private sector AI and animal health providers for AI services, vaccinations, and treatment, while the government provides subsidies during and after shocks. Some

cooperatives, like Osiepe Dairy Co-op Society, reported having started agro-vet stores in their neighborhood to ease access to affordable drugs, improved fodder seeds, and other farm inputs to farmers.

- KCDMS, in collaboration with other dairy VC actors (i.e., Ministry of Agriculture, county governments, and ILRI) trained dairy farm assistants (DFAs) to offer AI, vet services, and farm advice at subsidized prices. Each of these actors offer their services to farmers at a level playing field. These DFAs are only a call away, making dairy farming easier and more affordable for most small-scale farmers.
- KCDMS, through partnerships with cooperatives, AI service providers, county governments, and other private actors, offer AI services at a subsidized price. These partners also convene agricultural meetings, seminars and shows where farmers are sensitized about the technologies.

### Competition

***Low resilience***

- The dairy market is generally open and competitive. The government provides adequate regulation, especially for the more commercialized sectors, such as input suppliers and agro-vet providers. However, value-driven competition is not as common between farmers and cooperatives. Respondents believed that the sale of milk from other counties undermines the growth of the sector because the price is lower due to the commercial scale of milk production in northern counties.
- Compliance with grades and standards is encouraged through training and penalties, such as business closure, fines, and arrests. Larger businesses are more aware of standards and more compliant than smaller businesses.
- 35 percent of businesses in Nyanza Region and 26 percent in Western frequently enter agreements with their suppliers/brokers and buyers. A majority of businesses reported either that the uncertainty of the situation or lack of adherence generally discouraged them from forming business agreements.
- Levels of trust are low in both regions, with 74 percent in Western and 56 percent in Nyanza reporting that customers generally hesitate to trust businesses to treat them fairly.
- A higher percentage in Western (61 percent) reported that the number of new market entrants in their industry was increasing compared to Nyanza (48 percent). Further, only 22 percent of businesses in Western reported a decrease in new market entrants, compared to 34 percent in Nyanza.
- Perceptions regarding entrepreneurship in the dairy sector are largely positive, aside from production, especially for input suppliers, middlepersons, and transporters. However, in Nyanza, dairy farming is generally viewed as a traditional activity, which contrasts Western where the adoption of new breeds has enabled dairy farming to become more commercial.

**Evaluation Results – FY21**

- Results showed that the project fostered healthy competition. KCDMS facilitated a collaborative and transparent culture in the dairy VC through B2B activities. This led to a positive working relationship among the different players in the counties, who even came up with joint work plans and shared information through WhatsApp. This open exchange of information has helped to avoid duplication of efforts by different players in the same region. For example, Migori, Nuru, and Nyarkadera county governments, Advantage Crop, and other players are in one WhatsApp group where they exchange information that would previously have been difficult to share.

### Power dynamics

***Low resilience***

- Cooperatives are the primary form of representation and collective efforts for actors in the dairy sector; however, representation is inconsistent across different actor types and many smallholders are too small to be eligible for membership.
- Women are well-represented in cooperatives' membership and leadership, and in cooperative associations. Women take an active role mobilizing members and managing relationships, supervising milk collection and quality assurance, and calling for meetings.

- Government influences the dairy sector through policies, regulations (including quality standards, certification, and setting a minimum price for milk), development planning, provisions of extension services, inputs and equipment, infrastructure services, and grants to cooperatives.
- Lack of financial resources, human resources, political interests, and corruption undermine government influence. There is substantial unmet demand for government services.
- The private sector has limited influence in the market as private sector actors focus on demand generation and profit maximization. Overall, the limited degree of market development circumscribes private sector investment.
- The private sector is stronger in Western compared to the less commercialized Nyanza, and the quality and efficiency of private sector services contribute to overall market function. However, the presence of a large-scale milk processor in Nyanza leads to undue influence on milk prices.
- Under the devolved government, local government agencies consistently hold policy review meetings that are open to all. Cooperatives and relevant stakeholders are invited to policy review meetings; however, participation rates are low for persons beyond cooperative representatives.

**Evaluation Results – FY21**

- The county governments have continued to involve dairy market actors in policy formulation and agricultural-related decisions, giving the actors confidence in the market. Actors like cooperatives and processors have reported being invited for public-private dialogues by counties to deliberate on agribusiness matters. Consequently, actors have confidence in the efforts county governments are making to ensure that there is transparency among stakeholders. They have agreed to continue to work together to formulate and improve the policies that govern agribusiness.
- Although the county governments' investment in subsidizing AI provision is a positive gesture toward improving the quality of breeds, it is usually inconsistent and politically driven. Consequently, the private sector is disincentivized from investing in more stable and sustainable AI offerings.
- The government has put a cap on the amount of money that cooperatives can deduct from farmers. This limits cooperatives, as they have no ability to negotiate against such directives.
- The project facilitated fora where county government and other actors, such as cooperatives, could take part in policy formulation and decision-making related to agriculture. This has greatly improved confidence among stakeholders. Notably, dairy cooperatives have representatives in the newly created Kisumu County Dairy Development Corporation.
- The government has set up minimum milk pricing at $0.22 (33 Kenyan shillings [KES]) per liter. Processors can no longer dictate the amount to pay farmers, as was happening before.

### Rule of law

#### *Low resilience*

- Cooperatives provide dispute resolution services for members, following internal rules and bylaws. Government bodies responsible for cooperatives have a role in settling disputes between cooperatives and guiding cooperatives in dispute resolution. The local administration, including the village elders and chiefs, is often the mechanism used by non-members.
- Marginalized groups may not receive equal treatment in dispute resolution. Women tend to be at a disadvantage, along with ethnic minorities, who instead may turn to arbitration or higher courts. Finally, businesses with low capital are at a disadvantage due to lack of influence.
- Respondents in Nyanza reported few or no disputes occurring, and satisfactory resolution of most or all disputes. In contrast, disputes were more common in Western and satisfaction with dispute resolution was much lower; 63 percent indicated only some disputes were settled fairly.
- Perceptions of fairness vary widely, with 53 percent in Nyanza reporting that regulations were enforced impartially, compared to only 22 percent in Western. In Western, the majority of actors believed exceptions were made based on bribes, or business owner wealth, influence, and social status.

- Awareness of laws and regulations is high, with the vast majority of respondents feeling informed about new regulations affecting their businesses. However, 49 percent in Western and 62 percent in Nyanza reported that they rarely or never interacted with county government officials.
- Taxation is very high, with detrimental effects on sector profitability and competitiveness. The high taxes discourage new market entrants and undermine attempts to commercialize the sector. Entities at the county and national levels compete with each other to collect more taxes.

### Diversity

#### *Moderate resilience*

- A slight majority of businesses (55 percent) have only one channel (e.g., source or market) for most products and services. However, 79 percent in Western and 67 percent in Nyanza were confident in their ability to access alternative channels in case of a shock.
- 43 percent of businesses in Nyanza and 53 percent in Western had business arrangements with companies using innovative models in the last year, with the most common being a business offering a previously unavailable service followed by businesses offering services via digital means.
- Businesses in Western were more likely to have multiple types of innovative business arrangements compared to Nyanza Region, with a quarter of respondents also having agreements with businesses bundling services/products in a new way and using a previously unavailable franchise model.
- Less than half of businesses had at least one transaction with a start-up business in the last year. Thirty percent had interacted with start-ups once or twice in the last year. Concerns about interacting with start-ups centered on greater risk and less predictability.
- Respondents provided multiple examples of taking risks to diversify their business activities or products in response to shocks, including COVID-19 and drought. Examples included venturing into value addition for dairy products, feed milling, and fodder storage.
- In Nyanza, access to specialized services was offered primarily through cooperatives, which is a disadvantage due to the high number of smallholders who are not cooperative members or aware of those services. In Western, most actors have access to specialized services.
- Regarding women's involvement in a diverse set of business activities, men dominate most activities, apart from milk selling, which is a relatively low value and low capital activity. The greatest obstacle to women's advancement relates to access to finance.

**Evaluation Results – FY21**

- The project facilitated market actors to diversify products in the dairy VC. To achieve that, KCDMS co-invested with cooperatives and other firms in the acquisition of equipment that have enabled expanded production, increased marketable quantities, and access to wider markets. For example, Nuru Social Enterprise has been able to diversify its product range and distribution channels, selling more to supermarkets as a result of having fridges and milk ATMs to store milk products within these supermarkets. They have also expanded their milk supplier base and maintained a consistent supply, even during COVID-19 lockdown. Similarly, Lenack Ltd., a processor focused on value addition to make yogurt, has diversified to other VCs, such as making mixed fruit juice and fruits to generate additional income and mitigate against shocks.
- The project also facilitated market actors to implement social inclusion by deliberately co-investing with grant partners who had opportunities for the inclusion of youth and women in their activities. For example, Lenack Ltd. is wholly owned and run by two youth directors. Lengo is working with youth to offer artisan services to farmers in the construction of dairy cow sheds, while Nuru Social Enterprise and Borderless Dairies are engaging youth to deliver milk using boda bodas. This is due to the flexible nature of motorcycles to get to the interior parts of villages where some farmers are, and to quickly get milk to chilling points. This has created more employment for youth.
- Farmers are accessing multiple and improved markets to sell their increased volumes of milk and other value-added dairy products throughout the year. For example, Sirikwa Dairy reported that thanks to the networks established by the project, they always have a market for their milk—even in times of excess supply in the region.
- Dairy farmers in cooperatives have adopted technologies offered through KCDMS partners, leading to sustainable dairy farming throughout the year. A farmer in Osiepe Co-op has not only adopted technologies

like AI and improved fodder production like other cooperative members, but she has also taken to value addition at the farm level, producing yogurt and mala (fermented milk).

- Farmers, cooperatives, and processors have reported linkages to more markets for both raw and processed milk, necessitated by increased volumes of milk and milk products.

### Connectivity

***Low resilience***

- Access to informal loans was low in both Western (30 percent) and Nyanza (34 percent). Respondents in Western were more likely to access loans through VSLAs, SILCs, and rotating savings and credit associations (ROSCAs) compared to Nyanza. Only 20 percent of respondents in Nyanza accessed loans from friends and family.
- Only just under 40 percent of respondents applied for a loan through a formal channel. Respondents in Western more commonly applied for M-PESA loans and loans through MFIs. Banks and SACCOs were commonly cited in both Western and Nyanza. Of those who applied, 94 percent in Western and 78 percent in Nyanza received their full requested loan amount.
- Although approximately half of businesses that did not apply for a loan reported that they did not need one, 11 percent in Nyanza and 23 percent in Western were unable to apply for a loan because their business was not doing well. Twenty-two percent in Nyanza and 12 percent in Western believed a loan was too risky.
- In contrast to their responses on most other questions regarding the commercialization of the sector, respondents in Western were less likely to have businesses relationships outside of their friend and family networks compared to Nyanza.
- Most respondents made new business connections from existing non-family or friend networks. Access to finance and renegotiated credit terms were reported by smaller percentage.
- Insurance is not used in either Nyanza or Western, except in isolated cases. There is limited knowledge among smallholders about how insurance works. Smallholders and collection centers desire training on the insurance process and whether or not their cows are worth insuring.
- Respondents in Nyanza emphasize linkages cooperatives facilitate between producers and input suppliers, agro-vets, and AI service providers, whereas in Western, respondents place emphasis on end-market-related linkages to consumers. Trainings provided by government bodies and NGOs serve as platforms for interaction with other cooperatives and farmers.

**Evaluation Results – FY21**

- KCDMS facilitated several linkages among market actors that yielded more commodity transactions.
- For instance, KCDMS facilitated a connection between large milk processors who were not getting enough supplies from the counties, and farmer cooperatives who did not have consistent buyers, i.e., between Naitiri Dairies and Daima Milk processors. Further, cooperatives are linking their farmers with microfinance institutions and other service providers during farmer seminars and barazas. Farmers are then taught how they can access and manage finances to expand their dairy businesses, including buying fodder seeds, paying for AI and vet services, and so on.
- KCDMS assisted Nuru Social Enterprises Ltd. to access a $6,531 (KES 1 million) bridging credit facility from Equity Bank Migori branch, for the purchase of 67 refrigerator units as part of cost share to support their milk distribution and display at various market outlets across the Kenya's Western Region.

## 3.2 Shock exposure, response, and recovery

### Shock exposure and recovery

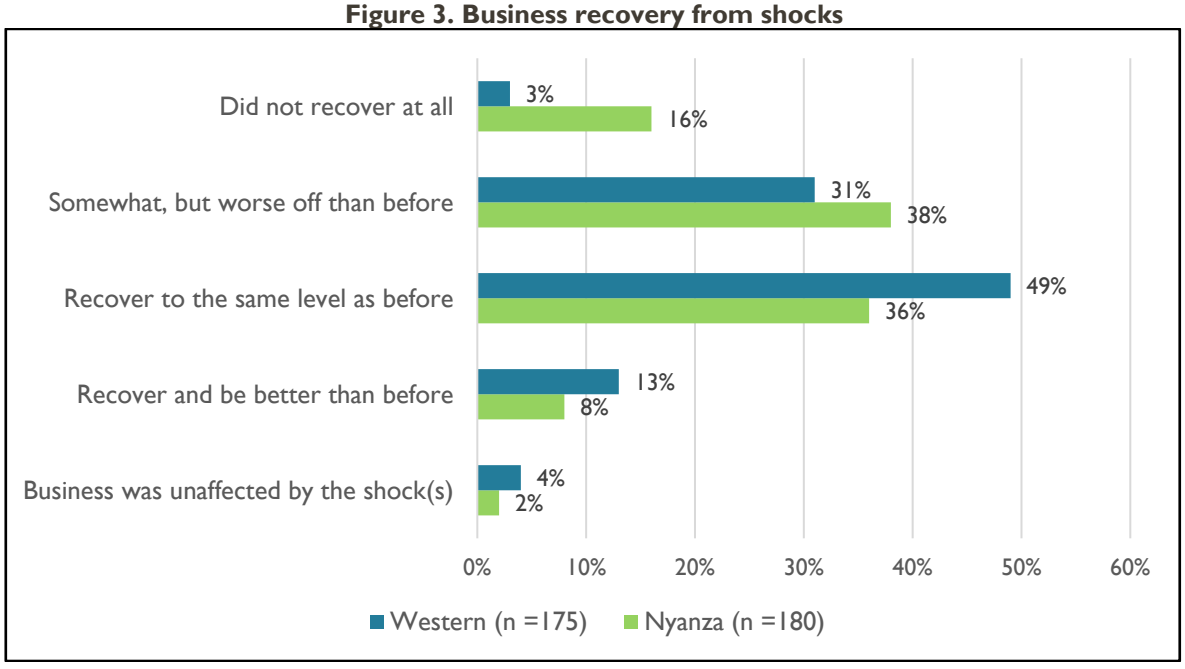
Respondents in both regions faced similar shocks (**Table 2**). The most significant was the shutdown of markets and distribution systems due to COVID-19, reported by 83 percent of respondents in Western and 72 percent in Nyanza. This was closely followed by price fluctuations, livestock diseases, and droughts affecting fodder production in both regions. Even though both regions faced similar shocks, a higher percentage of respondents in Western reported being affected by these shocks.

**Table 2. Shocks and disturbances faced in the market (multiple selection question)**

| | Nyanza Region (n = 180) | Western Region (n = 175) |
|---|---|---|
| Distribution and local market shut down due to COVID-19 | 72% | 83% |
| Significant unpredictable price fluctuations in the market | 69% | 68% |
| Livestock diseases that resulted in farmers incurring additional costs for treatment and severe cases of death for livestock | 55% | 66% |
| Droughts that result in reduced fodder for the livestock | 50% | 67% |
| Political and development partner-driven distortions, e.g., subsidies that often crowd out private sector investment in the dairy sector | 14% | 26% |
| Smaller dairies being undercut or bought out by larger milk processors that wield monopolistic power | 21% | 36% |

The greatest percentage of businesses (49 percent) in Western reported recovering to the same level as before the reported shock, compared to 36 percent in Nyanza. In Nyanza, 38 percent reported they were worse off than before (compared to 31 percent in Western). Sixteen percent in Nyanza reported not having recovered at all, while 13 percent in Western reported recovering and doing better than before (**Figure 3**).

**Figure 3. Business recovery from shocks**



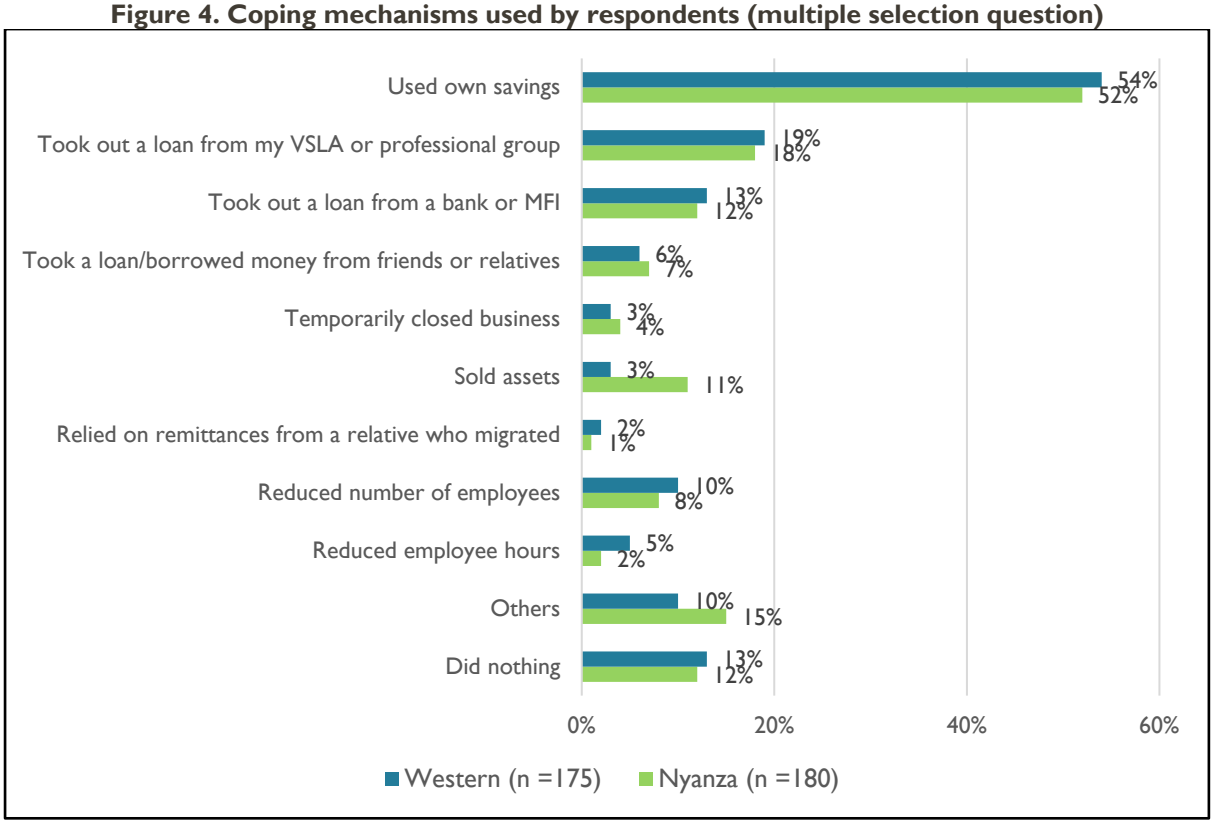

Producers reported robust levels of confidence in their support networks, including friends, relatives, savings groups, and VSLAs, to support their recovery in case of future shocks in the coming year, although this was substantially greater in Western (60 percent) than Nyanza (42 percent). However, less than 10 percent were very confident in their support networks. Businesses were similarly confident in their risk management systems, including

their ability to rely on savings, insurance, or renegotiate credit terms to recover: 52 percent in Western and 45 percent in Nyanza were confident, while 11 percent in Nyanza were very confident compared to none in Western.

### Coping and adapting mechanisms

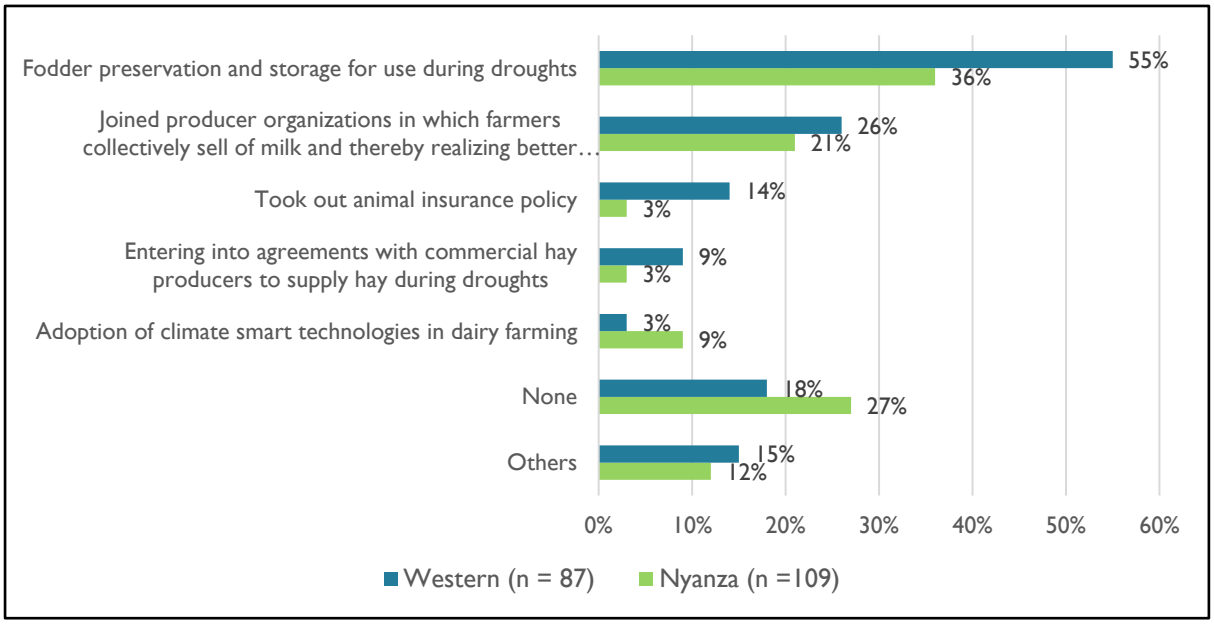
Regarding coping mechanisms, just over 50 percent of businesses used their own savings. A small overlapping percentage took a loan from their VSLA or professional group (approximately 20 percent), while approximately 10 percent were able to get a loan from a bank or MFI. Less than 10 percent turned to friends or relatives for loans; in Western only 3 percent resorted to selling assets, compared to 11 percent in Nyanza. Regarding labor impacts of coping strategies, approximately 10 percent let employees go to cope with shocks, while only a small percentage in each region reduced employee hours (arguably a more effective long-run strategy, when feasible). See **Figure 4**.

**Figure 4. Coping mechanisms used by respondents (multiple selection question)**



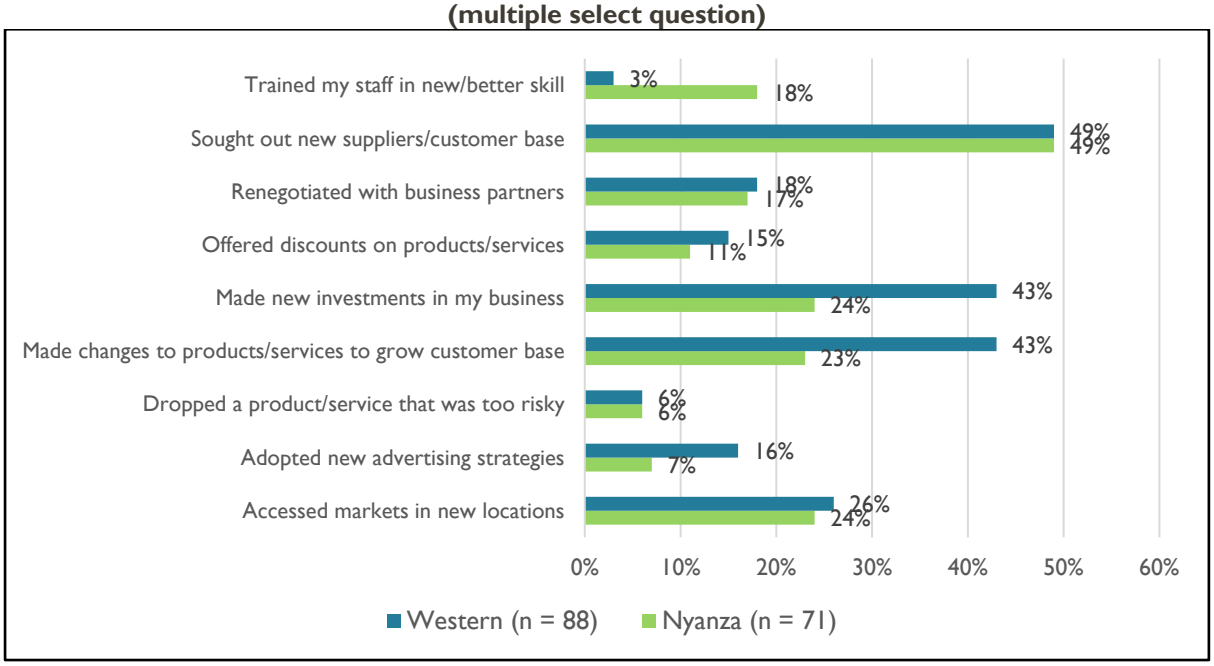

The survey also asked respondents what adaptive strategies they had used in the past year to prepare for shocks (**Figure 5**). For producers, fodder preservation and storage for use during drought was the most common adaptive strategy, which was reported by 55 percent in Western and 36 percent in Nyanza. The second most common strategy was joining producer organization to collectively sell milk. A notable 27 percent of producers in Nyanza had not followed any adaptive strategies, compared to 18 percent in Western. Overall, respondents in Western reported uptake of more adaptive strategies compared to Nyanza.

**Figure 5. Adaptive strategies used to prepare for shocks in the past one year (producers and petty traders) (multiple select question)**




Non-producers reported using a greater number of adaptive strategies in higher percentages, compared to producers, although, again, uptake was higher in Western compared to Nyanza (**Figure 6**). Seeking out a new supplier/customer base was the most commonly reported (49 percent), while 43 percent in Western also made new investments in their business and changes to producers or services to grow their customer base. Roughly a quarter of respondents accessed markets in new locations and 18 percent in Nyanza trained their staff in new or better skills, while 16 percent in Western adopted new advertising strategies.

**Figure 6. Adaptive strategies used to prepare for shocks in the past one year (non-producers) (multiple select question)**




### Key resilience domains for business recovery

Strengths in the domain of **diversity** are evidenced in the adaptive strategies businesses used to address shocks. For instance, almost half of businesses sought out new suppliers and a customer base, while a quarter of businesses accessed markets in new locations. KCDMS has invested substantially in B2B linkages, which have resulted in strong networks and diverse business opportunities, driving recovery, as observed in two-thirds of businesses in

Western and a little under half in Nyanza. Strengths in Western, in particular, illustrate customer service orientation related to making changes to product services, and investment in fodder preservation for use during droughts, an indication of strengths in the domain of **business strategy**. However, the hesitation to accept a loss in profits to retain customers is reflected in the low percentages of businesses offering discounts.

The ability to make new investments is also an indication of using reliable information to inform business innovation, an indication of strengths in the domain of **evidence-based decision-making.** However, the source of that investment remains problematic, due to low levels of access to formal and even informal loans, as reflected in a weak level of **connectivity**. Although overall levels of loan applications are roughly the same (about one-third of respondents) in both Western and Nyanza, the sources of those loans vary. In Western, respondents reported accessing multiple sources of loans, with greater uptake of M-pesa and MFI loans in Western compared to Nyanza, and greater access to loans from VSLAs/SILCs and ROSCAs. In Nyanza, more respondents replied on family and friends for loans. Respondents in Western also reported greater uptake of animal insurance policies (though still nascent). Based on the greater ability to make investments in businesses during shocks observed in Western, M-pesa, MFIs, VSLA/SILCs, and ROSCAs appear to be important to improving access to finance for businesses during hard times and may also facilitate the practicability of insurance.

Weaknesses in the domain of **power dynamics** underscore the struggles market actors still face to address shocks. In turn, such weaknesses create obstacles in addressing weaknesses in the areas of **rule of law**, such as taxation, and **competition**, such as poor trust and uncertainty in market outlook. As a result, we see low levels of adaptive mechanisms, such as difficulty accepting reduced profits (due at least in part to burdensome taxes) and renegotiating with business partners, due in part to widespread avoidance of making agreements to begin with. However, KCDMS achievements in the area of cooperative membership have contributed to strengths in the area of **cooperation**, as reflected in roughly a quarter of producers selling milk through producer groups to obtain better prices despite shocks. However, progress is needed to move the sector toward widespread participation in cooperatives.

Close analysis of the data failed to reveal clear trends indicating greater resilience in any particular domain of the Western dairy market system. However, recovery is evidently stronger in Western. In addition, the adaptive strategies of producers and non-producers indicate greater ability to undertake new investments in Western in (a) investment in fodder preservation and storage; (b) investments in business activities more generally; and (c) the ability to make changes to products and services, which requires up-front investment of time, if not money too. Recovery was also achieved by a substantially larger percentage of businesses in Western and Nyanza. Without attempting a more comprehensive comparison of the two regions, it is also worth noting that the presence of a large anchor firm, such as Brookside, can often drive market growth and progress toward commercialization.

It is critical for programs like KCDMS to take a crowding-in approach, avoiding giving Brookside greater dominance in the market while still leveraging its presence to attract investments in new and expanded business activities and financial service provision. In Nyanza, results were weaker, corresponding to qualitative results that show the sector is still perceived as traditional rather than commercial, which has discouraged uptake of improved practices and unwillingness to take risks in response to shocks. However, KCDMS interventions have managed to achieve significant shifts in Nyanza, as indicated in the outcome harvesting evaluation, by taking an ecosystem approach that engages a range of actors simultaneously to crowd-in investments and encourage risk-taking.

On the whole, a third of businesses in Western and more than half of businesses in Nyanza had not recovered from the shocks they faced. Weaknesses persist in three of the four structural domains, corresponding to weaknesses in competition, which are closely linked to factors under power dynamics and rule of law. Improvements in the domains that are still very weak will be critical to driving continued resilience in business strategy, evidence-based decision-making, cooperation, and diversity. The substantial investments KCDMS has made in the policy framework guiding the sector are meant to target these domains. However, structural domains generally shift slowly over time and policy changes may take several more years before achieving genuine changes in the norms, rules, and power relations that characterize the dairy market system. In the meantime, rapid gains in areas more within the control of businesses and the quality of their networks can be expected to continue to improve resilience and business recovery. The trend of improvements is reflected in the level of confidence of producers and businesses that their support networks and risk management systems will enable them to recover from new shocks occurring in the year ahead.

## 3.3 Applying learning to programming

Results from the midterm MSR assessment and outcome harvesting evaluations contributed to review of the resilience theories of change and adapted programming for the remaining years of the project. This section summarizes the outstanding weaknesses for each domain identified during the MSR assessment, the actions taken to address the weaknesses, and the results from those adaptations. Results are based on project monitoring and evaluation data. The resilience theories of change (see Annex 1) are structured by market function, including availability of dairy at stable prices, access to productive inputs and services, and income from sale of dairy products.

### Evidence-based decision-making

Progress in terms of equitable access to early warning information will be key for producers to successfully raise their own fodder using drought-resistant methods. Due to the occurrence of drought in the region, access to fodder is an important coping mechanism that is improving the resilience of the dairy market system. Businesses in Nyanza were less likely to report having access to digital warning information compared to Western and also more likely to believe that higher capital actors had better access than they do. Greater access to digital warning information for actors across the VC in Western correlated to substantially higher rates of fodder preservation and storage for use during droughts compared to Nyanza, resulting in better recovery rates.

> ***Adaptation (Market Function 2 – Dairy farmers and other dairy VC actors access productive inputs/services to prepare for, absorb, and recover from shocks):*** Fodder and Pasture Society of Kenya (FPSK), with a membership of 400, established an online fodder trading system and an organizational website using KCDMS support with the objective of operationalizing an electronic marketplace driven by web technologies. This system will make information more readily available to a broad array of actors and level the playing field for new competitors, provided business owners and employees are comfortable navigating the platform.

### Business strategy

Results showed only 55% of actors occasionally prioritize the value to customers over profit, indicating strides are needed in regard to planning to offset price shocks rather than passing them to customers. This is particularly a concern when it comes to the ability of agro-dealers to reliably provide quality inputs at accessible prices even during shocks. For instance, in the case of a disease outbreak, it will be important for private sector animal health providers to access the vet drugs needed to effectively treat and prevent the spread of animal diseases.

> ***Adaptation (Market Function 2 – Dairy farmers and other dairy VC actors access productive inputs/services to prepare for, absorb, and recover from shocks):*** KCDMS partnered with Kenya Dairy Farmers Federation (KDFF)to increase the uptake of ECF vaccines to address disease that were killing animals. Four business centers were established to support veterinarians by bundling feed supply with vaccinations, alongside other products, to also increase the availability of feed. At the time of writing, 36.7 tons of animal feed had been sold through agro-dealer host business centers in Western Kenya. Further, cooperatives had more than 2,000 cows vaccinated, while agro-vets saw business growth with a 24 percent increase in their client base and up to 26 percent increase in revenue in the two preceding years. Taken together, the client centricity and willingness to try new products and strategies, led to greater availability of vaccinations and feed to help producers mitigate the effects of shocks.

### Cooperation

Results indicated cooperatives are weak in some cases and fail to effectively represent and address the needs of their members. Only about one-third of producers and petty traders reported belonging to either a farmer cooperative, farmer/trader group, or field school. Buyer-to-farmer relationships, and willingness to invest in suppliers, are critical for the resilience of the market system to shocks, such as drought. In case of shocks, we expect to see buyers adjust the terms of contracts to enable suppliers to recover from the effects of the drought. The strength of the relationship prior to the shock is important for building the trust and sense of shared gain that can smooth the way for flexibility in response to the shock. Further, investment in suppliers is key for shock preparedness, such as adoption of improved feeding practices that enable producers to adapt to climate change, etc.

> ***Adaptation (Market Function 3 – Actors in the dairy VC generate income from sale of milk and related products during and after a shock/stress):*** To address the problem of smallholder farmers selling through informal channels, which offer little in the way of

relationships with suppliers and undermine aggregation, KCDMS supported aggregation and market models that enable sustained buyer engagements. To achieve this, KCDMS equipped aggregators with the negotiation skills needed to execute flexible, mutually agreeable contract frameworks that simultaneously address buyer demands. KCDMS further partnered with grantees and non-grantees to improve the base of business formalization so that buyers and farmers are investing in improved supply chain practices that lead to higher profitability.

For example, KCDMS facilitated linkages, resulting in dairy cooperatives entering formal contracts with milk processors for supply of raw milk. Partnerships included a dairy processor with a capacity of 250,000 liters of milk per day entering a private equity partnership with a Uganda-based processing company. A second dairy cooperative secured a supply contract with a dairy in Mombasa and is now selling 400 liters daily at $0.33 (KES 50) per liter. Finally, another dairy cooperative entered a milk supply and chilling contract with Brookside Dairies, which has enabled the dairy to improve its support to suppliers.

### Competition

*None aligned with endline results. These correspond to results under power dynamics.*

### Power dynamics

For the market systems to be resilient enough for cooperatives and regulatory authorities to prevent large dairies from buying out small ones during a shock, we need to see a more active civil society, producer organizations and trade associations with advocacy agendas, and both vertical and horizontal linkages. Results showed substantial weakness in this regard. Areas of concern include the misuse of government resources that undermine, rather than strengthen, the development of the sector, and lack of mechanisms to urge equity and responsive services. In the case of a shock, inequities and unresponsiveness could worsen, further aggravating the negative effects caused by the shock. Stakeholder participation in development and review of policies is a key avenue for market actors to address the challenges they face. However, low rates of participation and lack of mechanisms for engaging those who do not belong to cooperatives circumscribe participation in policy-making.

***Adaptation (Market Function 3 – Actors in the dairy VC generate income from sale of milk and related products during and after a shock/stress):*** The issue of political appointees for cooperative leadership and favoritism in allocating government resources is a major constraint in Kenya. KCDMS helped address this vulnerability by supporting county cooperative bills and regulations to guide the cooperative movement's development and implementation, including the allocation and utilization of public funds. Overcoming the politicization of appointments and allocations is expected to increase market orientation of the sector, as well as directing funds where they are most needed and ensuring resources are well utilized. Further, greater transparency, accountability, and stronger leadership will equip cooperatives to continuously address shocks and stresses.

To address the limited voice of the private sector in government decision-making, KCDMS issued a grant to the Agriculture Sector Network (ASNET) to pilot establishing county-level ASNETs to improve coordination of private sector actors for more effective advocacy for sector issues and enhance the voice and space of the private sector through effective policy dialogue with the government. ASNET facilitated public-private dialogues to discuss the key challenges affecting the private sector, including the high cost of running businesses, significant number of required licenses, high taxes and levies, extensive electricity and fuel costs, and inadequate participation in policy formation, among other issues.

### Rule of law

Without a strong regulatory capacity, and adequate support from the government to the private sector to compensate for the burdens imposed by taxation, the dairy market system in Nyanza and Western will have difficulty responding to shocks. Results showed that the ability of dairies to obtain licenses and pass inspections rely in part on a strong relationship with county-level government, an understanding of regulations, and expectations that regulations will be enforced in a consistent manner. The regulatory environment, especially the level of interaction with county officials, and perceptions of fairness (in Western in particular), will need to improve for the market to be less vulnerable to arbitrary and sudden enforcement, which interrupts market activities.

*Adaptation (Market Function 3 – Actors in the dairy VC generate income from sale of milk and related products during and after a shock/stress):* KCDMS supported inclusive policy development and institutional capacity to improve the regulatory environment and balance of power in policy design and drafting at the national and county levels. One initiative directly related to the ability of market systems to prepare for and manage shocks is the Livestock Identification, Registration, and Traceability System Regulations, 2020. The livestock regulations provide clear operational guidelines and enforcement of compliance in livestock identification and movement to mitigate and more effectively manage localized conflicts. This is just one of numerous regulations that will provide clear guidance and standards that will—overall—improve the quality and resilience of the market system. In addition, the inclusion of a range of actors in the preparation of the policies will facilitate advocacy for additional support for vulnerable actors who may otherwise struggle to meet the standards or apply the guidance.

### Diversity

Results showed that a slight majority of businesses only have one channel (e.g., source or market) for most products and services; approximately half have not done business with any companies using innovative business models or start-up companies in the preceding 12 months. Challenges reported in Nyanza regarding the availability of specialized services in the market system relate to the failure of cooperatives to have comprehensive membership, as services are only available through cooperatives.

*Adaptation (Market Function 2 – Dairy farmers and other dairy VC actors access productive inputs/services to prepare for, absorb, and recover from shocks):* KCDMS supported agribusinesses to engage ICT firms to create tailored solutions to enterprise challenges. Digitizing supply chains with ICT improves traceability and quality control. Grant and non-grant partners procured ICT solutions outside of KCDMS support, an indication of market change in response to new opportunities. For instance, the technology-enabled distribution company, iProcure, reached 310 agro-dealers and 1,464 farmers who are actively using the platform. Finally, as a result of KCDMS, 56 enterprises were given support to acquire ICT equipment and implement it in theirday-to-day operations. The growth of the ICT sector to provide tailored services for agribusinesses is an indication that the market is realizing the potential in offering specialized services, which can be critical in enabling firms and the market as a whole to respond to shocks and stresses.

FPSK, with 400 members, established an online fodder trading system and an organizational website with the objective of operationalizing an electronic marketplace driven by web technologies. This platform provides an opportunity for producers and suppliers to locate new buyers or fodder sources in case of a shock. Due to the occurrence of drought in the region, access to diverse sources of fodder is an important source of resilience for producers and the market system as a whole.

### Connectivity

Results showed that approximately 60 percent of market actors (including producers and petty traders) did not access loans from any formal channels. Further, approximately 70 percent of businesses did not access loans from informal channels in the preceding year, including family and friends. These results were disappointing, given the importance of flexible contracts and renegotiable credit terms for producers to enable them to maintain market relationships and sell production when hit by shocks. Producers also need access to credit to buy feed during droughts when their eligibility for credit may be further weakened.

*Adaptation (Market Function 1 – Quality dairy products are locally available, with more stable prices, during and after shocks):* Interventions in this last year included technical assistance to 10 financial service providers (FSPs)_ to increase their agricultural lending portfolios. As a result, for example, ECLOF Kenya, an MFI, disbursed [redacted] to 63 dairy farmers in Bungoma County, focusing on climate smart investments. Another example is the Arise and Shine SACCO that launched a dairy product, which disbursed 49 loans [redacted] for the purchase of dairy cows. Another example is Faulu Bank, which established agribusiness hubs in KCDMS counties. In the last year, Faulu reached 5,834 smallholder farmers with agribusiness loans valued at [redacted].

Over the life of the project, 49,986 farmers, individuals, or firms have accessed finance as a result of KCDMS support; 15,190 of those farmers, individuals, or firms accessed finance in 2022. In 2022 alone, the value of the loans was $175,048 (KES 26.8 million). The total value of the loans over the life of the project amounted to $274,330 (KES 42 million). The increase in the number and value of loans disbursed is an indication of increased connectivity in the market as finance underwrites all of the business practices and strategies highlighted in this report. Further, the greater the value of lending available, the greater the capacity of the market system to issue new loans and adjust loan terms in case of shocks.

# 4. Recommendations

### *Evidence-based decision-making*

- KCDMS was successful in engaging ICT firms to create tailored solutions for enterprise challenges that were affordable for small and medium enterprises (SMEs), especially agro-dealers. KCDMS co-invested with the firms to develop custom point of sale systems for specific SME needs—wherever possible, SMEs were supported to adopt off-the-shelf programs, such as iProcure or Mtela. Future programs should build on these successes to engage ICT providers to introduce services that effectively enable SMEs to rapidly prepare for and respond to shocks.
- The cost of ICT equipment, even when subsidized, remains out of reach for most cooperatives. Few farmer groups can afford the $1,958 (KES 300,000) price tag on equipment, including laptops, internet bundles, and custom dairy or traceability management software packages. Future programming should continue to prioritize activities to boost productivity and group earnings to increase purchasing power for more advanced systems. Support may also take the form of developing creditworthiness through sustained business activity, thereby opening opportunities for the groups to access commercial credit products. It is worth exploring off-the-shelf alternatives with no subscription fee or connectivity requirements, since even internet bundles may not be affordable on a consistent basis for some cooperatives. For example, an alternative to improve members' creditworthiness would be to start with a computer with an Excel-based system or QuickBooks for financial management.

### *Business strategy*

- As a result of KCDMS interventions, qualified BDS providers are equipped to provide strategic support tailored to the specific profile of agribusinesses at varying stages of growth and development. Further support should focus on marketing the tailored services they can provide. For example, BDS providers now conduct diagnostic reviews and due diligence for beneficiary farmer groups, cooperatives, and SMEs to ensure adequate capacity and revenue flows are available to sustain upgrades to ICT platforms, etc. Alternative off-the-shelf solutions can be found for nascent organizations or firms until their revenue streams strengthen. Another important service is developing turn-around strategies for agribusiness SMEs when impacted by shocks, such as price shocks or export market interruptions.
- Adapted technologies and strategies to reduce reliance on electricity and other scarce resources present opportunities for micro, small, and medium enterprises to improve resilience. Project support for the transition is critical to cover up-front costs and smooth the risk associated with acquisition of tangible and intangible assets. One example relates to the potential of Power Usage Effectiveness (PUE) technologies to reduce grid consumption by more than 30 percent. Due to ongoing challenges related to business continuity and costs resulting from brownouts and other power interruptions, transitioning to PUE technologies, such as solar water pumps and solar chilling technologies, should be an area of future support.

### *Cooperation*

- Cooperatives are key for procuring inputs and negotiating market alternatives when facing shocks. KCDMS support to cooperatives resulted in increased membership and diversification into new value addition activities that are less vulnerable to shocks. To continue this positive trend, further work is needed to advocate for professionalizing cooperatives, related, in particular, to recruiting and retaining qualified personnel. To combat politicization of cooperative leadership and resource allocation, BDS providers should assist with revisiting budgets and salary allocations, while programs can introduce incentive systems to reward cooperatives for meeting sustainability and profitability targets.

### *Power dynamics*

- Despite substantial progress in increased professionalism of cooperatives and a greater voice for the private sector in government decision-making, many challenges remain that undermine the resilience of the sector. Greater sustained engagement by the private sector and greater responsiveness by the government are key to building on successes achieved through KCDMS support. The pilot with county-level ASNETs facilitated public-private dialogues regarding issues plaguing the sector and should be scaled to more counties, while supporting ASNETs and their government counterparts to cooperate on effective solutions. The success of the 2021 Dairy Industry Pricing Regulations to increase producer incomes through greater sales using official channels indicates the importance of such initiatives for greater inclusion and competitiveness.

  An ongoing stress faced by market actors in the Kenyan context relates to heightened political activities during campaign periods preceding elections. Such activities can interrupt momentum due to fears of insecurity and channel the efforts and focus of top county officials away from market activities. To effectively weather these frequent periods of politicization and interruption to the smooth flow of market activities, associations should engage lower level officials whose positions will not be affected by elections. Developing these relationships over time will help sustain the continuity of advocacy efforts and effective response to emerging threats despite periods of political interruptions. Further, KCDMS has had success with using virtual platforms to sustain momentum for policy and advocacy efforts and facilitate the process. Integrating virtual platforms into mandatory statutory steps will be helpful in sustaining engagement in the future, despite shocks such as COVID-19, insecurity, etc.

### *Diversity*

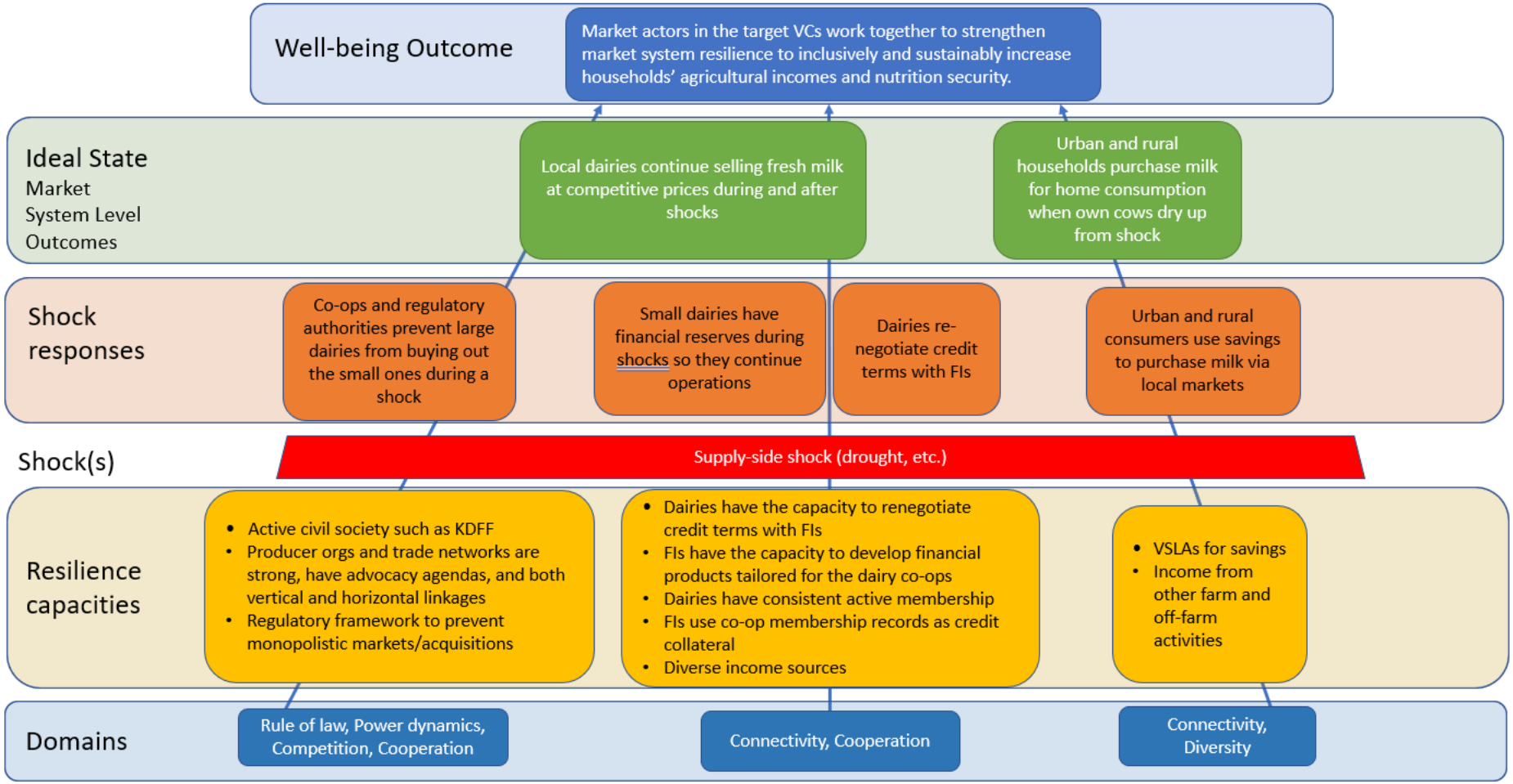
- KCDMS was successful in introducing financing for working capital and assets to improve operations. Future programs should replicate and scale activities related to finance brokerage/linkages for enterprises and collaborating market actors to obtain technologies that improve business' ability to manage their finances better despite shocks. For instance, KCDMS collaborated with FSPs to mobilize and enable investments, such as bank loans to purchase trucks to haul milk and distribute yogurt and a motorbike-based solar-powered milk cooler transport system to help mitigate risks related to road closures. These technologies also enabled processors to collect milk from more remote cooperatives than they would otherwise have reached, thereby helping mitigate the vulnerability of more marginalized producers.
- KCDMS achieved substantial success in attracting youth into the dairy sector to improve the diversity and vitality of the market. Moving forward, projects should strengthen youth-owned microenterprises by building on the following lessons learned in the Kenyan context:
  - Youth need a quick return on investment and prefer investing in high-value activities that involve a short business cycle. They are interested in providing animal health and breeding services in the dairy VC (animal health and breed improvement), herd health protection (animal health assistants and animal insemination technicians) because it earns money that can be used to meet daily needs.
  - Youth have been quick to adopt technology that provides value for time, enabling them to use approaches that are effective on smaller plots of land, which is also climate smart. They are drawn toward activities that use affordable machinery or equipment to minimize labor.
  - Youth prefer accessing money from their village savings and loan groups compared to the formal financial institutions due to minimal borrowing conditions and quick money for investment purposes. After developing a savings culture through the VSLAs, and seeing the benefit of taking small loans, some youths graduated to taking loans from formal finance institutions. However, youth need to be supported to avoid defaulting on loans available through mobile money or other packages, which could affect their credit worthiness.
  - KCDMS recognizes that youth's start-ups and nascent agribusinesses require a lot of support. This includes coaching and mentoring on agribusiness management, how to take calculated risks, proactiveness, competitiveness, and how to address technical challenges that arise when running a business. Mentorship also helps youth see the ability to overcome barriers to entry and sustain operations amid shocks and stresses. Further, awareness raising efforts are needed with youths' parents to avoid a common scenario where parents take over managing activities that prove remunerative.

### *Connectivity*

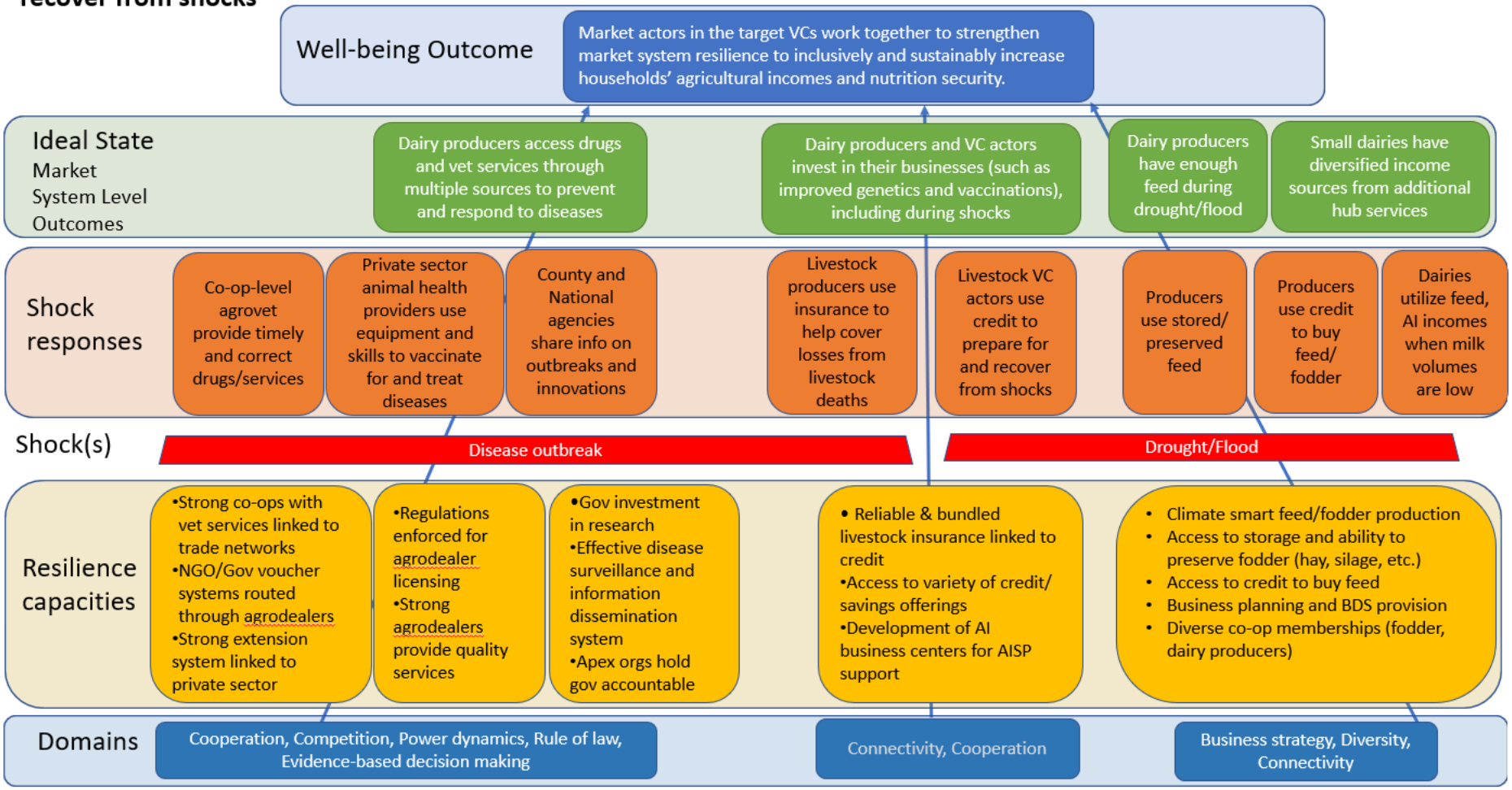
- Taking an ecosystem approach—whereby efforts on the supply side are complemented by demand side activities, as well as addressing the enabling environment—requires patience and commitment but results in the greatest improvement in MSR. For instance, KCDMS supported the provision of different financing mechanisms in tandem with SMEs development of business plans and strong financial management practices and systems, while also ensuring a supportive regulatory environment.
- Through this process, it became clear that different FSPs, farm types, and agribusiness models need to be considered based on factors like agro-ecological context, type of VC, demographic profiles, and FSP capacity to tailor products to each risk profile. KCDMS successfully used a portfolio approach involving diverse financial instruments offered through a range of FSPs, not excluding patient capital from foundations and bank loans, coupled with grants. Working with diverse lenders and investors produced significant results in tackling the array of shocks and risks associated with climate change, uncertainties regarding the export market, etc.
- It is important to build FSPs knowledge of VCs and assessment approaches to pinpoint risks and design specific de-risking instruments. Financial institutions (even small ones) desire credit guarantees schemes for agriculture loans so they can lend more to farmers because of reduced or shared risks, but they are often unsure where to start. KCDMS partnered with a local business school to develop tools financial institutions can use alongside BDS providers to carry out credit scoring based on specific business profiles that use alternate forms of collateral. For instance, one MFI started using the number of export fruit trees to determine the value of finance they could provide.
- Success factors for future programs investing in building the capacity of credit staff on agribusiness financing include high staff retention and fluid staffing approaches to manage uncertainties in the sector. When such conditions were met, KCDMS interventions resulted in substantial new credit outflows for sectors traditionally perceived as high risk.
- Future projects need to expand agriculture insurance offerings and link to financing instruments using an integrated approach and increased cooperative and farmer understanding of insurance mechanisms. There is still a very low supply and uptake of agricultural insurance. KCDMS intended to initiate interventions with the insurance industry, especially those that bundle with credit. However, despite wider engagement of leading insurance companies, only one organization adopted insurance and the results were not as hoped. There is a need for further inquiry into the mechanisms, investments and collaborative approaches that could be viably undertaken due to the importance of insurance in shock-prone operating environments.
- Future projects should also focus on innovative and agile business models to attract long-term finance and mechanisms that help businesses evaluate these new models. We found that despite the shocks arising from COVID-19 and the army worm and locust invasion and flooding in 2019, some businesses continued to access capital. Agile businesses, such as the franchising agro-input model and those who have adopted technology, had higher chances of obtaining external capital.

## Annex 1 – Resilience Theories of Change per Market Function

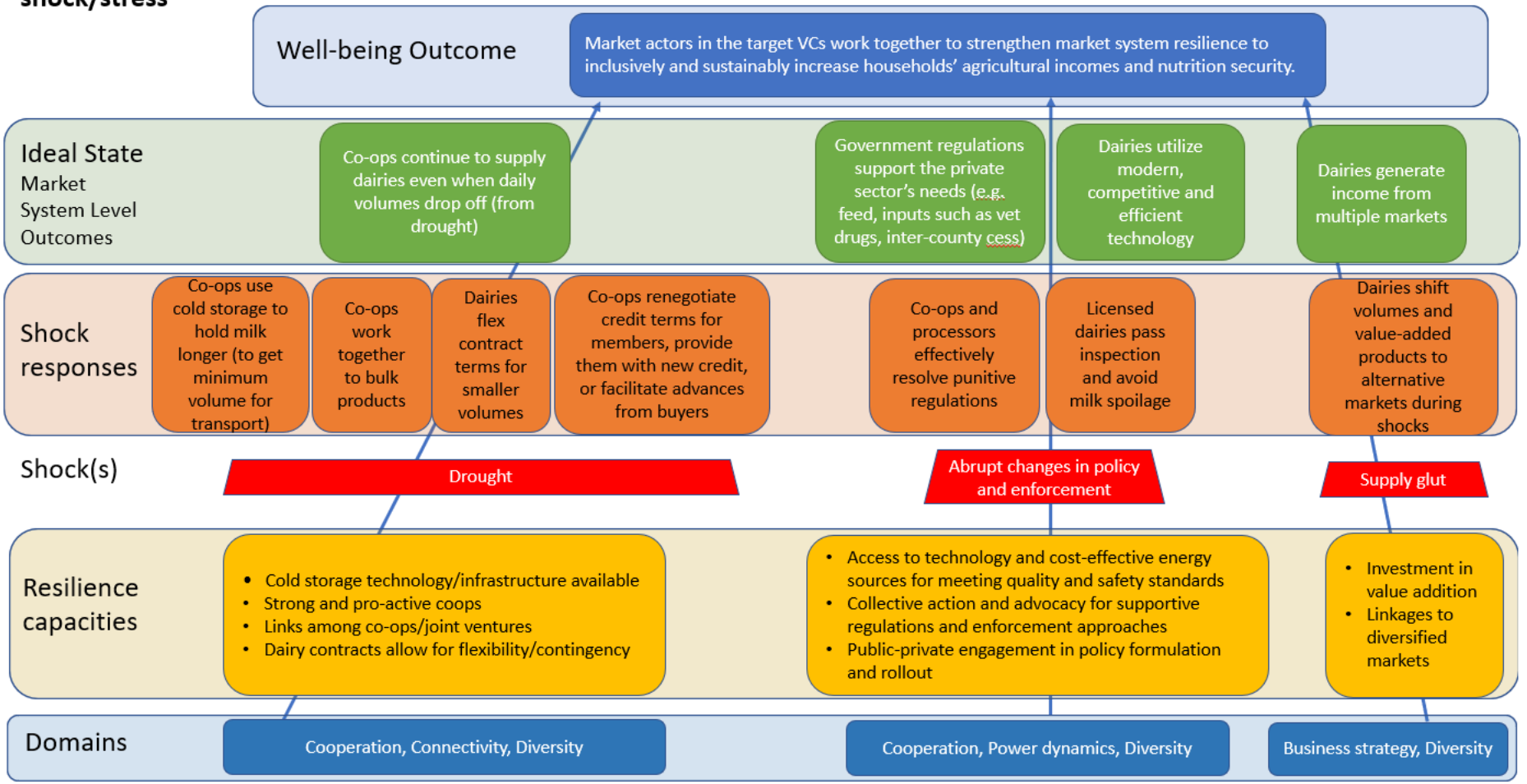
**Market Function 1 – Quality dairy products are locally available, with more stable prices, during and after shocks**



**Market Function 2 – Dairy farmers and other dairy VC actors access productive inputs/services to prepare for, absorb, and recover from shocks**



**Market Function 3 – Actors in the Dairy VC generate income from sale of milk and related products during and after a shock/stress**



# Annex 2 – Charts and Graphs

## Business strategy

**Figure 2-1. Planning horizon for business decisions**

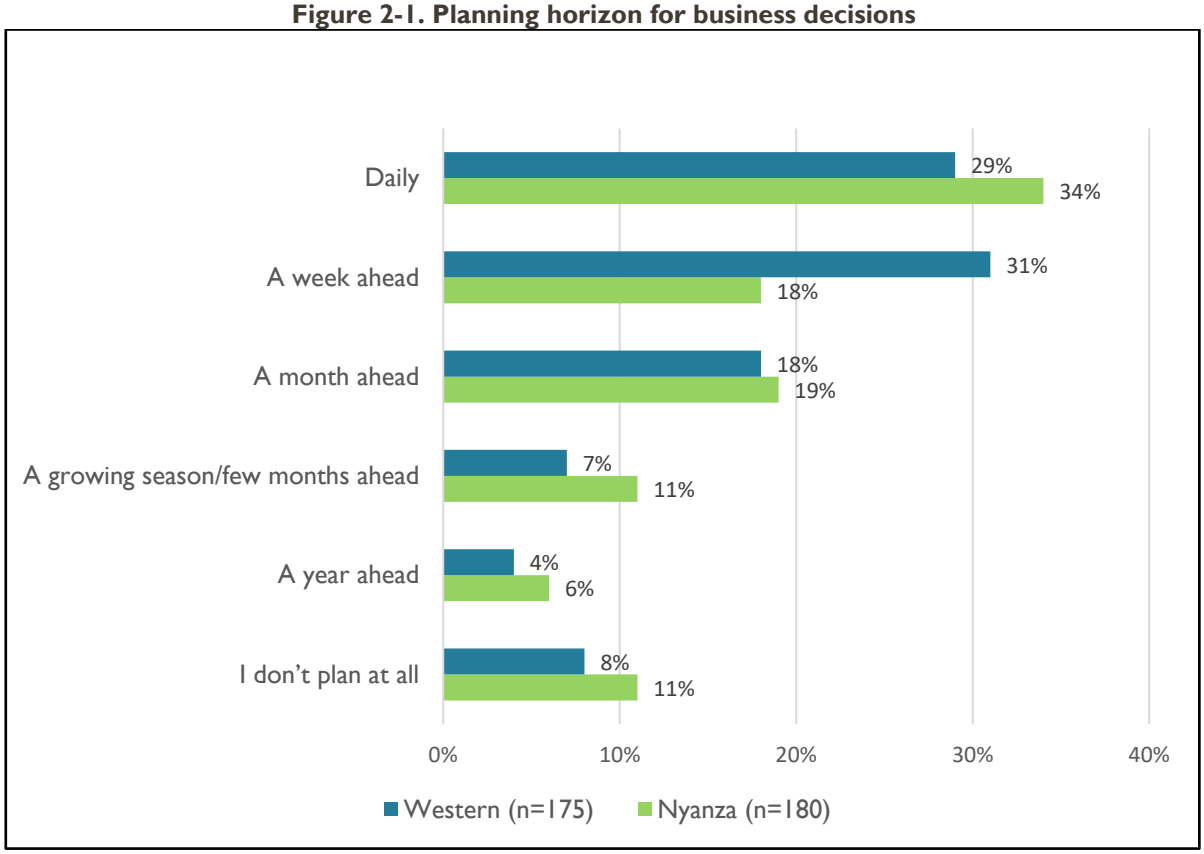



**Figure 2-2. Types of business planning actors partake in (multiple selection question)**

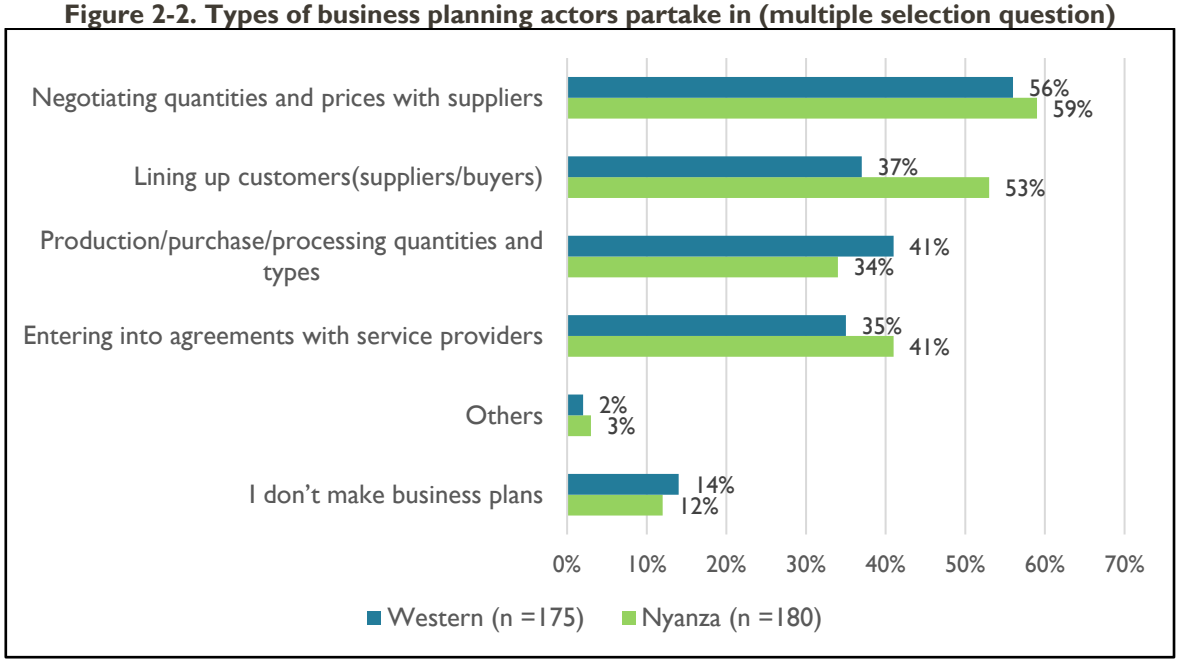


**Figure 2-3. Opportunities provided for staff in the last 12 months (multiple selection question)**

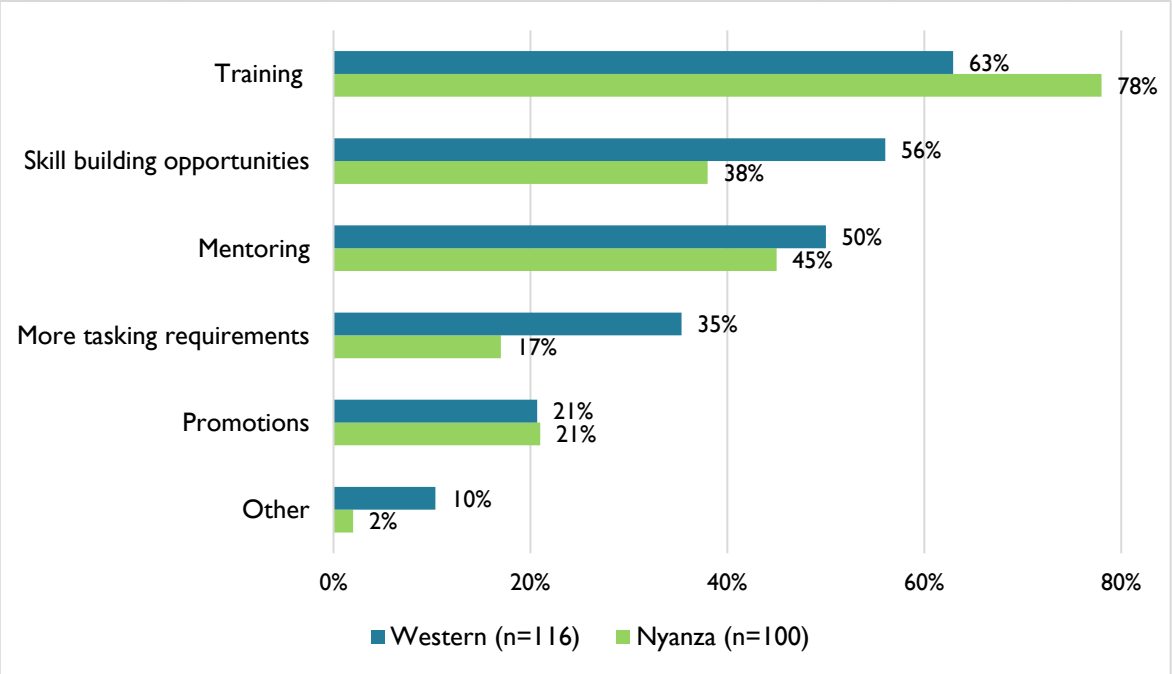



**Figure 2-4. Willingness to reduce profit margin to ensure value to customers**

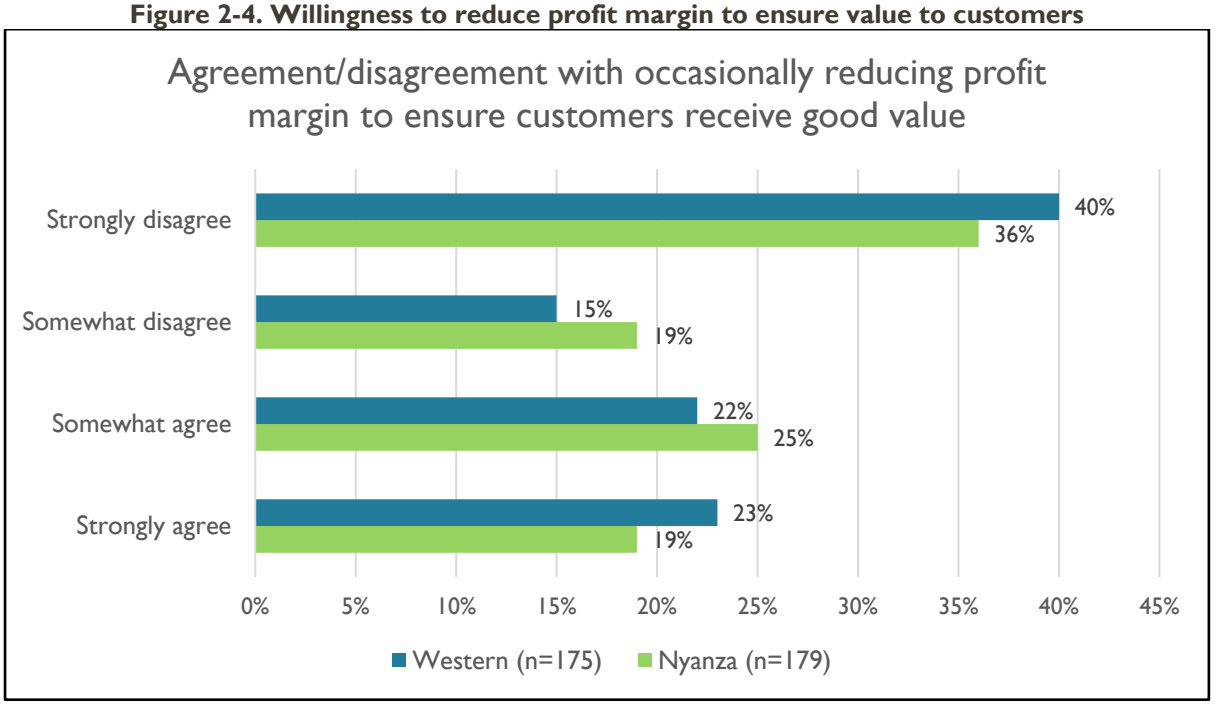
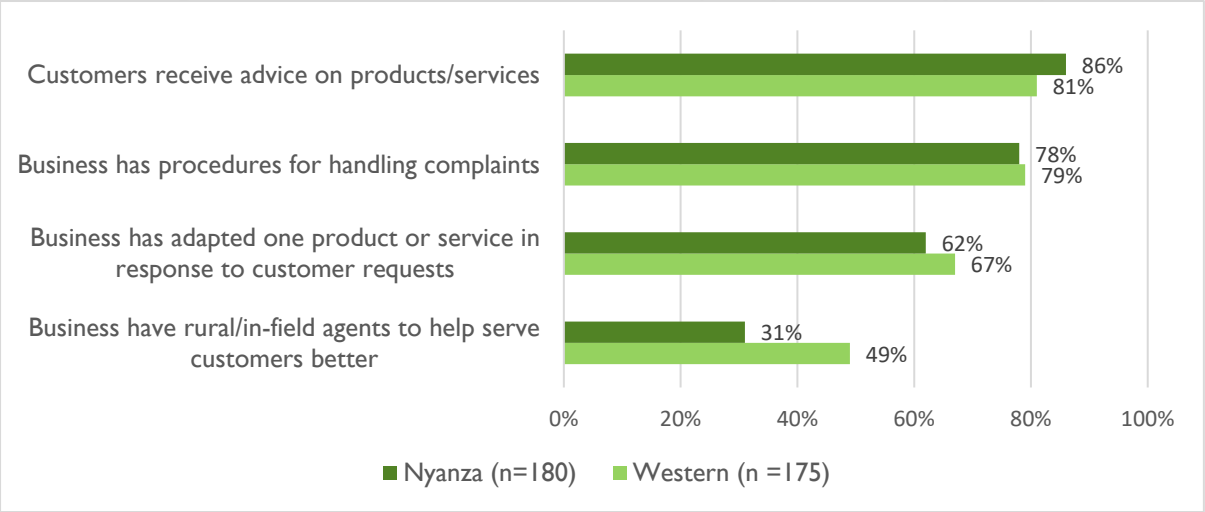


**Figure 2-5. Investment in customer service (multiple selection question)**




## Cooperation

**Figure 2-6. Proportion of producers and petty traders belonging to groups (multiple selection question)**

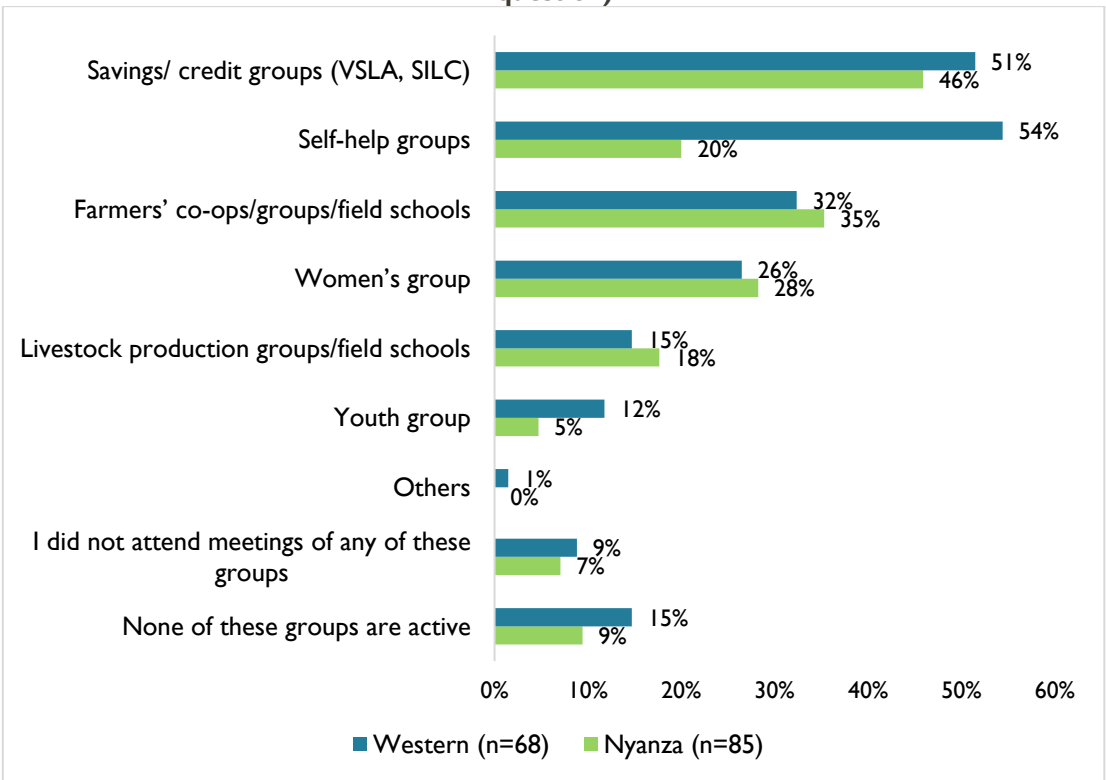


**Figure 2-7. Proportion of businesses that belong to groups/associations (multiple selection question)**

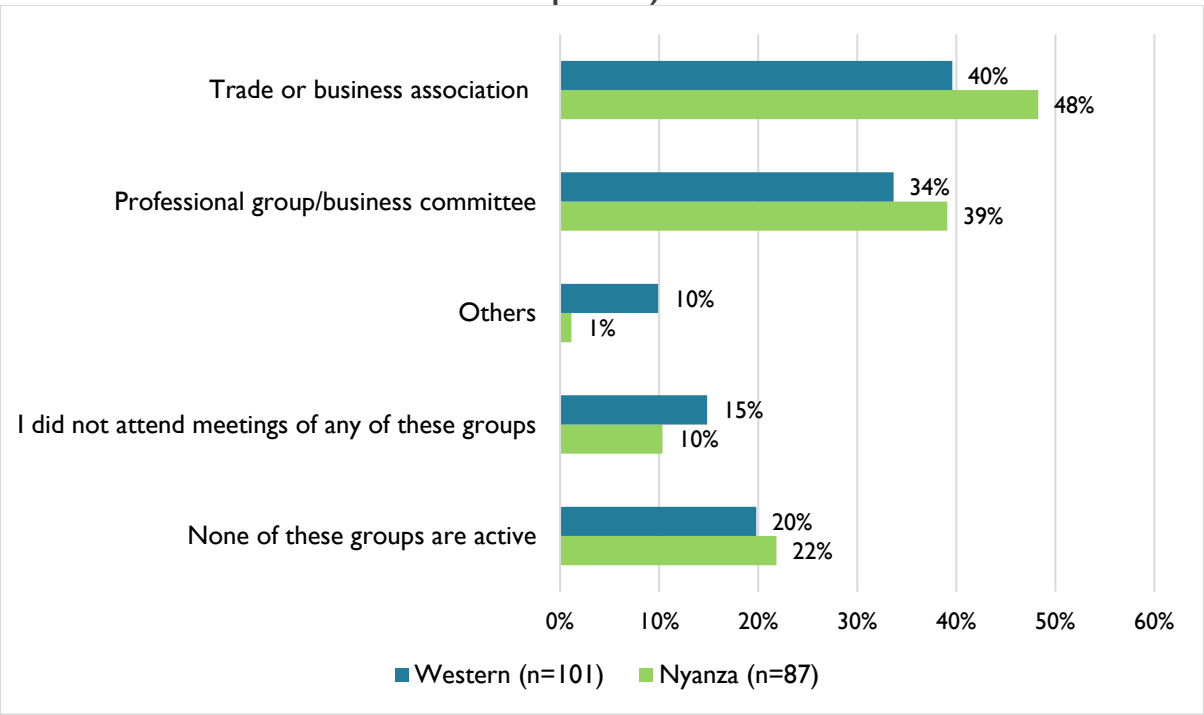



**Table 2-1. Types of cooperation between businesses (multiple selection question)**

| | Nyanza Region (n = 180) | Western Region (n = 175) |
|---|---|---|
| Shared information with at least two other businesses | 72% | 59% |
| Shared services such as transportation, security, processing, storage facility, or advertising | 26% | 42% |
| Jointly purchased products/services to meet a threshold or access volume discounts | 16% | 24% |
| Jointly marketed to provide bundled service or some other benefit to customers | 6% | 17% |
| Jointly advocated to suppliers, government, or others to improve business environment, e.g., seed certification, aggregation | 8% | 19% |
| Did not attend meetings of any of these groups | 18% | 13% |
| None of the above | 23% | 22% |

**Table 2-2. Ways actors provide support to suppliers and service providers (multiple selection question)**

| | Nyanza Region (n = 180) | Western Region (n = 175) |
|---|---|---|
| Access to a steady supply of seeds even in times of drought | 44% | 33% |
| Trained farmers to cultivate resilient pastures that can withstand drought to continuously supply feed | 32% | 33% |
| Access to dairy farming extension services | 29% | 28% |
| Access to artificial insemination services | 19% | 24% |
| Provide them in-kind credit through value chain financing recovered through check-off system | 15% | 25% |
| Access to early warning systems on spread of livestock diseases | 12% | 10% |
| Access to required drugs and vaccinations through farmer cooperatives on credit | 7% | 14% |
| Formation of producer organizations, e.g., cooperatives that actively engage in policy formation | 7% | 11% |
| Credit access to respond to shocks through cooperative-level financial service associations, as well as from other financial service providers | 9% | 1% |
| Access to animal insurance to cushion farmers against losses due to death of animals | 4% | 1% |
| Others | 6% | 14% |

***Competition***

**Table 2-3. Frequency of business agreements between businesses and suppliers/brokers**

| Agreements with suppliers/brokers | Nyanza Region (n = 180) | Western Region (n = 175) |
|---|---|---|
| Frequently | 35% | 26% |
| Occasionally | 26% | 32% |
| Rarely | 24% | 24% |
| Never | 15% | 17% |

**Figure 2-8. Businesses experience on adherence to agreements**

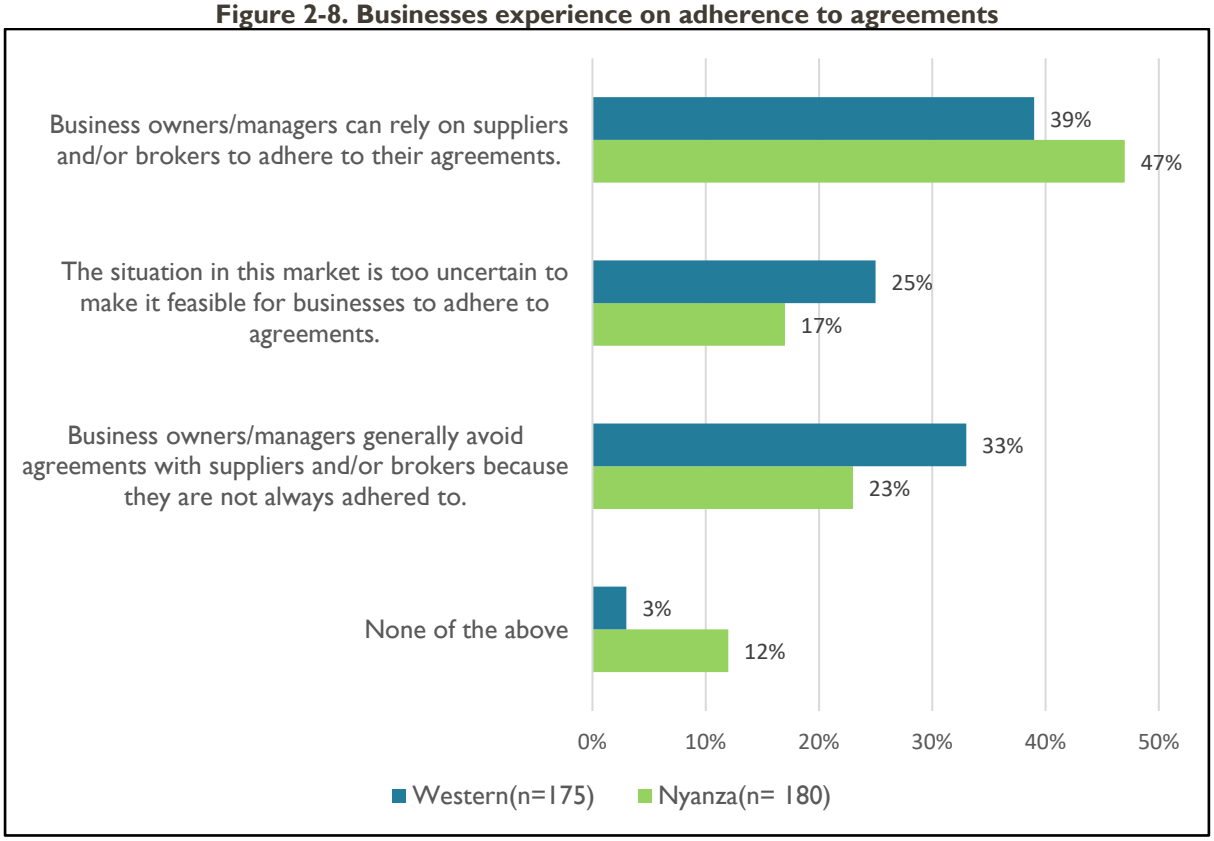
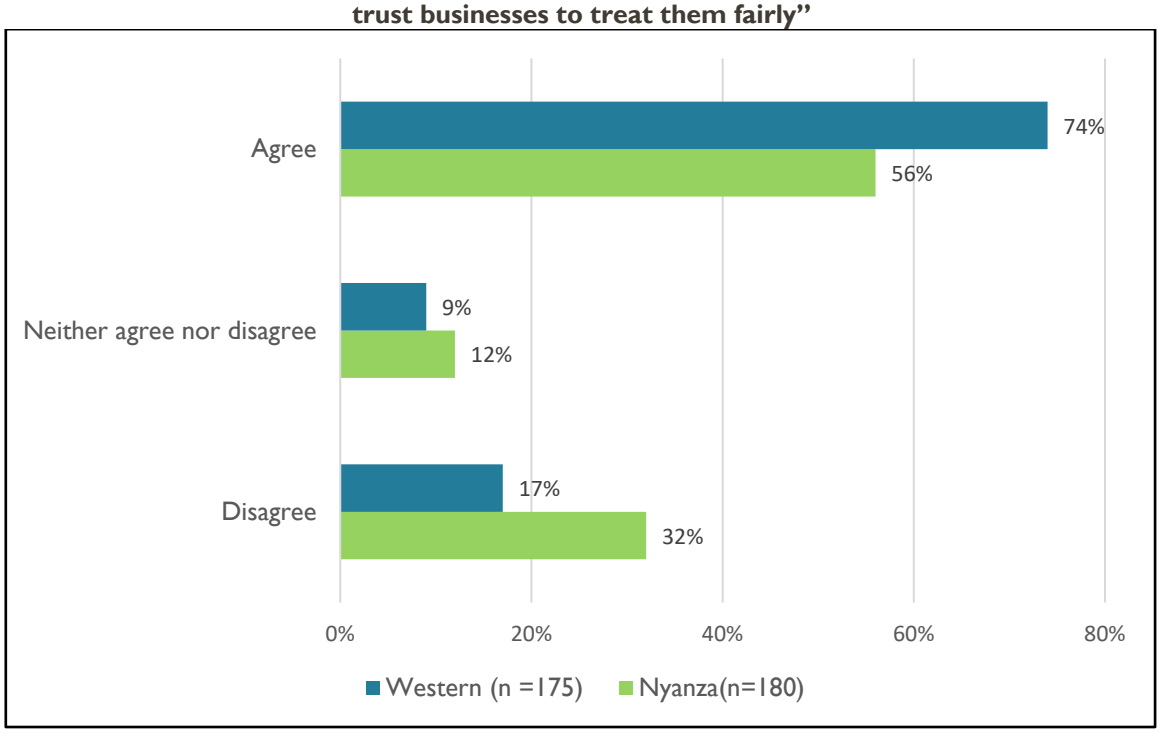



**Figure 2-9. Agreement/disagreement with the statement: "Customers generally hesitate to trust businesses to treat them fairly"**



## Rule of law

**Figure 2-10. Number of disputes witnessed by respondents involving competitors in the market**

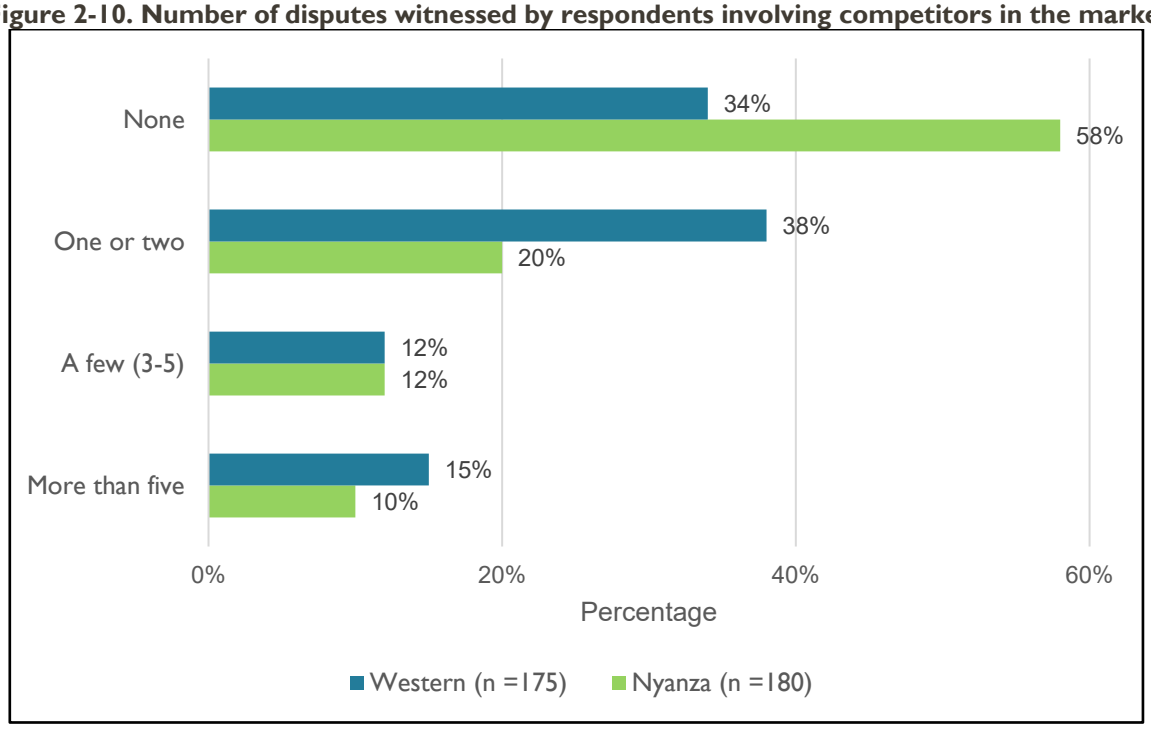



**Figure 2-11. Proportion of disputes settled among competitors**

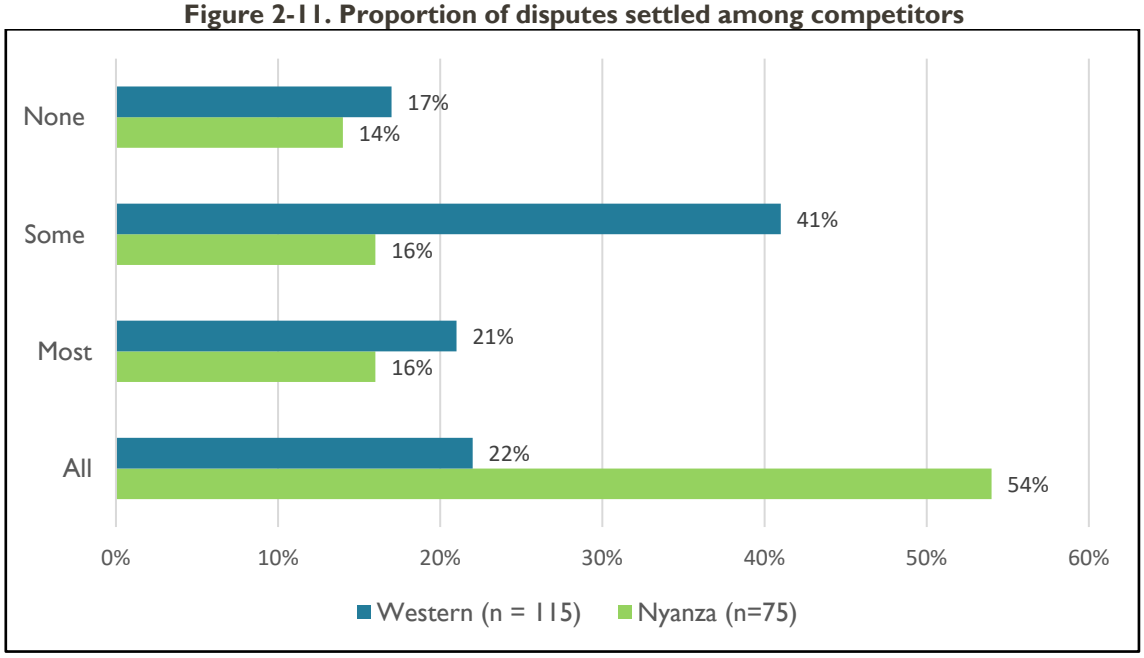


**Figure 2-12. Distribution of responses on portion of disputes settled fairly**

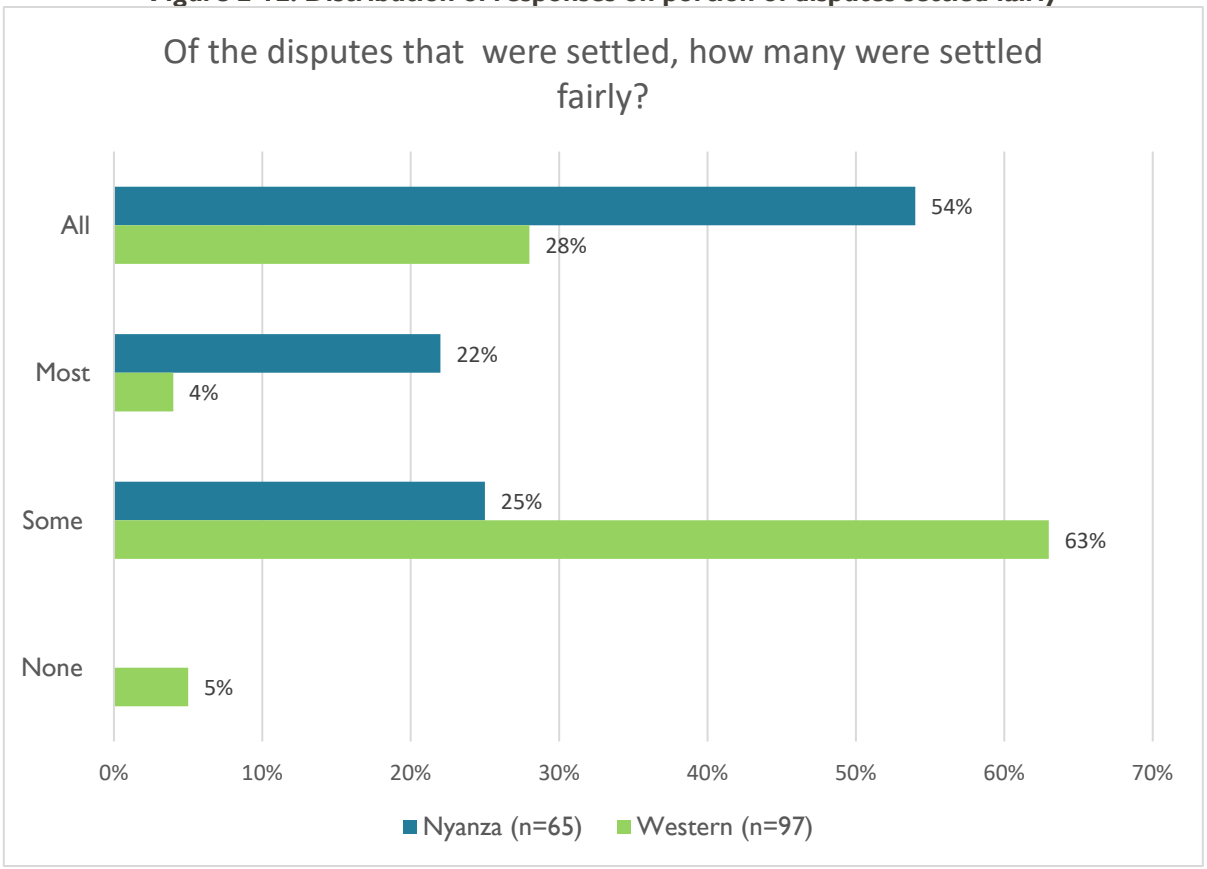
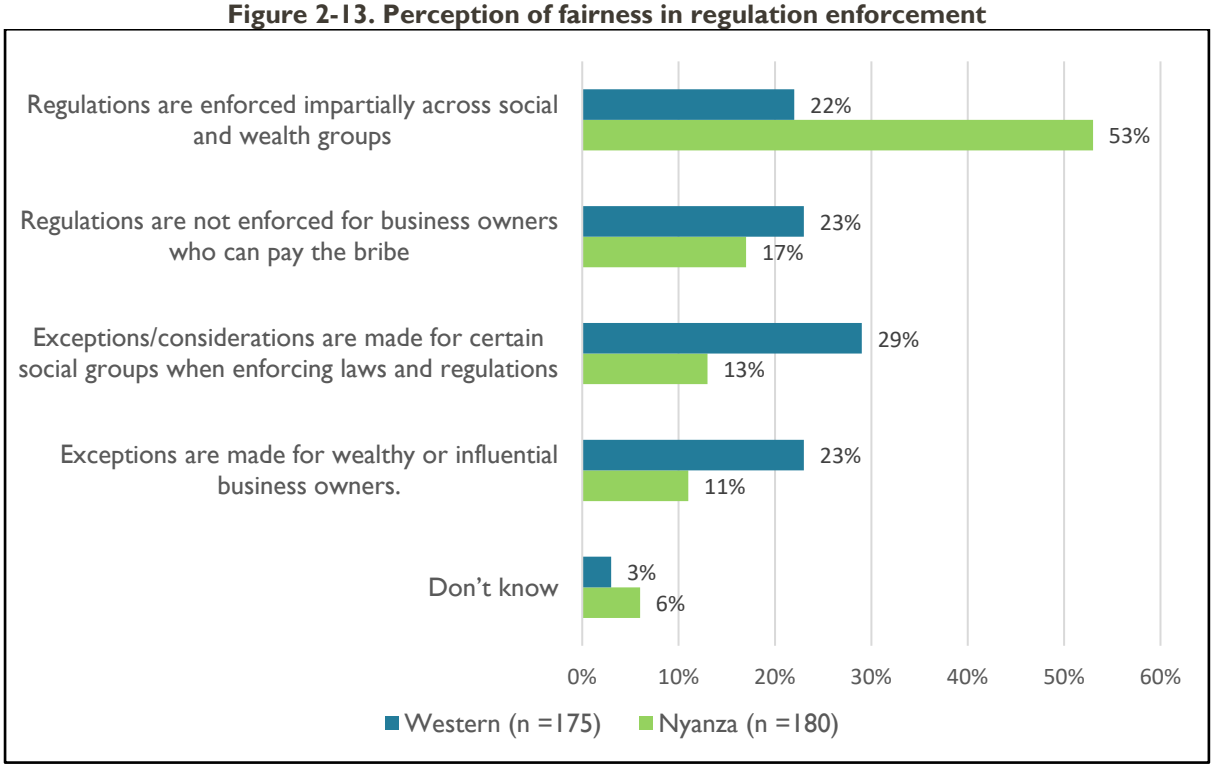



**Figure 2-13. Perception of fairness in regulation enforcement**



## Diversity

**Figure 2-14. Number of channels used to source products and services**

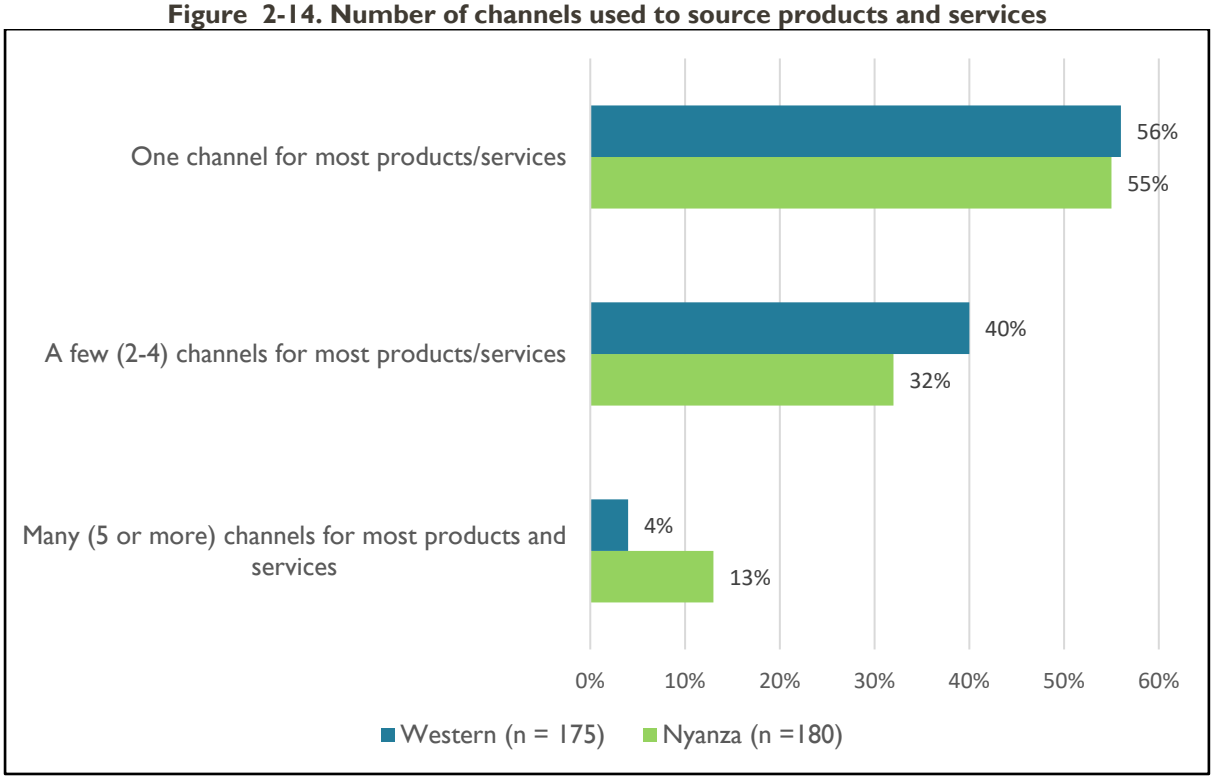



**Figure 2-15. Motivation for dealing with start-ups (multiple selection question)**

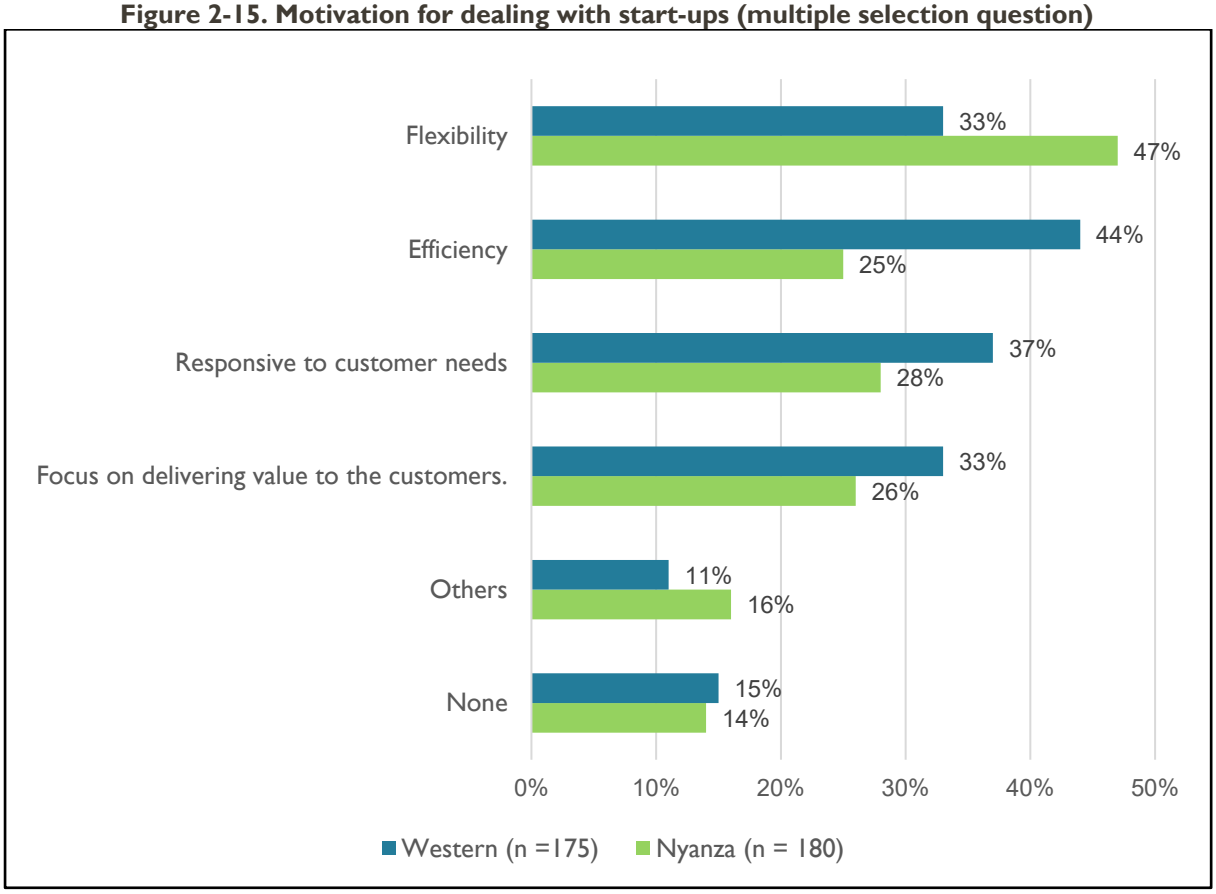


**Figure 2-16. Disadvantages of dealing with start-ups (multiple selection question)**

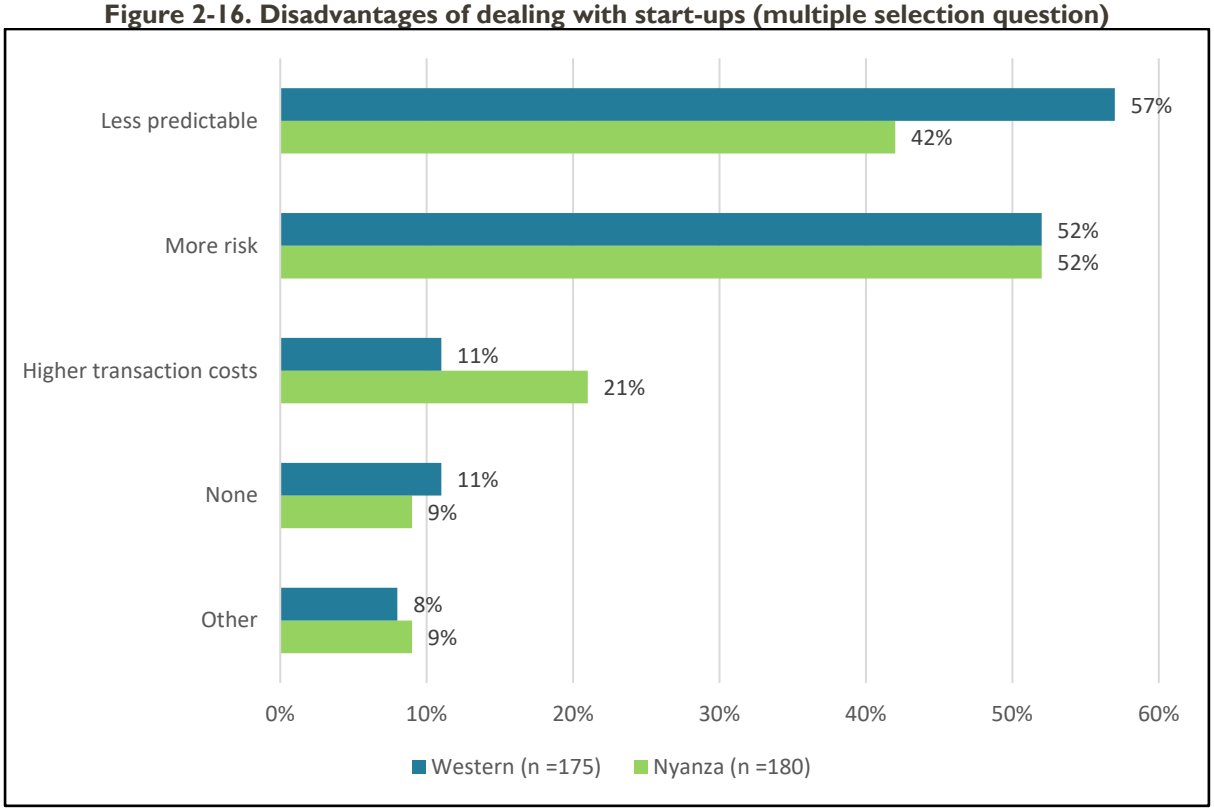



**Table 2-4. Businesses arrangements in the past 12 months (multiple selection question)**

| | Nyanza Region (n = 180) | Western Region (n = 175) |
|---|---|---|
| Business offering a previously unavailable service | 19% | 33% |
| Business offering services accessed via digital means | 16% | 32% |
| Business bundling services/products in a new way | 11% | 26% |
| Business using a previously unavailable franchise model | 1% | 24% |
| None of these businesses | 57% | 47% |
| Other innovative models | 4% | 3% |

## Connectivity

**Figure 2-17. Source businesses used to access formal loans (multiple selection question)**

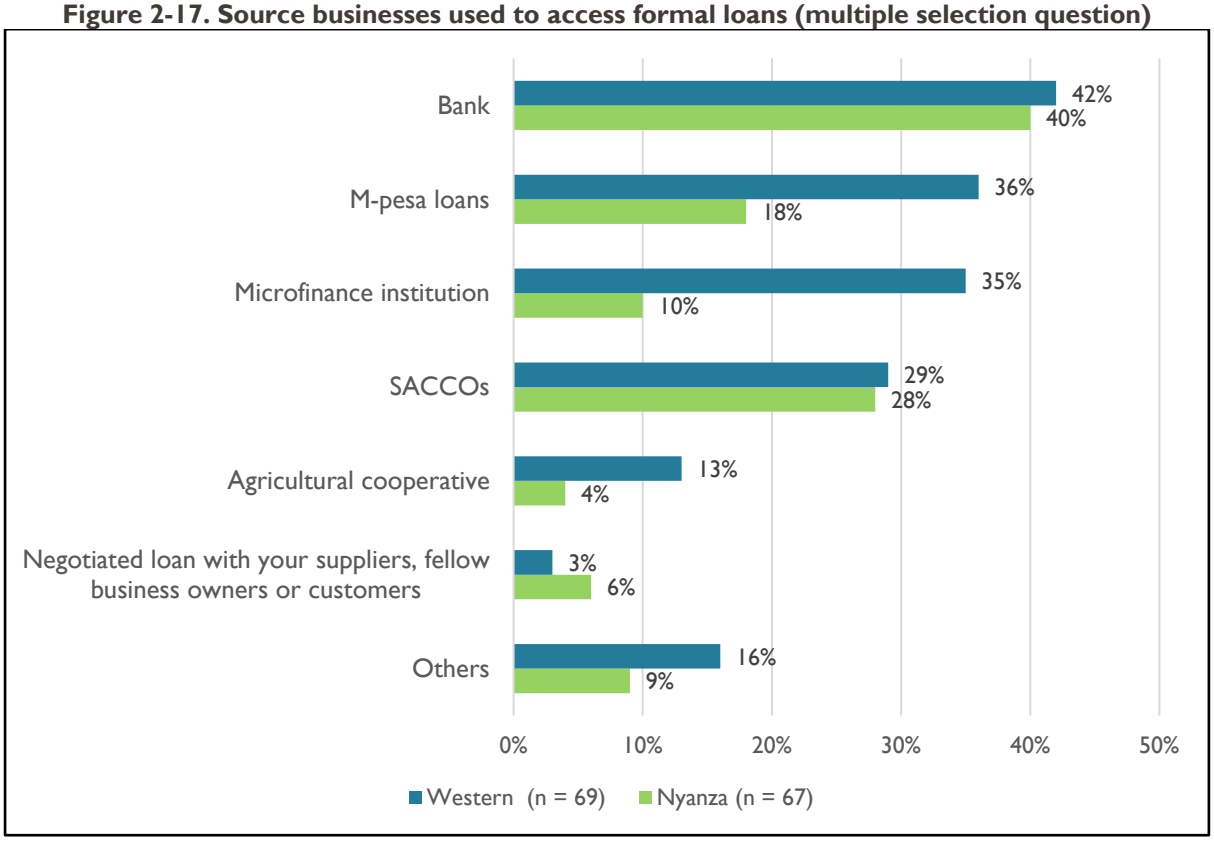


**Figure 2-18. Reasons for not applying for formal loan (multiple selection question)**

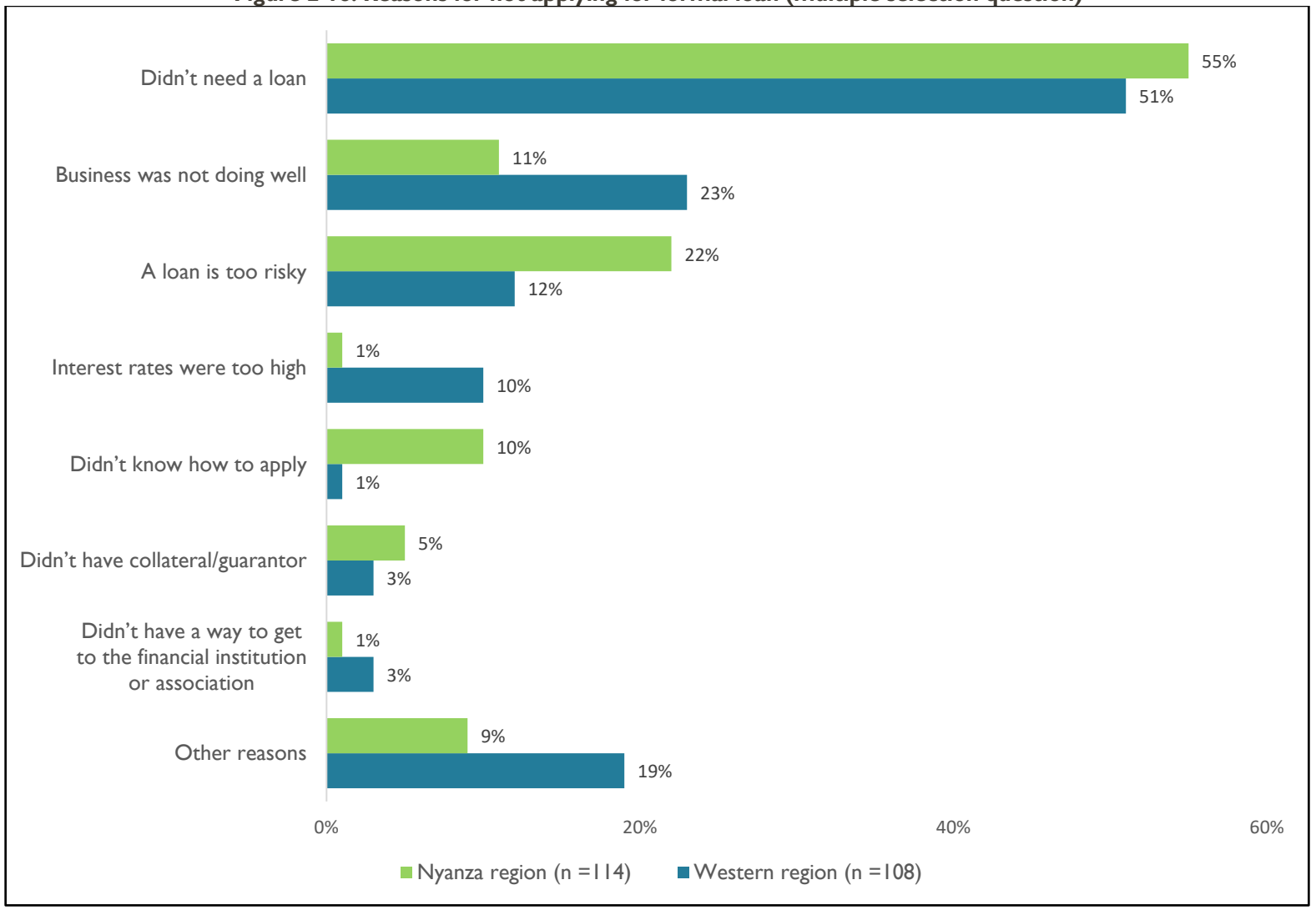
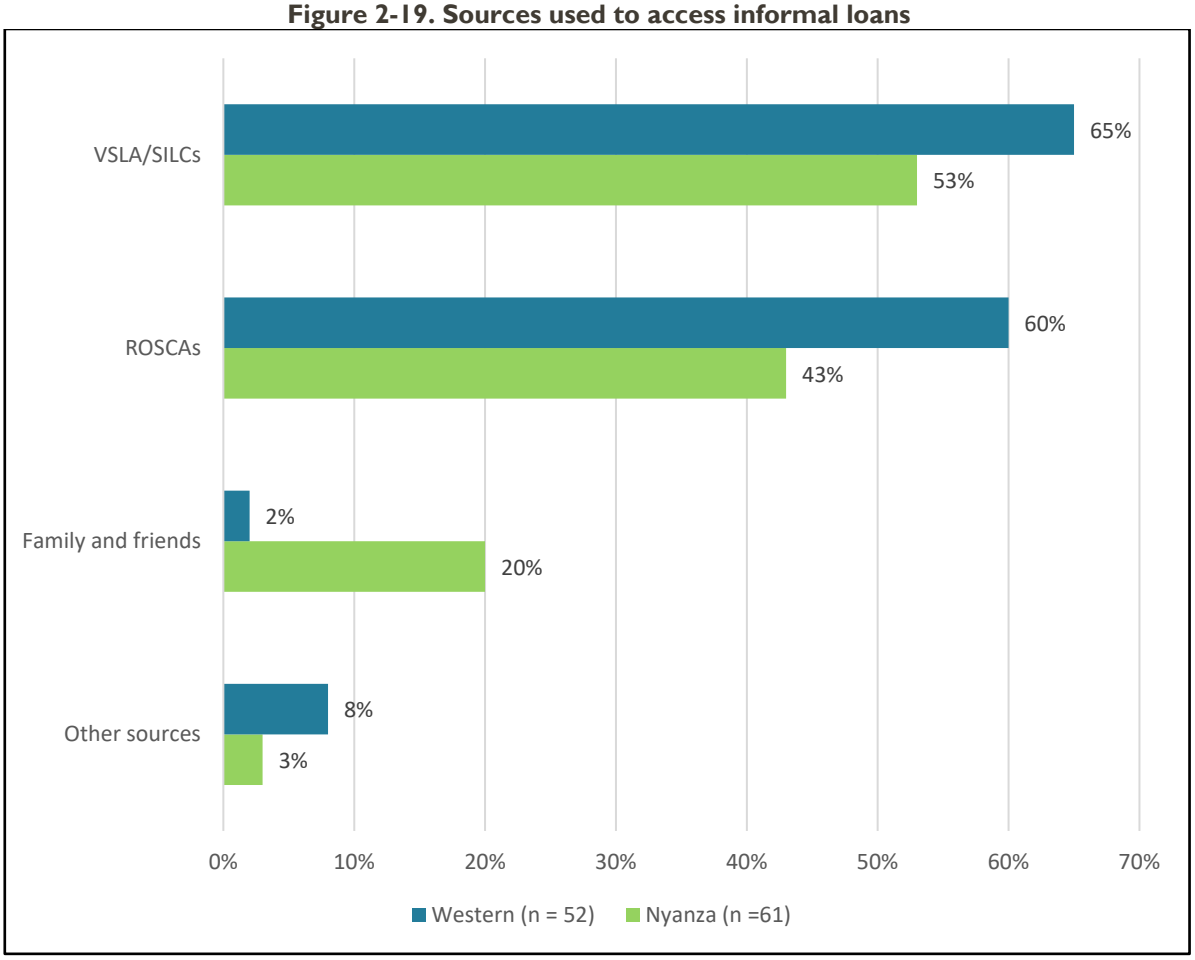


**Figure 2-19. Sources used to access informal loans**





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